EXHIBIT 2

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REVIEW ARTICLE

A systematic review of hormone treatment for children with gender dysphoria and recommendations for research

Jonas F. Ludvigsson[1,2,3] | Jan Adolfsson[4,5] | Malin Höistad[5] | Per-Anders Rydelius[6,†] | Berit Kriström[7] | Mikael Landén[1,8]

[1]Department of Medical Epidemiology and Biostatistics, Karolinska Institutet, Stockholm, Sweden

[2]Department of Paediatrics, Örebro University Hospital, Örebro, Sweden

[3]Division of Digestive and Liver Disease, Department of Medicine, Columbia University Medical Center, New York, New York, USA

[4]Department of Clinical Science, Intervention and Technology, Karolinska Institutet, Stockholm, Sweden

[5]The Swedish Agency for Health Technology Assessment and Assessment of Social Services, Stockholm, Sweden

[6]Department of Women's and Children's health, Karolinska Institutet, Stockholm, Sweden

[7]Department of Clinical Sciences/Paediatrics, Umeå University, Umeå, Sweden

[8]Department of Neuroscience and Physiology, Sahlgrenska Academy at the University of Gothenburg, Gothenburg, Sweden

Correspondence
Mikael Landén, Section of Psychiatry and Neurochemistry, Sahlgrenska University Hospital, Blå Stråket 15, S-431 45 Gothenburg, Sweden.
Email: mikael.landen@neuro.gu.se

Berit Kriström, Department of Clinical Sciences/Paediatrics, Umeå University, S-90185 Umeå, Sweden.
Email: berit.kristrom@umu.se

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Abstract

Aim: The aim of this systematic review was to assess the effects on psychosocial and mental health, cognition, body composition, and metabolic markers of hormone treatment in children with gender dysphoria.

Methods: Systematic review essentially follows PRISMA. We searched PubMed, EMBASE and thirteen other databases until 9 November 2021 for English-language studies of hormone therapy in children with gender dysphoria. Of 9934 potential studies identified with abstracts reviewed, 195 were assessed in full text, and 24 were relevant.

Results: In 21 studies, adolescents were given gonadotropin-releasing hormone analogues (GnRHa) treatment. In three studies, cross-sex hormone treatment (CSHT) was given without previous GnRHa treatment. No randomised controlled trials were identified. The few longitudinal observational studies were hampered by small numbers and high attrition rates. Hence, the long-term effects of hormone therapy on psychosocial health could not be evaluated. Concerning bone health, GnRHa treatment delays bone maturation and bone mineral density gain, which, however, was found to partially recover during CSHT when studied at age 22 years.

Abbreviations: BMD, bone mineral density; CSHT, cross-sex hormone treatment; DXA, dual-energy X-ray absorptiometry; GnRHa, gonadotropin-releasing hormone agonist (analogues); GRADE, grades of recommendation, assessment, development and evaluation; ICD, International Classification of Diseases; MRI, magnetic resonance imaging; SBU, Swedish Agency for Health Technology Assessment and Assessment of Social Services.

Berit Kriström and Mikael Landén have equal contrbution.

[†]Part of the original study group but deceased in December 2021.

Conclusion: Evidence to assess the effects of hormone treatment on the above fields in children with gender dysphoria is insufficient. To improve future research, we present the GENDHOR checklist, a checklist for studies in gender dysphoria.

KEYWORDS
adolescent, bone density, gender dysphoria, gonadotropin-releasing hormone agonist, psychosocial functioning

1 | INTRODUCTION

Gender incongruence refers to a mismatch between the biological sex and perceived gender identity. When gender incongruence causes significant discomfort, it is called gender dysphoria. When gender dysphoria causes clinically significant distress, the condition might meet the diagnostic criteria for transsexualism according to the (international classification of disease) ICD-10 guidelines,[1] or gender dysphoria according to the DSM-5.[2] Gender identity-affirming health care is provided to ease gender dysphoria.[3] The treatment aims to align bodily characteristics with the individual's gender identity, and usually includes cross-sex hormone treatment (CSHT), as well as chest and genital surgery.

In youth with gender dysphoria, gonadotropin-releasing hormone analogues (GnRHa) have been used to inhibit spontaneous puberty development. The rationale is to prevent irreversible bodily changes and give young individuals time to explore their gender identity. Following the first case report in which a GnRHa was used to suppress puberty in a female-to-male transsexual individual,[4] the '"Dutch protocol" was developed.[5] According to this protocol, young pubertal people presenting with gender dysphoria should first undergo a thorough psychological evaluation. If the diagnosis gender dysphoria is confirmed, GnRHa treatment is recommended to start during the early stages of puberty (Tanner stages 2–3). If gender dysphoria subsides, the individual may discontinue GnRHa treatment, at which point spontaneous puberty will restart. If gender dysphoria persists, CSHT might start at age 16 years and sex-reassignment surgery at 18 years. Gender dysphoria in youth was a rare phenomenon when the Dutch multidisciplinary protocol for the treatment of gender dysphoria was introduced. Seeking care for gender dysphoria has since become increasingly common in younger people in many parts of the western world,[6,7] with an exponential rise among children born female.[8] Although not all children with gender dysphoria receive gender identity affirming treatment, there has been an ensuing increase in hormones to treat children with gender dysphoria, of which data on the effects and side effects are limited. There is no previous systematic review or meta-analysis of hormone treatment for children with gender dysphoria.

This systematic review aimed at assessing (a) psychosocial effects, (b) effects on bone health, (c) effects on body composition and metabolism, and (d) satisfaction and therapy persistence in children aged <18 years with gender dysphoria undergoing hormone therapy.

Key Notes

- This systematic review assessed psychosocial effects, bone health, body composition and metabolism, and therapy persistence in children (<18 years of age) with gender dysphoria undergoing treatment with gonadotropin-releasing hormone analogues (GnRHa).
- Long-term effects of hormone therapy on psychosocial health are unknown. GnRHa treatment delays bone maturation and gain in bone mineral density.
- GnRHa treatment in children with gender dysphoria should be considered experimental treatment of individual cases rather than standard procedure.

In this review, trans women are referred to as male-to-female and trans men as female-to-male.

2 | METHODS

2.1 | Preregistration

This systematic review originated from a 2-year commissioned work from the governmental body the Swedish Agency for Health Technology Assessment and Assessment of Social Services (SBU). Ongoing SBU reviews are registered on the SBU website (https://www.sbu.se/en/ongoing-projects/) but not recorded in external databases.

2.2 | Selection criteria

The search was restricted to children aged <18 years with reported gender dysphoria. We included observational studies, randomised controlled trials, and systematic reviews according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines.[9] Case reports, editorials, and non-human studies were excluded from further review. The search was limited to English-language publications.

2.3 | Search strategy

Two professional information specialists at the Swedish Agency for Health Technology Assessment and Assessment for Social Services (SBU) performed a comprehensive search of the following medical databases up until 9 November 2021: CINAHL (EBSCO), Cochrane Library (Wiley), EMBASE (Embase.com), PsycINFO (EBSCO), PubMed (NLM), Scopus (Elsevier), and SocINDEX (EBSCO). They also searched the Campbell Library, Epistemonikos, Evidence Search, International HTA database, as well as three NIHR Centre for Reviews and Dissemination (CRD) databases: Database of Abstracts of Reviews of Effects (DARE), Health, and Technology Assessment (HTA), and NHS Economic Evaluation Database (EED). Finally, we searched PROSPERO, an international prospective register for systematic reviews, to identify any relevant ongoing systematic reviews but found none. The search, selection, and assessment were conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines.[9] The search and selection processes are outlined in Figure 1. Only studies of low or moderate bias were eligible for this review. Full literature search strategy is provided at the SBU web page (https://www.sbu.se/contentassets/4062b596a35c4e1383405766b7365076/bilaga-1-litteratursokning.pdf).

2.4 | Relevance, risk of bias, and quality of evidence

Two independent experts checked all hits for relevance. Relevant studies (based on a pre-defined PICO) were then evaluated for risk of bias, also by two independent experts, according to ROBINS-I (Risk of bias in non-randomised studies of interventions).[10,11] Robins-I assesses possible bias in seven domains: confounding; bias due to selection, measurement classification of interventions, deviations from intended interventions, missing data, measurement of outcomes, and selection of the reported result.

If the two reviewers did not agree on content or quality, the paper was discussed in the larger research team of four experts (JFL, PR, BK, ML). Randomised controlled trials were planned to be assessed by RoB–2.[10,11] To rate the quality of evidence for specific outcomes, we used the Grades of Recommendation, Assessment, Development and Evaluation (GRADE) system.[12] GRADE has four levels of evidence (very low, low, moderate, high) and considers five domains that can decrease the level of certainty one or two levels (risk of bias, imprecision, inconsistency, indirectness (similar to 'external validity'), and publication bias).

2.5 | Data extraction

Two reviewers (MH, JA) retrieved data from the included studies. The data extracted included the outcomes mental and psychosocial health including suicidality, anthropometric measures and metabolism, bone health, adverse events, and the characteristics of each study including age at referral or intake, age at start of GnRHa treatment, age at start of CSHT, number of participants enrolled in study, number of transgender participants, number of hormone treated transgender participants, number of non-transgender participants, number of participants evaluated, treatment type (drugs, dosages, type of administration, treatment frequency), total treatment duration, and total follow-up time. The full data extraction of included studies is provided at the SBU web page (https://www.sbu.se/contentassets/4062b596a35c4e1383405766b7365076/bilaga-3-tabellverk-over-inkluderade-studier.pdf).

2.6 | Statistics

No statistical analyses were performed.

2.7 | Ethics

Ethical approval is not applicable for this systematic review.

3 | RESULTS

3.1 | Identified studies

After duplicate removal, the search yielded 9934 potential studies (Figure 1). Of these, 195 were selected for thorough reading. Of these, 36 were relevant and assessed for risk of bias. Twelve studies were excluded because of high risk for bias, leaving 24 studies with low to moderate, moderate, or moderate to high risk of bias reviewed in this paper. A list of excluded studies is provided at the SBU web page (https://www.sbu.se/contentassets/4062b596a35c4e1383405766b7365076/bilaga-2-exkluderade-studier-med-hog-risk-for-bias.pdf).

3.2 | Characteristics of the 24 studies

All 24 relevant studies had been published since 2014 (Table 1). Study participant age at the start of GnRHa therapy was typically between 11 and 15 years (range 9–18.6 years), with CSHT rarely being introduced before age 15. Except for the Hisle-Gorman et al.[6] ($n=3754$ participants) and Mullins et al.[13] ($n=611$) papers, few studies included >200 individuals. GnRHa treatment often continued for around 2 years, sometimes up to 4 years, and similar treatment durations were observed or reported for CSHT as observations were usually not reported after age 18 years. Full details of included studies are given at the SBU web page. Overall, there were eight studies on GnRH alone, 13 studies on GnRH + CSHT, and three studies on CSHT alone.

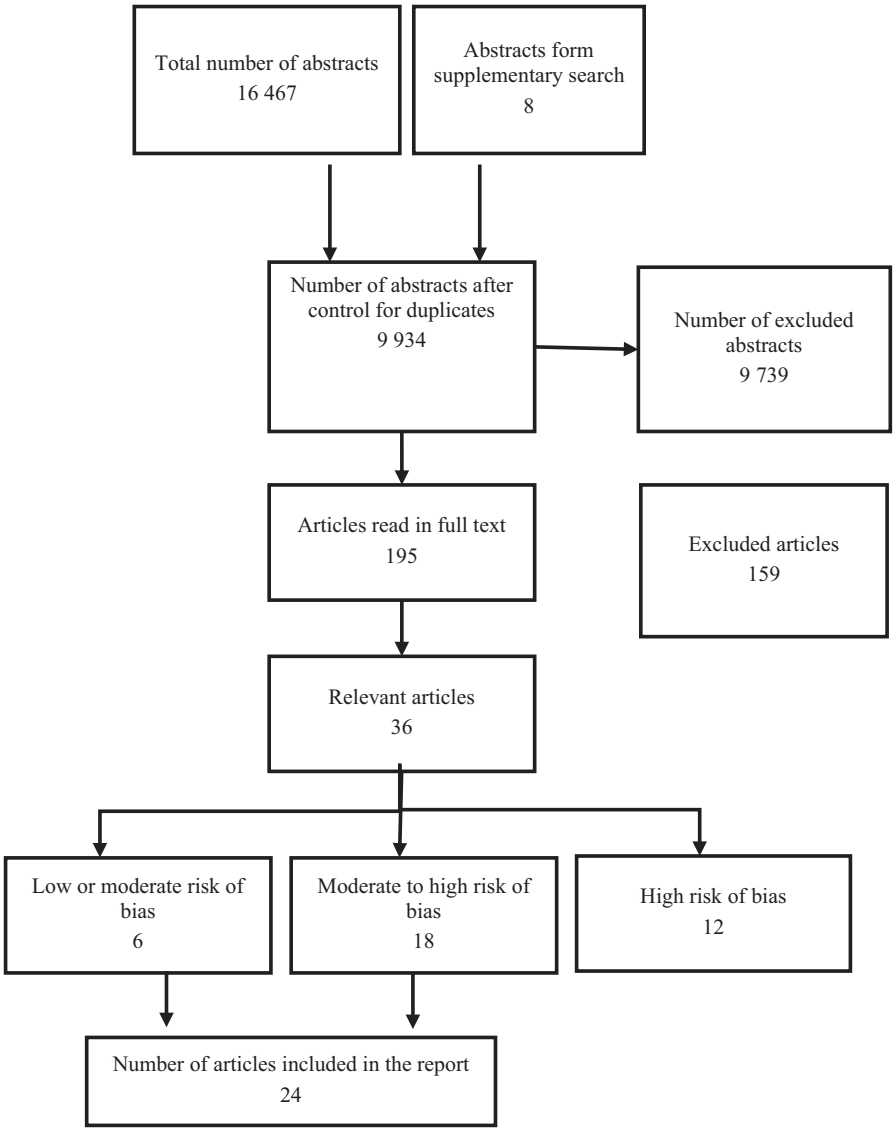

FIGURE 1 PRISMA flow diagram.

3.3 | Psychosocial and mental health

Table 2 outlines the six studies that examined psychosocial outcomes and cognitive effects.[14–19] Three of these studies found significantly improved overall psychosocial function after GnRHa treatment as measured by the Children's Global Assessment Scale (CGAS).[14–16] Two of these studies observed no statistically significant change in gender dysphoria.[15,16] Two of these studies reported significantly improved self-rated quality of life after treatment measured through Kidscreen-27, Short Form-8 (SF-8), Child Behaviour Checklist (CBCL) (parent report), and Youth Self Report (YSR),[16,17] while another study reported no statistically significant differences in anxiety and depression between those who started and not started hormone therapy.[18]

Because these studies were hampered by small number of participants and substantial risk of selection bias, the long-term effects of hormone treatment on psychosocial health could not be evaluated. Of note, the above studies do not allow separation of potential effects of psychological intervention independent of hormonal effects.

3.4 | Cognitive outcomes

We could only identify one study of low-moderate bias on cognitive outcomes in children with gender dysphoria receiving GnRHa therapy.[19] This cross-sectional study from the USA comprised 20 treated (8 male-to-female and 12 female-to-male) and 20 untreated (10 male-to-female and 10 female-to-male) young transgender persons and a control group ($n = 45$). Controls were identified from age-matched family members and friends. The Tower of London task was administered to assess executive functioning. The study neither found differences in cognitive function between treated and untreated transgender persons, nor between treated transgender persons and controls. However, because no before-after GnRHa therapy analyses were performed, the study

TABLE 1 Overview of 24 included studies.

Reference	Ages of patients (years)			Numbers of patients						Interventions			Time: duration and follow-up			Outcomes extracted
	Age at intake range (mean)	Age at start of GnRH range (mean)	Age at start of CSHT range (mean)	*n* referred	*n* TG enrolled	*n* TG HT	*n* TG non-HT	*n* non-TG	*n* TG HT at last FU	GnRH	CSHT	Surgery[b]	GnRH duration range (mean)	CSHT duration range (mean)	Follow-Up time range (mean)	Mental health Bone health Anthropometrics Metabolism
Mental health																
de Vries 2014[14]	11–17 (13.6)	11.5–18.5 (14.8)	13.9–19 (16.7)	196	111	55			32	x	x	x	1 year[a]	4 years[a]		UGDS, global functioning (CGAS), depression (BDI), anxiety (STAI), anger (TPI)
Costa 2015[15]	12–17 (15.5)	13–17 (16.5)		436	201	101	100		35	x			1 year		1.5 years	UGDS, psychosocial functioning (CGAS)
Becker-Hebly 2020[17]		11–17 (15.5)	13–17 (15.5)	434	75	54	21		54	x	x	x	0.5–4 years[a]	0.5–4 years[a]	7–49 months	Global functioning (CGAS), psychosocial functioning (YSR/ASR)
Cantu 2020[18]		11–xx (15)	xx–18 (15)		80	42	38		28	x	x		NR	NR	1–11 months (5 months)	Psychosocial functioning (PHQ-9, GAD-7), acute distress, suicidality
Carmichael 2021[16]		12.0–15.3 (13.6)			44	44			14	x			12–59 months (31 months)		12–36 months	UGDS, CGAS, psychological functioning (CBCL, YSR), Self-harm, BIS, HRQoL (Kidscreen52)
Hisle-Gorman 2021[6]	8–13 (10)		16.6–19.8 (18.2)		3754	963		6603	963	x	x		0.7–2.7 years (1.5)	0.7–2.7 years (1.5)	8.5 years	Mental health diagnosis, psychotropic medication use, medication days, service use
Staphorsius 2015[19]		min 12			41	20	20	45		x			0.6–2.6 years (1.6)			Psychological functioning (CBCL), cognitive function (executive function task)

Reference	Ages of patients (years)			Numbers of patients						Interventions			Time: duration and follow-up			Outcomes extracted
	Age at intake range (mean)	Age at start of GnRH range (mean)	Age at start of CSHT range (mean)	*n* referred	*n* TG enrolled	*n* TG HT	*n* TG non-HT	*n* non-TG	*n* TG HT at last FU	GnRH	CSHT	Surgery[b]	GnRH duration range (mean)	CSHT duration range (mean)	Follow-Up time range (mean)	Mental health Bone health Anthropometrics Metabolism
Bone health																
Joseph 2019[23]		12–14 (13)				70			70	x			1–xx years		up to 2.8 years	Height, weight, BMI BMD, BMAD, Z-score (hip, spine)
Klink 2015[21]		11.4–18.3 (15)	15.6–19 (16)			34			34	x	x	x	0.25–8 years	xx–8 years	up to age 22	Height, BMD, aBMD, Z-score, T-score (femoral neck, lumbar spine)
Vlot 2017[22]		11.5–18.6 (14)	14.0–19.5 (16)		215	70			57	x	x		1–xx years		up to 2 years	Height, BMAD, Z-score (hip, lumbar spine), bone markers (P1NP, OC, ICTP)
Schagen 2020[20]		12.2–16.5 (14)	15.0–17.9 (16)			127			121	x	x		1.5–4 years	3 years		aBMD, Z-score (hip)
Stoffers 2019[24]		11.8–18.0 (16)	14.9–18.4 (17.2)		64	62			15	x	x		3 months–3 years	5 months–3 years	2 years	Height, BP, BMD, Z-score (femoral neck, lumbar spine)
Navabi 2021[25]		13.4–17.4 (15)			198	172			116	x			6 months–2 years		1.5 years	BMD, aBMAD, Z-score (hip, lumbar spine)
van der Loos 2021[26]		11–17	15–17			322			322	x	x	x	1–3 years	2–6 years	up to 4 years	Subperiostal width, endocortical diameter
Lee 2020[27]		9.6–13.4 (11.5)			95	63			63	x			2 months			BMD, aBMAD, Z-score (hip, lumbar spine)
Anthropometrics and metabolism																
Schagen 2016[28]		11.1–18.6 (14)			138	116			77	x			3–12 months		1 year	Height, weight, BMI, lean body mass, liver enzymes, creatinine
Klaver 2018[31]		12.7–17.3[a] (15)	15.3–17.8[a] (16)	489	192	192			192	x	x	x	0.5–2.9 years (1.5[a])	1.6–3.4 years (2.9[a])	age 22	Weight, BMI, total body %, WHR

Reference	Ages of patients (years)			Numbers of patients						Interventions			Time: duration and follow-up			Outcomes extracted
	Age at intake range (mean)	Age at start of GnRH range (mean)	Age at start of CSHT range (mean)	*n* referred	*n* TG enrolled	*n* TG HT	*n* TG non-HT	*n* non-TG	*n* TG HT at last FU	GnRH	CSHT	Surgery[b]	GnRH duration range (mean)	CSHT duration range (mean)	Follow-Up time range (mean)	Mental health Bone health Anthropometrics Metabolism
Klaver 2020[32]		12.8–17.2[a] (14.9)	15.3–17.8[a] (16.6)		192	192			192	x	x	x	0.5–2.9 years (1.5)[a]	1.1–3.4 years (2.5[a])	age 22	BMI, SBP, DBP, glucose, insulin, HOMA-IR, cholesterol, triglycerides
Perl 2020[33]		13.4–15.4 (14)	14.2–16.0 (15)		48	15			15	x	x		2–4 months	2–6 months		BMI, BP
Schulmeister 2021[29]		9.0–14.5 (11.5)			92	55	226		55	x			10–14 months		1 year	Height velocity, BMI, z-score
Nokoff 2021[30]		10.2–14.1 (12)			17	17	31		17	x			0.5–5.8 years			Insulin, glucose HbA1c, HOMA-IR, body fat, % lean mass
Tack 2016[34]			NR (15–17)		45	43			43		x			6–18 months (12)	1.5 years	Height, weight, BMI, triglycerides, cholesterol, suicide, side effects
Jarin 2017[35]		103–xx	xx–25 (16–18)		116	116			116	(x)	x				2 years	BMI, BP, haematocrit, Hb, cholesterol
Mullins 2021[13]			13–24 (17)	1406	611	611			611		x			0.8–2.8 years (1.5 years)	3 years	Haematology, thrombosis, BMI

Note: Number of patients:*n* referred = number of patients referred to gender clinic for evaluation of gender dysphoria (not same at number of patients receiving GD diagnosis)*n* TG enrolled = number of patients enrolled in the study at start*n* TG = number of patients with gender dysphoria*n* TG HT = number of patients with gender dysphoria treated with hormones (GnRH alone, GnRH + CSHT, or CSHT only)*n* TG non-HT = number of patients with gender dysphoria treated NOT with hormones*n* TG HT at last FU = number of patients with gender dysphoria treated with hormones (GnRH alone, GnRH + CSHT, or CSHT only) evaluated at last follow-up time*n* non-TG = number of subjects in study without gender dysphoria (reference population).

Abbreviations: BDI, Beck Depression Inventory; BIS, Body Image Scale; BMAD, Bone Mineral Apparent Density; BMD, Bone Mineral Density; BMI, Body Mass Index; BP, Blood pressure; CBCL, Child Behaviour Checklist; CGAS, Global functioning Children's Global Assessment Scale, [higher scores (>80) indicating better global functioning]; CSHT, Cross-Sex Hormone Treatment/ gender-affirming treatment, testosterone, oestradiol, cyproterone acetate (CA), spironolactone, lynestrenol; GAD-7, Generalised Anxiety Disorder-7; GnRH, Gonadotropin Releasing Hormone analogue: triptorelin; HRQoL, Health Related Quality of Life; HT Hormone treatment, either GnRH, CSHT, or both; PHQ-9, Patient Health Questionnaire-9; SF-8, Short Form-8: (<18 years); STAI, Spielberger's Trait Anxiety; TG, Transgender; TPI, Anger Spielberger's Trait Anger; UGDS, Utrecht Gender Dysphoria Scale, score range 12–60 points [high score = high level of GD]; WHR, Waist-hip ratio; YSR, Youth Self Report: YSR (ages 11–18 years); Adult version (ASR, >18 years), [higher scores reflect higher degree of problems]; NR, not reported.

[a]Calculated by SBU.

[b]Surgery = any kind of gender reassignment surgery (gonadectomy, mastectomy, hysterectomy, laryngeal surgery, hair removal, phalloplasty, vaginoplasty).

TABLE 2 Summary of findings on psychosocial outcomes of puberty-blocking treatment (GnRHa) treatment in children with gender dysphoria.[14–19]

Outcome measures	Number of study participants, description of studies	Main result	"Certainty of evidence"	Deduction in GRADE[a]
Global function	*n* on hormones = 254 *n* evaluated = 113 Four observational cohort studies: one prospective and three retrospective studies[14–17]	Improved global function as assessed with the CGAS	Cannot be assessed	−2 risk of overall bias[b] −2 precision[c]
Suicide ideation	*n* on hormones = 42 *n* evaluated = 28 One prospective observational cohort study with mixed treatment (38 subjects with no pharmacological treatment)[18]	No change in suicide ideation	Cannot be assessed	−2 risk of overall bias[b] −2 precision[c]
Gender dysphoria	*n* on hormones = 145 *n* evaluated = 49 Two prospective observational cohort studies[15,16]	No change in gender dysphoria	Cannot be assessed	−2 risk of overall bias[b] −2 precision[c]
Depression	*n* on hormones = 97 *n* evaluated = 60 Two prospective observational cohort studies of which one included mixed treatment[14,18]	No change in depression	Cannot be assessed	−2 risk of overall bias[b] −2 precision[c]
Anxiety	n on hormones = 97 n evaluated = 60 Two prospective observational cohort studies[14,18]	No change in anxiety	Cannot be assessed	−2 risk of overall bias[a] −2 precision[b]
Cognition	*n* on hormones = 20 *n* evaluated = 20 One study[19]	No change in cognition compared with matched controls	Cannot be assessed	−2 risk of overall bias[b] −2 precision[c]
Quality of life	*n* on hormones = 98 *n* evaluated = 46 Two observational cohort studies, whereof one retrospective[16,17]	1. Improvement in quality of life most pronounced in subjects receiving puberty-blocking hormones, followed by gender-affirming hormone treatment[17] 2. Some improvement[16]	Cannot be assessed	−2 risk of overall bias[b] −2 precision[c]

Abbreviation: CGAS, Children's Global Assessment Scale.

[a]Starting at 4 for optimal studies in each study type.

[b]Selection of study participants is difficult to assess, analysis not based on stage in puberty development.

[c]Few study subjects in each study, heterogeneity in outcome and analyses.

could not investigate potential cognitive effects of hormone therapy.

3.5 | Bone health outcomes

Six longitudinal studies used dual-energy X-ray absorptiometry (DXA) scan technology to explore bone health before and again after some time with GnRHa treatment (Table 3). The second DXA scan usually coincided with CSHT initiation leading to different follow-up durations. The third DXA scan was performed after variable time with CSHT, performed with variable dosing and administration. The lumbar spine and hip were most often examined. One study investigated bone geometry.[20] Six studies were retrospective[21–26] and one study was prospective.[20] An additional study was cross-sectional where study participants in early puberty (Tanner stages 2–3) were examined only once, before the start of GnRHa therapy.[27]

Three studies reported a lower bone mineral density (BMD) in patients before or at start of GnRHa treatment compared with the general population of the same biological sex and age.[21,23,27] During GnRHa treatment, BMD estimated through area or volume, and expressed in z-scores increased less compared with general population reference values. However, the mean absolute BMD remained unchanged up to 2–3 years of GnRHa treatment.[20,23] The initiation of CSHT stimulated bone maturation and mineral accrual, increasing BMD.[21,22] After a median CSHT duration of 5.4 years in in female-to-male and 5.8 years in male-to-female, the lumbar spine mean areal BMD z-score was still significantly lower than at the start of GnRH therapy, while the other volume BMD and femoral neck estimates had normalised.[21] In another study, female-to-male receiving testosterone replacement therapy for 1–2 years had not regained their group mean BMD z-score registered at the start of GnRHa therapy.[24]

Bone geometry, estimated as subperiosteal width and endocortical diameter, was studied on DXA scans before start of GnRHa

TABLE 3 Summary of effects on bone development by puberty-blocking treatment (GnRHa) followed by CSHT in children with gender dysphoria.[20–25]

Outcome measures	Number of study participants, description of studies	Main Result	"Certainty of Evidence"	Deduction in GRADE[a]
Bone density during puberty-blocking hormonal treatment (g/cm^2, g/cm^3)	*n* on hormones = 363 *n* evaluated = 297 Five observational cohort studies (four retrospective and one prospective)[20–24]	Unchanged bone density (DXA measurement)	⊕⊕◯◯ Low certainty	–1 risk of overall bias[b] –1 precision
Bone density during puberty blocking hormonal treatment in relation to reference data in the literature (z-score)	*n* on hormones = 408 *n* evaluated = 292 Five observational cohort studies (four retrospective, and one prospective)[21–25]	Decreased increase in bone density over time	⊕⊕◯◯ Low certainty	–1 risk of overall bias[b] –1 precision
Bone density after 1–3 years (up to 22 years of age) of CSHT, which had been preceded by puberty-blocking hormonal treatment in relation to reference data in the literature	*n* on hormones = 268 *n* evaluated = 165 Three observational cohort studies (two retrospective and one prospective)[21,24,25]	After group median five years with CSHT, bone density recovered in hip but not in lumbar spine compared to data at start of treatment (z-score)	⊕⊕◯◯ Low certainty	–1 risk of overall bias[b] –1 precision

Abbreviations: CSHT, Cross-sex hormone treatment; DXA, Dual-Energy X-ray Absorptiometry.

[a]Starting at 4 for optimal studies in each study type.

[b]Analysis not based on stage in puberty development.

treatment and after at least two years on CSHT and compared with reference values of the general population: the bone geometry resembled the reference curve for the experienced sex only when GnRHa was started during early puberty. Bone geometry estimates in those who started GnRHa treatment during mid and late puberty remained within the reference curve of the biological sex.[26]

3.6 | Body composition and metabolic markers

GnRHa treatment effectively reduced endogenous sex hormone serum levels (Table 4). DXA scans after 1 year of GnRHa treatment revealed increased fat mass and reduced lean body mass.[28] Longitudinal growth depends on bone maturity (bone age) of those in the study group. Ongoing pubertal growth spurt will be arrested when GnRHa therapy is started, reducing the growth velocity to the prepubertal rate.[29]

Nokoff et al studied body composition and insulin sensitivity during 1 year of GnRHa therapy.[30] In addition to body composition, metabolic effects as insulin sensitivity during CSHT, and changes in blood pressure during testosterone therapy were examined.[31–33] Of these studies, three originated from Amsterdam.[29,32,33] The Amsterdam studies included observations during GnRHa therapy,[28] 1 year after starting CSHT,[32] as well as after a group median >5 years with CSHT in a cohort of 22-year-old adolescents.[31,33] The studies from Amsterdam were generally larger than the other studies. CSHT changed body composition towards the affirmed sex.[31,32] Obesity (defined as BMI >30 at age 22 years) was more prevalent in the transgender population[33] (Table 4).

3.7 | CSHT in children without prior GnRHa treatment

We were able to identify three studies of low-to-moderate bias examining CSHT in children without prior GnRHa treatment.[13,34,35] All were retrospective longitudinal studies. Because the number of study participants was small, studies were deemed to have low external validity, and because the studies examined different outcomes (e.g., lipid serum levels, Hb, blood pressure, metrorrhagia), it was not possible to draw any overall conclusions from these studies. Although the Mullins et al. paper[13] included several individuals at elevated risk of arterial or venous thrombosis, no cases of thrombosis were reported.

4 | DISCUSSION

We performed an extensive literature search to examine psychosocial and cognitive outcomes as well as metabolic and bone health in children with gender dysphoria taking hormone therapy. No randomised controlled trials were found, but we could identify 24 relevant observational studies. However, these were limited by

TABLE 4 Summary of findings of puberty-blocking (GnRHa) hormone treatment on anthropometric measures, body composition, and metabolism in children with gender dysphoria.[28–33]

Outcome measures	Number of study participants, description of studies	Main result	"Certainty of Evidence"	Deduction in GRADE[a]
Anthropometric measures	*n* on hormones = 192 *n* evaluated = 192 One retrospective observational cohort study[31]	Increased weight and body mass index	Cannot be assessed	−2 risk for overall bias[b] −1 precision[c] −1 indirectness[d]
Body composition	*n* on hormones = 325 *n* evaluated = 286 Two prospective observational cohort studies and one controlled cross-sectional study[28,30,31]	Decreased lean body mass	Cannot be assessed	−2 risk for overall bias[b] −1 precision[c] −1 indirectness[d]
Metabolic measures	*n* on hormones = 209 *n* evaluated = 209 One retrospective observational cohort study and one controlled cross-sectional study[30,32]	No change in serum lipids or blood pressure Increased insulin level in MtF Decreased insulin sensitivity	Cannot be assessed	−2 risk for overall bias[b] −1 precision[c] −1 indirectness[d]
Blood pressure	*n* on hormones = 15 *n* evaluated =15 One retrospective observational cohort study[33]	Change in blood pressure	Cannot be assessed	−2 risk for overall bias[b] −1 precision[c] −1 indirectness[d]
Growth (cm/year)	*n* on hormones = 55 *n* evaluated = 55 One prospective multicentre observational GnRHa treatment cohort study[29]	Reduced growth velocity	Cannot be assessed	−2 risk for overall bias[b] −1 precision[c] −1 indirectness[d]

[a]Starting at 4 for optimal studies in each study type.

[b]Selection of study participants is difficult to assess. Analysis not based on stage in puberty development.

[c]Few study subjects in each study, hence there is heterogeneity in outcome and analyses.

[d]Single study. In this context, 'indirectness' is similar to 'external validity'.

methodological weaknesses, for instance lack of or inappropriate control group, lack of intra-individual analyses, high attrition rates that precluded conclusion to be drawn. The exception being that children with gender dysphoria often had lower group mean values for BMD already prior to GnRHa treatment, and that GnRHa treatment delays the physiologically occurring BMD gain during pubertal sex hormone stimulation. However, this GnRHa-induced delay in BMD gain is almost fully compensated for by later ensuing CSHT. Although study participants were followed up to 22 years of age, the observed remaining deficit may depend on the limited study group size or on too short observation time.[21]

Our review highlights several specific knowledge gaps in gender dysphoria that are important to bridge not least given the recent increased incidence in many countries.[6,7] First, randomised controlled trials are lacking in gender dysphoria research. We call for such studies, which may be the only way to address biases that we have noted in the field. Given the current lack of evidence for hormonal therapy improving gender dysphoria, another ethically feasible option would be to randomise individuals to hormone therapy with all study participants, independent of intervention status, receiving psychological and psychosocial support. However, controlled trials do not necessarily require placebo treatment, but could for example build on the date or time of starting hormonal therapy to generate comparison groups. However, it should also be noted that this is a highly vulnerable population.

A second limitation concerns the statistical management of data. In the reviewed studies, observational data have frequently been analysed at a group level where intra-individual changes would have been more appropriate. Intra-individual analyses would allow for a better understanding of how subgroups of individuals respond (both positively and negatively) to hormone therapy. Group-level analyses are sensitive to selection bias because of high drop-out rates: The group studied at the end of the study is a selection of the group studied at baseline, which increases indirectness (reduces external validity). Moreover, it is important to analyse the distribution of individual data to be able to identify outliers who may be at risk for severe consequences of treatment.

Third, many studies only present data on chronological age but fail to account for puberty stage and biological age. This is a concern because the main purpose of GnRHa treatment is to suppress puberty and, with that, biological ageing.

Fourth, long-term studies are lacking. The duration of GnRHa treatment and CSHT was rarely >4 years. The absence of long-term studies is worrying because many individuals start treatment as minors (<18 years) and CSHT is lifelong. Fifth, individuals who stop GnRHa treatment before the start of CSHT need to be described and followed up. Sixth, some of the findings underlying this review are old, and studies reflecting the changing demographics of individuals seeking care for gender dysphoria are warranted.

TABLE 5 The GEnder Dysphoria HORmone treatment (GENDHOR) checklist.

	Recommendations
Aim	Describe the aim of the study
Study participants:	
Cases/exposed	Define gender dysphoria in your study, including the assessment tools used. Define eligibility criteria for your study (including chronological age, bone age or puberty stage, according to Tanner or Prader (when study concerns adolescents), biological sex, perceived gender identity, psychiatric and somatic comorbidities, medications at baseline). List exclusion criteria (diagnoses). List ages of participants at the start of each treatment (including absolute age ranges).
Comparators/ unexposed	Clarify how controls were selected (were controls recruited from the general population?) or whether national/ regional reference data (for instance, Z-scores) were used instead of individual controls.
Study design	Describe the study design: Cross-sectional, retrospective, prospective; case–control (and if nested), cohort study, randomised clinical trial.
Setting	Describe the setting of the study. Were study participants included at a tertiary centre or from the general population? Describe the catchment area/population of participating centres.
Intervention	Hormone treatment Describe whether GnRHa, anti-androgens, CSHT, or a combination was used. List generic names, mode of administration, and dosages of all treatments. Specify the treatment duration of each treatment. If hormone serum concentrations are studied, include the standard procedure for the timing of blood samples to hormone intake. If patients undergo surgery, clarify the type of surgery and number of participants undergoing each surgical procedure (gonadectomy, mastectomy, laryngeal surgery, vaginoplasty/phalloplasty, etc.). Clarify if any participant received psychiatric counselling before, or during the study, including total duration and frequency of counselling.
Variables	Define each variable (including co-variates) and its source. If possible, mention any effort to validate the variables.
Data measurement	Clarify who collected the data on study participants. Present time between first and second measurements if your study is longitudinal and includes "before-after" measurements in relation to the intervention. Mention if study participants had previously been included in other studies with a different aim or examining other outcomes.
Blinding	Describe if the data collectors were blinded to participant status/treatment or not.
Loss to follow-up	Indicate the number of participants discontinuing GnRHa/ CSHT and the reason(s) for discontinuation, including no longer wish to pursue gender reassignment treatment. Describe loss to follow-up/missing data
Statistical methods	Describe statistics according to a relevant checklist. Consider when applicable: Intra-individual changes (mean, SD, median, range) vs. between-group differences.
Descriptive data	In addition to usual demographic, clinical, social/socioeconomic information, report body mass index (BMI), smoking, use of oral contraceptives (type) or other hormonal treatment, puberty stage. Report any psychiatric illness at baseline, as well as the use of psychotropic medication. Describe other comorbidities, including disorders that could be considered contraindications for either hormone treatment or surgery. Specify follow-up time (median, mean) since the start of the intervention and since start of hormone treatment (define intervention start).
Outcome data	Specify main outcome of the study. Indicate all secondary outcomes, including adverse events.
Adverse events/ complications	Describe all adverse events.
Main results	Present absolute numbers. Calculate absolute and relative risks/Intraindividual effects/change and group mean/ median. Present incidence data. Describe any adjustment for potential confounders.
Limitations	Discuss limitations of your study, including limitations of the measurements used (e.g., DXA) and sources of potential bias or imprecision.
Generalisability/ external validity	Can data be generalised to individuals with gender dysphoria outside your study centre and the study country?
Conflict of interest	Report any conflict of interest.

Note: Based on our literature review, we created a *GEnder Dysphoria HORmone treatment checklist* (GENDHOR).

This list consists of recommendations that researchers may consider when planning a study of gender dysphoria, whether observational or interventional.

Abbreviations: CSHT, Cross-sex hormone treatment; DXA, Dual-Energy X-ray Absorptiometry; GnRHa, Gonadotropin-releasing hormone agonist (analogues).

Finally, we could not evaluate the frequency of individuals who drop out from GnRHa treatment and no longer wish to continue with gender transition. However, a follow up study was published after our literature search.[36] Of 720 children (31% born male and 69% born female) who started GnRHa treatment in adolescence, 98% continued to use hormone treatment into adulthood, which suggests that children generally continue with gender transition once they have started GnRHa treatment. We know from internet-based surveys that detransitioning exists,[37] but such studies cannot provide reliable estimates of detransitioning frequency because of selection bias. Studies that closely follow individuals who start GnRHa therapy and/or CSHT until at least age 30 are urgently needed. We also acknowledge there are other potential side effects from GnRHa therapy or CSHT that were not included in our review such as alopecia and abscesses from injections.[38]

Due to limitations in reporting of data, previous published studies in this field repeatedly contain insufficient details on drug administration and dosages, treatment duration, and the type of surgery performed. Some of these limitations will be partly remedied by the introduction of the new ICD version 11, and the Utrecht criteria,[39] but the field also urgently needs high quality longitudinal studies that not only assess medical outcomes but also those outcomes that matter most for affected individuals. Building on the identified limitations in previous research, we compiled a checklist to improve gender dysphoria research ("GENDHOR", Table 5). The aim of this checklist is not to replace existing research guidelines, but using it together with existing guidelines might support researchers and peer reviewers, and ultimately benefit patients and their families.

Last, there have been studies in this field published after the date of our literature search (9 November 2021). These have not been added to this study in order to not depart from the systematic approach. We nevertheless wish to comment on some of the publications. First, the National Institute for Health and Care Excellence in England (NICE) conducted evidence reviews of GnRHa[40] as well as CSHT[41] for children with gender dysphoria, which were independent from our work. The conclusions generally align with our findings. Second, Chien et al.[42] recently published a prospective study of psychosocial functioning during 2 years after initiation of CSHT in youths (12–20 years of age) with gender dysphoria. Of 315 participants, 162 completed that study. Life satisfaction increased, and depression and anxiety scores decreased, among biological females but not biological males. The strongest finding was a moderately improved appearance congruence. No information on concomitant psychological or psychopharmacological therapy was provided.

5 | CONCLUSION

This systematic review of almost 10 000 screened abstracts suggests that long-term effects of hormone therapy on psychosocial and somatic health are unknown, except that GnRHa treatment seems to delay bone maturation and gain in bone mineral density.

AUTHOR CONTRIBUTIONS

Study concept and design: All authors. Acquisition of data: Malin Höistad, Jan Adolfsson. Drafting of the manuscript: All authors. Interpretation of data and critical revision of the manuscript for important intellectual content: All authors. Administrative, technical, or material support: Jan Adolfsson, Malin Höistad. Funding acquisition: the Swedish agency for technology assessment and assessment for social services.

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Information specialists Klas Moberg and Hanna Olofsson designed and performed the literature search.

FUNDING INFORMATION

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CONFLICT OF INTEREST STATEMENT

JFL coordinated an unrelated study on behalf of the Swedish inflammatory bowel disease quality register (SWIBREG) that received funding from the Janssen Corporation. JFL has also received financial support from Merck Sharp & Dohme developing a paper reviewing national healthcare registers in China. JFL is currently discussing potential research collaboration with Takeda. ML has received lecture honoraria for Lundbeck pharmaceuticals and served as consultant for AstraZeneca. The other authors report no conflict of interest.

The data collection of this study was funded by the Swedish agency for technology assessment and assessment for social services. JA and MH are employees at this agency.

ORCID

Jonas F. Ludvigsson https://orcid.org/0000-0003-1024-5602
Jan Adolfsson https://orcid.org/0000-0003-2992-1869
Malin Höistad https://orcid.org/0000-0002-2312-3885
Per-Anders Rydelius https://orcid.org/0000-0002-1923-0282
Berit Kriström https://orcid.org/0000-0002-5456-2514
Mikael Landén https://orcid.org/0000-0002-4496-6451

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EXHIBIT 3

IN THE UNITED STATES DISTRICT COURT
FOR THE MIDDLE DISTRICT OF TENNESSEE
Nashville Division

L.W., by and through her parents and next friends, Samantha Williams and Brian Williams, et al. Plaintiffs, v. JONATHAN SKRMETTI, in his official capacity as the Tennessee Attorney General and Reporter, et al., Defendants.	Civil No. 3:23-cv-00376

EXPERT DECLARATION OF JAMES CANTOR, PhD

Table of Contents

I. Credentials and Qualifications

A. Education and professional background

1. I am a sexual behavior scientist, with an internationally recognized record studying the development of human sexualities, and an expert in research methodology of sexuality. My curriculum vitae is attached as Appendix 1 to this report. My publication record includes both biological and non-biological influences on sexuality, ranging from pre-natal brain development, through adulthood, to senescence. The primary, but not exclusive, focus of my own research studies has been the development of atypical sexualities. In addition to the studies I myself have conducted, I am regularly consulted to evaluate the research methods, analyses, and proposals from sexual behavior scientists throughout the world. The methodologies I am qualified to assess span the neurochemical and neuroanatomic level, individual behavioral level, and social and interpersonal levels.

2. I am trained as a clinical psychologist and neuroscientist, and I am the author of over 50 peer-reviewed articles in my field, spanning the development of sexual orientation, gender identity, hypersexuality, and atypical sexualities collectively referred to as *paraphilias*. Although I have studied many atypical sexualities, the most impactful of my work has been MRI and other biological studies of the origins of pedophilia. That work has revolutionized several aspects of the sex offender field, both with regard to the treatment of offenders and to the prevention of sexual abuse of children. In 2022, I received the Distinguished Contribution Award from the Association for the Treatment and Prevention of Sexual Abuse in recognition of my research and its integration into public policy. My efforts in this regard have been the subject of several documentary films.

3. Over my academic career, my posts have included Senior Scientist and Psychologist at the Centre for Addiction and Mental Health (CAMH), and Head of Research for CAMH's Sexual

Behaviour Clinic. I was on the Faculty of Medicine of the University of Toronto for 15 years and have served as Editor-in-Chief of the peer reviewed journal, *Sexual Abuse*. That journal is one of the top-impact, peer-reviewed journals in sexual behavior science and is the official journal of the Association for the Treatment and Prevention of Sexual Abuse. In that appointment, I was charged to be the final arbiter for impartially deciding which contributions from other scientists in my field merited publication. I believe that appointment indicates not only my extensive experience evaluating scientific claims and methods, but also the faith put in me by the other scientists in my field. I have also served on the Editorial Boards of *The Journal of Sex Research*, the *Archives of Sexual Behavior*, and *Journal of Sexual Aggression*. I am currently the Director of the Toronto Sexuality Centre in Canada. Thus, although I cannot speak for other scientists, I regularly interact with and am routinely exposed to the views and opinions of most of the scientists active in our field today, within the United States and throughout the world.

4. For my education and training, I received my Bachelor of Science degree from Rensselaer Polytechnic Institute, where I studied mathematics, physics, and computer science. I received my Master of Arts degree in psychology from Boston University, where I studied neuropsychology. I earned my doctoral degree in psychology from McGill University, which included successfully defending my doctoral dissertation studying the effects of psychiatric medication and neurochemical changes on sexual behavior, and included a clinical internship assessing and treating people with a wide range of sexual and gender identity issues.

5. I have a decades-long, international, and award-winning history of advocacy for destigmatizing people with atypical sexualities. While still a trainee in psychology, I founded the American Psychological Association's (APA) Committee for Lesbian, Gay, and Bisexual Graduate Students. Subsequently, I have served as the Chair for the Committee on Science Issues

for APA's Division for the Psychology of Sexual Orientation and Gender Diversity and was appointed to its Task Force on Transgender Issues. Throughout my career, my writings and public statements have consistently supported rights for transgender populations and the application of science to help policy-makers best meet their diverse needs. Because my professional background also includes neurobiological research on the development of other atypical sexualities, I have become recognized as an international leader also in the destigmatizing of the broader range of human sexuality patterns.

6. I am highly experienced in the application of sex research to forensic proceedings: I have served as the Head of Research for the Law and Mental Health Program of the University of Toronto's psychiatric teaching hospital, the Centre for Addiction and Mental Health, where I was appointed to the Faculty of Medicine.

7. I have served as an expert witness in 21 cases in the past four years, as listed on my *curriculum vitae*. These cases included criminal, civil, and custody proceedings, preliminary injunction and Frye hearings, as well as trials. I have testified in courts in Canada and throughout the U.S., including Alabama, Arizona, Florida, Illinois, Indiana, Kansas, Kentucky, Massachusetts, New York, Texas, Utah, and West Virginia. I have provided expert testimony concerning the nature and origins of atypical sexualities, as well as concerning gender dysphoria and gender identity in children.

8. For my work in this case, I am being compensated at the hourly rate of $400 per hour. My compensation does not change based on the conclusions and opinions that I provide here or later in this case or on the outcome of this lawsuit.

B. Clinical expertise vs. scientific expertise

9. In clinical science, there are two kinds of expertise: Clinicians' expertise regards

applying general principles to the care of an individual patient and the unique features of that case. A scientist's expertise is the reverse, accumulating information about many individual cases and identifying the generalizable principles that may be applied to all cases. Thus, different types of decisions may require different kinds of experts, such that questions about whether a specific patient represents an exception to the general rule might be better posed to a physician's expertise, whereas questions about establishing the general rules themselves might be better posed to a scientist's.

10. In legal matters, the most familiar situation pertains to whether a given clinician correctly employed relevant clinical standards. Often, it is other clinicians who practice in that field who will be best equipped to speak to that question. When it is the clinical standards that are themselves in question, however, it is the experts in the assessment of scientific studies who are the relevant experts.

C. The professional standard to evaluate treatment models is to rely on objective assessors, not treatment model users in a conflict of interest with its results.

11. I describe in a later section the well-recognized procedures for conducting reviews of literature in medical and scientific fields to evaluate the strength of evidence for particular procedures or treatments. Importantly, the standard procedure is for such evaluations to be conducted by objective assessors with expertise in the science of assessment, and not by those with an investment in the procedure being assessed. Because the people engaged in providing clinical services are necessarily in a conflict of interest when claiming that their services are effective, formal evaluations of evidence are routinely conducted by those *without* direct professional involvement and thus without financial or other personal interest in whether services are deemed to be safe or effective. This routine practice standard is exemplified by all of the only three

systematic, comprehensive research reviews that have been conducted concerning the safety and efficacy of puberty blockers and cross-sex hormones as treatments for gender dysphoria in children.

12. In 2020, England's National Health Service (NHS) commissioned a major review of the use of puberty blockers and cross-sex hormones in children and young people and appointed prominent pediatrician Dr. Hilary Cass to lead that review, explicating that "Given the increasingly evident polarization among clinical professionals, Dr. Cass was asked to chair the group as a senior clinician with *no prior involvement* or fixed views in this area." (Cass 2022 at 35, italics added.) Dr. Cass's committee in turn commissioned formal systematic reviews of evidence from the England National Institute for Health & Care Excellence (NICE), a government entity of England's Department of Health and Social Care, established to provide guidance to health care policy, such as by conducting systematic reviews of clinical research, but without direct involvement in providing treatment to gender dysphoric individuals. (https://www.nice.org.uk/.) Similarly, the Finnish health care council commissioned its systematic review to an external firm, Summaryx Oy. (Pasternack 2019.) Summaryx Oy is a "social enterprise" (a Finnish organization analogous to a non-profit think-tank) that conducts systematic research reviews and other analyses for supporting that nation's medical and social systems. Its reviews are conducted by assessment professionals, not by clinicians providing services. (www.summaryx.eu/en/.) The systematic review by Sweden's National Board of Health and Welfare (NBHW) included four experts. (SBU Scoping Review 2019.) In addition to their own research fields, they provided clinical services in areas adjacent to but apart from gender dysphoric children, such as physical disorders of sexual development (Dr. Berit Kriström) or gender dysphoria in adults (Dr. Mikael Landén).

13. My own most-cited peer-reviewed paper relating to gender dysphoria in minors

illustrates the expertise in the evaluation of scientific evidence that I have and am recognized for. That is, that paper provided not clinical advice or a clinical study, but rather a review and interpretation of the available evidence concerning desistance in children who suffer from gender dysphoria, as well as of evidence (and lack of evidence) concerning the safety and efficacy of medical transition to treat gender dysphoria in minors. (Cantor 2019.)

14. My extensive background in the assessment of sexuality research and in the development of human sexuality places me in exactly the position of objectivity and freedom from conflict-of-interest required by the universal standards of medical research science.

15. I do not offer opinions about the best public policy. Multiple jurisdictions have attempted multiple different means of implementing that science into various public policies. Although I accept as an axiom that good public policy must be consistent with the scientific evidence, science cannot objectively assess societal values and priorities. Therefore, my opinions summarize and assess the science on which public policy is based, but I can offer no opinion regarding which public policy mechanisms would be best in light of that science.

II. Multiple international health care systems that had initially expanded medicalized transition to include minors have reversed that policy, as research on safety and effectiveness accumulated, in a growing international trend against the medicalized transition of minors.

16. Medicalized interventions for minors originated in European clinics (most prominently in the Netherlands and Sweden), and these precedents (and in particular the so-called "Dutch Protocol") are frequently cited by American clinicians. However, growing concerns about safety together with the continuing absence of reliable evidence of benefit even after more than 20 years of experience have led respected and far-from "conservative" European health care ministries to step back and discourage or even cease providing medicalized transition of minors, other than in exceptional and carefully limited circumstances, such as within registered and approved research trials. Instead, these authorities now endorse psychotherapy as the treatment of choice for minors, with medical interventions representing a method of last resort, if permitted at all. These range from medical advisories to outright bans on the medical transition of minors. I provide details concerning these policy changes below, and provide additional details regarding the underlying systematic reviews in Section II and VI below.

A. England

17. The National Health Service (NHS) of the United Kingdom centralized gender counselling and transitioning services into a single clinic, the Gender Identity Development Service (GIDS) of the Tavistock and Portman NHS Foundation Trust. Between 2008 and 2018, the number of referrals to the clinic had increased by a factor of 40, leading to a government inquiry into the causes. (Rayner 2018.) The GIDS was repeatedly accused of approving and endorsing medical transition in minors without adequate justification, including by 35 members of the GIDS own staff, who resigned by 2019. (BBC News 2021; Donnelly 2019). An ex-governor and psychotherapist of the Trust who resigned, Marcus Evans, said staff feared being called

transphobic, which was impacting their objectivity in their work. (Doward 2019).

18. In 2020, a former patient of the GIDS, Keira Bell, brought a lawsuit alleging that the GIDS practices with respect to prescribing puberty blockers for minors were unproven and potentially harmful in ways that meant that it was impossible for minors to give meaningful informed consent. After taking extensive expert evidence, the trial court concluded that puberty blockers might have "potentially irreversible" and "life-changing" effects on a young person (*Bell v. Tavistock*, [2020] EWHC 3274 (Admin), ¶148, 151), that there was "very limited evidence as to its efficacy" (¶134) such that "it is right to call the treatment experimental" (¶148), and that use of puberty blockers almost always led to use of cross-sex hormones that "may well lead to a loss of fertility" (¶¶ 137-138). While an appeals court later concluded that the trial court had exceeded the proper role of the court in making factual findings on these questions, the appeals court acknowledged that "Medical opinion is far from unanimous about the wisdom of embarking on treatment before adulthood. The question raises not only clinical medical issues but also moral and ethical issues, all of which are the subject of intense professional and public debate." (Bell v. Tavistock 2021 at ¶3.)

19. Perhaps prompted by the Kiera Bell litigation, also in 2020 the English National Health Service ("NHS") commissioned the thorough independent review of the use of puberty blockers and cross-sex hormones to be chaired by Dr. Cass that I have described above. After an extensive process that included obtaining the systematic reviews of all published studies bearing on safety or efficacy of these hormonal interventions in minors as well as "extensive" listening sessions with clinicians, patients, and families, in February 2022 Dr. Cass issued an extensive "Interim Report" summarizing the state of the relevant medical science and in particular highlighting the presence of serious but unstudied risks, and the lack of strong evidence of efficacy. I will quote specific

items from Dr. Cass's Report as relevant to specific topics below. At a high level, Dr. Cass concluded that to date there has been "very limited research on the sexual, cognitive, or broader developmental outcomes" from the use of puberty blockers for gender dysphoria (Cass 2022 at 19), that it is an unanswered question "whether the evidence for the use and safety of [puberty blockers] is strong enough as judged by reasonable clinical standards" (at 37), and that "the available evidence was not strong enough to form the basis of a policy position" with regard to use of both puberty blockers and cross-sex hormones in minors (at 35).

20. Following issuance of Dr. Cass's Interim Report, the English NHS has published a consultation document concerning a proposed revised service specification under which "NHS England will only commission [puberty blockers] in the context of a formal research protocol." (NHS Interim Service Specification at 12.)

B. Finland

21. In Finland, minors were made eligible for medicalized transition in 2011 by that country's health care service, the Council for Choices in Health Care in Finland (COHERE). Assessments of mental health and preparedness were centralized by law into two research clinics, Helsinki University Central Hospital and Tampere University Hospital.

22. In 2019, the Service Selection Council (Palko) of the Finnish Ministry of Social Affairs and Health commissioned a systematic review of the effectiveness and safety of medicalized transition (Pasternack 2019), and in 2020, Finnish researchers published an analysis of the outcomes of adolescents diagnosed with transsexualism and receiving cross-sex hormone treatment in Finland's Tampere University Hospital. (Kaltiala 2020.) Despite the purpose of medical transition being to improve mental health, the study showed:

> Medical gender reassignment is not enough to improve functioning and relieve psychiatric comorbidities among adolescents with gender dysphoria. Appropriate

> interventions are warranted for psychiatric comorbidities and problems in adolescent development. (Kaltiala 2020 at 213.)

They concluded that the youth who were functioning well after transition were those who were already functioning well before transition, and those who were functioning poorly before transition continued to function poorly after transition.

23. Importantly, the results of this study exemplify why correlations reported from surveys cannot be interpreted as evidence of causality. Mental health assessment would exclude the most poorly functioning youth from among those permitted to transition, but transition itself did not improve the functioning of those who were permitted to transition.

24. Consistent with the results of the independent evidence review by Summaryx Oy and analysis of the ethical issues involved, Finland's health care service ended the surgical transition of minors, ruling in 2020 that "Surgical treatments are not part of the treatment methods for dysphoria caused by gender-related conflicts in minors." (COHERE Summary 2020.) The review of the research concluded that "[N]o conclusions can be drawn on the stability of gender identity during the period of disorder caused by a psychiatric illness with symptoms that hamper development." (COHERE Summary 2020.) COHERE also greatly restricted access to puberty-blocking and cross-sex hormonal treatments, explicating that they may be considered for minors "only if it can be ascertained that their identity as the other sex is of a permanent nature and causes severe dysphoria," and only "if the need for it continues *after* [any] other psychiatric symptoms have *ceased* and adolescent development is progressing normally." (COHERE Summary 2020, italics added.) They restricted the procedures to their centralized research clinics. The council was explicit in noting the lack of research needed for decision-making, "There is also a need for more information on the disadvantages of procedures and on people who regret them." (COHERE Summary 2020.) In light of the special developmental and ethical considerations surrounding

minors, COHERE recommended that "no decisions should be made that can permanently alter a still-maturing minor's mental and physical development." (COHERE Recommendation 2020 at 7.)

C. Sweden

25. Sweden's national health care policy regarding trans issues has developed quite similarly to that of the UK. Already in place 20 years ago, Swedish health care policy permitted otherwise eligible minors to receive puberty-blockers beginning at age 14 and cross-sex hormones at age 16. At that time, only small numbers of minors sought medical transition services. An explosion of referrals ensued in 2013–2014. Sweden's Board of Health and Welfare ("Socialstyrelsen") reported that, in 2018, the number of diagnoses of gender dysphoria was 15 times higher than 2008 among girls ages 13–17. (Swedish Socialstyrelsen Support 2022 at 15.)

26. Sweden has long been very accepting with regard to sexual and gender diversity. In 2018, a law was proposed to lower the age of eligibility for surgical care from age 18 to 15, remove the requirement for parental consent, and lower the legal age for change of gender to age 12. A series of cases of regret and suicide following medical transition were reported in the Swedish media. (Orange 2020.) In 2019, the Swedish Agency for Health Technology Assessment and Assessment of Social Services (SBU) therefore initiated its own systematic review of the research. The SBU released English-language results first as a summary and then published as a peer reviewed article. (Ludvigsson et al., 2023.) Like the UK, the Swedish investigation employed standardized review methods to ensure the encapsulation of the all the relevant evidence and came to the same conclusions: "This systematic review of almost 10,000 screened abstracts suggests that long-term effects of hormone therapy on psychosocial and somatic health are unknown, except that GnRHa treatment seems to delay bone maturation and gain in bone mineral density." (Ludvigsson 2023 at 12.) They emphasized, "The absence of long-term studies is worrying

because many individuals start treatment as minors (<18 years) and CSHT is lifelong." (Ludvigsson 2023 at 10.) Regarding the full set of studies, "No randomised controlled trials were found, but we could identify 24 relevant observational studies. However, these were limited by methodological weaknesses, for instance lack of or inappropriate control group, lack of intra-individual analyses, high attrition rates that precluded conclusion to be drawn." (Ludvigsson 2023 at 9–10.)

27. In 2021, the leading Swedish pediatric gender clinic, at the Karolinska Institute, issued a new policy statement in which it stated that the Swedish evidence review "showed a lack of evidence for both the long-term consequences of the treatments, and the reasons for the large influx of patients in recent years." (Karolinska 2021.) The Karolinska Institute further stated that "These treatments are potentially fraught with extensive and irreversible adverse consequences such as cardiovascular disease, osteoporosis, infertility, increased cancer risk, and thrombosis." In a dramatic reversal of its policy, the Institute announced that "In light of the above, and based on the precautionary principle, which should always be applied, it has been decided that hormonal treatments (i.e., puberty blocking and cross-sex hormones) will not be initiated in gender dysphoric patients under the age of 16." Further, the Karolinska clinic announced that patients ages 16–18 would receive such treatments *only* within research settings (clinical trials monitored by the appropriate Swedish research ethics board). (Karolinska 2021.)

28. In 2022, the Swedish National Board of Health and Welfare published a major new national policy document concerning "Support, investigation and hormone therapy in gender incongruence in children and youth," including an English-language summary. (Swedish Socialstyrelsen Support 2022.) The National Board of Health noted "the continued lack of reliable scientific evidence concerning the efficacy and the safety of both [puberty blockers and cross-sex

hormones]," and concluded (based on the commissioned evidence reviews) that "the evidence on treatment efficacy and safety is still insufficient and inconclusive for all reported outcomes. Further, it is not possible to determine how common it is for adolescents who undergo gender-affirming treatment to later change their perception of their gender identity or interrupt an ongoing treatment." As a result, the Board of Health concluded that, "[f]or adolescents with gender incongruence, the . . . risks of puberty suppressing treatment with GnRH-analogues and gender-affirming hormonal treatment currently outweigh the possible benefits." (Swedish Socialstyrelsen Support 2022 at 10-12.) Accordingly, the Swedish Board of Health and Welfare "recommends restraint when it comes to hormone treatment." (Swedish Socialstyrelsen Updated Recommendations 2/22/22.)

D. France

29. While medical authorities in France have not issued any actual restriction, in 2022, the Académie Nationale de Médecine of France issued a strongly worded statement, citing the Swedish ban on hormone treatments:

> [A] great medical caution must be taken in children and adolescents, given the vulnerability, particularly psychological, of this population and the many undesirable effects, and even serious complications, that some of the available therapies can cause…such as impact on growth, bone fragility, risk of sterility, emotional and intellectual consequences and, for girls, symptoms reminiscent of menopause." (Académie Nationale de Médecine 2022.)

For hormones, the Académie concluded "the greatest reserve is required in their use," and for surgical treatments, "[T]heir irreversible nature must be emphasized." The Académie warned "the risk of over-diagnosis is real, as shown by the increasing number of transgender young adults wishing to 'detransition'." Rather than medical interventions, it advised health care providers "to extend as much as possible the psychological support phase." The Académie reviewed and emphasized the evidence indicating the very large and very sudden increase in youth requesting

medical transition. It attributed the change, not to society now being more accepting of sexual diversity, but to social media, "underlining the addictive character of excessive consultation of social networks which is both harmful to the psychological development of young people and responsible, for a very important part, of the growing sense of gender incongruence." (Académie Nationale de Médecine 2022.)

E. Norway

30. In 2022, Norway's Healthcare Investigation Board (Ukom) began a review of that country's guidelines for the medicalized transition of minors. (Block, Norway's Guidance, 2023.) In 2023, it released its report, which concluded that the evidence for the use of puberty blockers and cross-sex hormone treatments in youth was insufficient, and acknowledged the international recognition of the dearth of evidence of safety and effectiveness. The report deemed medicalized transition to be experimental. (Ukom 2023, Summary and Section 11.) The report faulted the existing Norwegian guidelines, published in 2020, for concentrating on "equality and rights" while "deviating from the requirements for the development of knowledge-based guidelines." (Ukom 2023, Summary.)

31. The Norwegian report concluded that "The knowledge base, especially research-based knowledge for gender-affirming treatment (hormonal and surgical), is insufficient and the long-term effects are little known" and that "This applies particularly to the teenage population, which accounts for a large part of the increase in referrals to the specialist health service in the last decade." (Ukom 2023, Summary and Section 7.)

32. In an interview about the report with the *British Medical Journal,* the Ukom Medical Director, Stine Marit Moen, said, "We're concerned that there may be undertreatment, overtreatment, and the wrong treatment" and added:

> We've seen a marked increase in referrals to specialised healthcare services in Norway for teenagers, as seen in many other western countries, and nobody knows the reason. The stability of the gender dysphoria of these teenagers is not known, and the evidence of long term effects of gender affirming treatments for this young population is insufficient. (Block, Norway's Guidance, 2023.)

33. Ukom noted that referrals to its national treatment service increased by a factor of eight between 2007 and 2018, and that this increase was largely from young biological females. Seventy-five percent of the referrals to its National Treatment Service had other co-morbid psychiatric diagnoses, including not only depression and anxiety but also autism spectrum disorders, ADHD, and Tourette's Syndrome. (Ukom 2023, Summary and Section 7.)

F. Assertions by U.S. organizations and officials that there is 'no debate' over medicalized transition are false.

34. The international consensus is clearly demonstrated by the multiple recent analyses, statements, and policy decisions from the health care service systems around the world. These include England's National Health Service, which noted the "Scarce and inconclusive evidence to support clinical decision making [which] has led to a lack of clinical consensus on what the best model of care for children and young people experiencing gender incongruence and dysphoria should be." (NHS 2022 at 5.)

35. As these several recent national policy reviews, statements, and recommendations make very clear, there is a great deal of doubt and debate among the sophisticated international medical and mental health community as to whether the administration of puberty blockers and cross-sex hormones to children and young people is the best clinical practice, and as to whether these treatments have been shown to be safe and effective. Indeed, the lack of scientifically reliable data concerning safety and efficacy highlighted by the systematic evidence reviews commissioned by the English National Health Service, by the Swedish National Board of Health and Welfare, and by the Finnish Council for Choices in Health Care in Finland have caused those national health

authorities and others to move sharply away from approving puberty blockers, cross-sex hormones, or surgery for minors.

36. In this report, I explain the evidence and lack of evidence behind that doubt, that debate, and the emerging international consensus of caution reflected in the several recent European policy statements or changes.

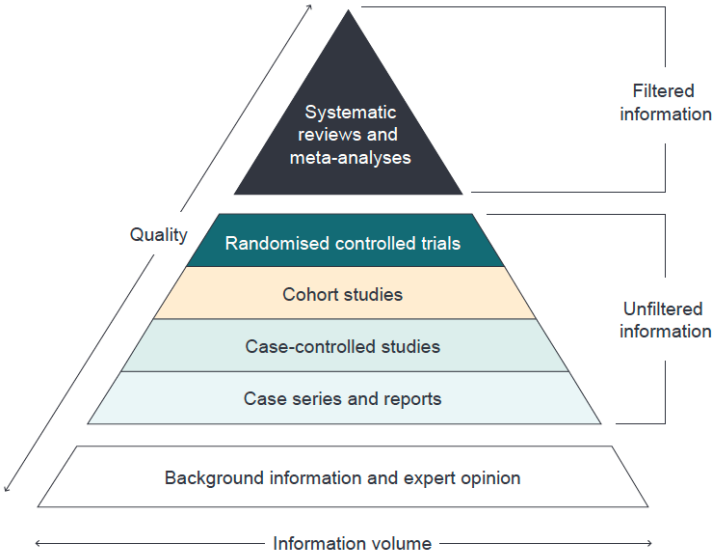
III. Clinical research has a standard *Pyramid of Evidence* that summarizes the relative strength of potential sources of information.

37. The widely accepted starting point in evidence-based medicine is the recognition that clinical experiences and recollections of individual practitioners (often called "expert opinion" or "clinical anecdote") do not and cannot provide a reliable, scientific basis for treatment decisions. Rather, in evidence-based medicine, clinical decision-making is based on objectively demonstrated evidence of outcomes from the treatment options. An essential first step in evidence-based medicine is identifying the relevant findings from among the immense flood of clinical journal articles published each year. Those studies and the evidence they report are then assessed according to the strength offered by the research methods used in each study. The research methods used in a study determine its reliability and generalizability, meaning the confidence one may have that using the same treatment again will have the same result again on other people. In this section, I explain the well-accepted criteria for evaluating the evidentiary value of clinical studies.

A. Clinical research comprises a standard *Pyramid of Evidence,* wherein studies from higher levels of evidence outrank even more numerous studies from lower levels of research.

38. The accepted hierarchy of reliability for assessing clinical outcomes research is routinely represented as a "Pyramid of Evidence" (Figure 1). Scientific questions are not resolved by the number of studies coming to one versus another conclusion. Studies representing higher levels of evidence outrank studies from lower levels. Even large numbers of lower-level studies cannot overcome a study representing a higher level of evidence. Indeed, because lower-level studies are generally faster and less expensive to conduct, it is typical for them to outnumber higher level studies. This is the property meant to be reflected by the pyramid's shape, which is larger at the base and smaller at the apex.

Figure 1: Pyramid of Standards of Evidence



Source: OpenMD. Retrieved from https://openmd.com/guide/levels-of-evidence.

B. The highest level of evidence for safety and effectiveness research is the systematic review of clinical experiments.

39. The most reliable and conclusive method of determining what is actually known or not known with respect to a particular treatment is the *systematic review*. Systematic reviews employ standardized procedures to assess comprehensively all available evidence on an issue, minimizing opportunities for bias in gathering and evaluating research evidence. As described by Dr. Gordon Guyatt, the internationally recognized pioneer in medical research who invented the term *evidence-based medicine*, "A fundamental principle to the hierarchy of evidence [is] that optimal clinical decision making requires systematic summaries of the best available evidence." (Guyatt 2015 at xxvi.)

40. I note that Dr. Antommaria's report for the plaintiffs correctly indicated that "It is best practice to ascertain the studies via systematic reviews of the literature." (Antommaria Report at 6.) Missing from Dr. Antommaria's report is that none of the systematic reviews he cited were systematic reviews of safety and efficacy, both of which are necessary for assessing the risk:benefit

ratio of a treatment. Moreover, I note that none of the plaintiffs' other experts cited any systematic reviews at all, failing to meet the standard Dr. Antommaria and I indicated.

1. Systematic reviews prevent the 'cherry-picking' of studies that favor a particular result.

41. Because systematic reviews are designed to prevent researchers from including only the studies they favor and other biases, systematic reviews are the routine starting point for developing clinical practice guidelines. (Moher 2009.) The methods of a systematic review include:

- Define the scope, including the "PICO": Population/Patient, Intervention, Comparison/Control, and Outcome(s);
- Select and disclose the keywords used to search the (massive) available clinical research database(s) for potentially relevant articles, identify the databases they were applied to, and the date(s) of the searches, including any subsequent updates;
- Select and disclose the inclusion/exclusion criteria to be used to filter the "hits" from the keyword searches to identify research studies to be included in the detailed review;
- Review abstracts to select the final set of studies, using at least two independent reviewers to allow for measuring inter-rater reliability on the criteria;
- Code each study's results impacting the research question(s), disclosing the list of all studies and the results coded from each;
- Evaluate the reliability of the results [risk of bias] of each included study, applying uniform criteria across them all.

42. As detailed in Section V, several systematic reviews have been conducted of the outcomes of medicalized transition of gender in minors. Their conclusions are highly consistent with each other. Much of the expert testimony offered by plaintiffs' experts, however, depends on levels of evidence far lower on the pyramid of evidence (e.g., "expert opinion") or beneath the pyramid entirely (e.g., survey studies) while ignoring the thorough, high-quality systematic reviews available in the research literature. Doing so is in direct conflict with foundational principles of evidence-based medicine.

2. Systematic reviews prevent biased assessment of individual studies by uniformly applying standard criteria to each study reviewed. The most widely used criteria set is "GRADE."

43. In order to produce unbiased assessment of the studies within the systematic review, all the studies must be evaluated using the same evaluation criteria. Without such criteria, assessments can become influenced by researchers who, intentionally or not, hold the evaluative bar higher or lower for studies according to whether the studies' conclusions support or challenge that researcher's perspective. Several such systems have been developed. The most widely used system is the "Grading of Recommendations, Assessment, Development and Evaluations" (GRADE). (Goldet & Howick 2013.) In the GRADE system, studies' findings are downgraded for:

- Risk of bias:[1]
    - Lack of clearly randomized allocation sequence,
    - Lack of blinding,
    - Lack of allocation concealment,
    - Failure to adhere to intention-to-treat analysis,
    - Trial is cut short,
    - Large losses to follow-up;
- Inconsistency;
- Indirectness of evidence;
- Imprecision; and
- Publication bias (when studies with 'negative' findings remain unpublished).

Studies' ratings are upgraded if their findings identify:

- A large effect of the treatment;
- A dose-response relationship (the size of the effect has a systematic association with the dose of the treatment given); or
- That all plausible biases only *reduce* the apparent effect of the treatment (necessarily making the estimated effect sizes conservative estimates).

[1] In science, including in the GRADE system, the term "bias" refers to any external influence leading to a systematic over- or underreporting of the outcome being measured. That is, in this context "bias" is not used in the sociopolitical sense of personal values.

44. GRADE assessments yield a four-point score representing the certainty that a reported treatment effect is true. These certainty scores are (GRADE Handbook, Section 5):

Certainty	Meaning
High	We are very confident that the true effect lies close to that of the estimate of the effect.
Moderate	We are moderately confident in the effect estimate: The true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different.
Low	Our confidence in the effect estimate is limited: The true effect may be substantially different from the estimate of the effect.
Very Low	We have very little confidence in the effect estimate: The true effect is likely to be substantially different from the estimate of effect.

C. The highest level experimental study of clinical safety and effectiveness is the Randomized Controlled Trial (RCT). RCTs can demonstrate that a given treatment causes (rather than only correlates with) a given outcome.

45. Randomized Controlled Trials are the gold standard method of assessing the effects caused by an experimental treatment. The great scientific weight of RCTs follows from the randomization: People do not pick which research group they are in—a treatment group or a control group. Without random group assignment, it is not possible to identify which, if any, changes are due to the treatment itself or to the factors that led to who did and did not receive treatment.

46. Levels of evidence lower than RCTs are unable to distinguish when changes are caused by the experimental treatment, or by factors that can mimic treatment effects, such as 'regression to the mean' and the placebo effect.

47. In the absence of evidence that X causes Y, it is a scientific error to use language indicating there is causal relationship. In the absence of evidence of causality, it is scientifically unsupportable to describe a correlation with terms such as: increases, improves, benefits, elevates,

leads to, alters, influences, results in, is effective for, causes, changes, contributes to, leads to, yields, impacts, decreases, harms, and depresses. Scientifically valid terms for correlations include: relates to, is associated with, predicts, and varies with.

48. I note that the plaintiffs' experts repeatedly misrepresent studies using causal language to describe studies that are unable to demonstrate causality. Such language incorrectly asserts that the evidence is stronger than it actually is.

1. RCTs, but not lower levels of evidence, overcome biases representing 'regression to the mean' and other factors that can mimic clinical improvement.

49. 'Regression to the mean' arises when researching issues, such as mood, depression, or levels of emotional distress that typically fluctuate over time. People are more likely to seek out treatment during low points rather than high points in their emotional lives. Thus, when tracking emotional states over time, the average of a group of people in a treatment group may often show an increase; however, without an untreated control group to which to compare them, researchers cannot know whether the group average would have increased anyway, with only the passage of time.

50. Blinding or masking participants in an RCT from which group they are in has been described as a preferred strategy since the 1950s, in order to exclude the possibility that a person's expectations of change caused any changes observed (the "placebo effect"). In practice, however, it has often made little or no significant difference. For example, a study using very high quality methods—meta-analysis of meta-analysis research—has revealed no statistical difference in the sizes of the effects detected by blinded/placebo-controlled studies from non-blinded/non-placebo-controlled studies of depression. (Moustgaard 2019.) That is, the pre-/post- treatment differences found in placebo groups are not as attributable to participants' expectations of improvement as

they are to expectable regression to the mean. (Hengartner 2020.)

2. When a 'no treatment control group' is untenable, RCTs use an 'active comparator' group instead.

51. It is not always possible to compare a group receiving a treatment to a group receiving only an inactive procedure, such as a placebo treatment or no treatment at all. In such situations, the standard, ethical, clinical research method is to compare two active treatments with each other.

52. The systematic reviews from England explicitly called for 'active comparator' studies to test whether medicalized transition of minors shows mental health benefits superior to those obtained from psychotherapy. (NICE 2020a at 40; NICE 2020b at 47.) Risk:benefit analysis cannot justify the greater risks associated with medicalization without evidence of correspondingly greater benefit.

D. Cohort studies are the highest level of evidence about medicalized transition currently available.

53. The highest-level study of medicalized transition of minors conducted thus far are cohort studies: gathering a sample of individuals who chose to undergo treatment and tracking them over time. Cohort studies are able to answer some questions that lower-level studies cannot, such as whether a high-functioning group improved over time versus having been composed of people who were already high-functioning. Cohort studies are, however, unable to demonstrate causality, to identify how much of any change was due to regression to the mean, or to detect any placebo effects.

E. Expert opinion represents the least reliable evidence.

54. As Figure 1 illustrates, evidence-based medicine opinion based on clinical experience is identified as the *least* reliable source of medical knowledge. Among other reasons, this is because non-systematic recollections of unstructured clinical experiences with self-selected

clientele in an uncontrolled setting is the most subject to bias. Indeed, mere "clinical experience" was long the basis of most medical and mental health clinical decisions, and it was precisely the scientific and clinical inadequacy of this type of "knowledge" that led to the development and widespread acceptance of the importance of evidence-based medicine. As Dr. Guyatt has written, "EBM places the unsystematic observations of individual clinicians lowest on the hierarchy," both because EBM "requires awareness of the best available evidence," and because "clinicians fall prey to muddled clinical reasoning and to neglect or misunderstanding of research findings." (Guyatt 2015 at 10, 15.)

F. Surveys and cross-sectional studies cannot demonstrate treatment effectiveness.

55. Surveys represent observational research rather than experimental research. (In science, experiments are studies involving a manipulation, not merely observation, by the researcher.) Surveys and cross-sectional studies can provide only correlational data and cannot demonstrate causality. (See Section IV below.) It is not possible for a survey to yield evidence that a treatment is effective. No number of surveys can test a treatment, advancing it from 'experimental' to 'established' status.

56. Survey studies do not even appear on the *pyramid of evidence*. In accordance with the routine standards, systematic reviews of treatment studies exclude surveys.

57. I note that the plaintiffs' experts' reports rely largely on survey studies.

IV. Methodological defects limit or negate the evidentiary value of many studies of treatments for gender dysphoria in minors.

A. In science, to be valid, a claim must be objective, testable, and falsifiable.

58. In behavioral science, people's self-reports do not represent objective evidence. It is when emotional and other pressures are strongest that the distinction between and need for objective over subjective evidence is greatest. Surveys do not represent objective evidence. This is especially true of non-random surveys and polls, recruited through online social networks of the like-minded.

B. Correlation does not imply causation.

59. Studies representing lower levels of evidence are often used because they are faster and less expensive than studies representing higher levels. A disadvantage, however, is that they are often limited to identifying which features are *associated* with which other features, but they cannot show which ones are *causing* which. It is a standard property of statistical science that when a study reports a correlation, there are necessarily three possible explanations. Assuming the correlation actually exists (rather than represents a statistical fluke or bias), it is possible that X causes Y, that Y causes X, or that there is some other variable, Z, that causes both X and Y. (More than one of these can be true at the same time.) To be complete, a research analysis of a correlation must explore all three possibilities.

60. For example, assuming a correlation between treatment of gender dysphoria in minors and mental health actually exists (rather than is a fluke): (1) It is *possible* that treatment causes improvement in mental health. (2) Yet, it is also possible that having good mental health is (part of) what enabled transition to occur in the first place. That is, because of gate-keeping procedures in the clinical studies, those with the poorest mental health are typically not permitted to transition, causing the higher mental health scores to be sorted into the transitioned group. (See Section IV.E

on *Selection Bias*.) (3) It is also possible that a third factor, such as wealth or socioeconomic status, causes both the higher likelihood of transitioning (by being better able to afford it) and the likelihood of mental health (such as by avoiding the stresses of poverty or affording psychotherapy).

61. This principle of scientific evidence is why surveys do not (cannot) represent evidence of treatment effectiveness: Surveys are limited to correlations. (See Section III.F. on *Surveys*.)

C. When two or more treatments are provided at the same time, one cannot know which treatment caused observed changes (i.e., 'confounding').

62. Confounding is a well-known issue in clinical research design. As detailed in the present report, it applies throughout treatment studies of gender dysphoria. Patients who undergo medical transition procedures in research clinics routinely undergo mental health treatment (psychotherapy) at the same time. Without explicit procedures to distinguish them, it cannot be known which treatment produced which outcome (or in what proportions). Indeed, that mental health improvement came from mental health treatment is a more parsimonious (and therefore, scientifically superior) conclusion than is medicalized treatment causing mental health improvement.

D. Extrapolation to dissimilar populations and dissimilar conditions.

63. The purpose of clinical science is to establish from a finite sample of study participants information about the effectiveness and safety, or other variables, of a treatment that can be generalized to other people. Such extrapolation is only scientifically justified with populations matched on all relevant variables. The identification of those variables can itself be a complicated question, but when an experimental sample differs from another group on variables already known to be related, extrapolation cannot be assumed but must be demonstrated directly and explicitly.

64. Each of the systematic reviews from the UK, Sweden, and Finland emphasized that the

recently observed, greatly increased numbers of youth coming to clinical attention are a population different in important respects from the subjects of often-cited research studies. Conclusions from studies of adult-onset gender dysphoria and from childhood-onset gender dysphoria cannot be assumed to apply to the current patient populations of adolescent-onset gender dysphoria. The Cass Report correctly advised:

> It is also important to note that any data that are available do not relate to the current predominant cohort of later-presenting birth-registered female teenagers. This is because the rapid increase in this subgroup only began from around 2014-15. Since young people may not reach a settled gender expression until their mid-20s, it is too early to assess the longer-term outcomes of this group. (Cass 2022 at 36.)

The report also indicated:

> [I]t is important that it is not assumed that outcomes for, and side effects in, children treated for precocious puberty will necessarily be the same in children or young people with gender dysphoria. (Cass 2022 at 63.)

65. Finland's review repeated the observation of greatly (20 times) increased numbers, an entirely different demographic of cases, and increased proportions of psychiatric co-morbidities. (Finnish Palko Preparation Memo at 4-6.) The Swedish review highlighted "the uncertainty that follows from the yet unexplained increase in the number of care seekers, an increase particularly large among adolescents registered as females at birth." (Swedish Socialstyrelsen Support 2022 at 11.)

66. It is well known that males and females differ dramatically in the incidence of many mental health conditions and in their responses to treatments for mental health conditions. Thus, research from male-to-female transitioners (the predominant population until recent years) cannot be extrapolated to female-to-male transitioners (the predominant population presenting at clinics today). Outcomes from patients who experienced clear pre-pubertal childhood gender dysphoria cannot be extrapolated to patients who first manifest diagnosable gender dysphoria well into puberty. Outcomes from clinics employing rigorous and openly reported gate-keeping procedures

cannot be extrapolated to clinics or clinicians employing only minimal or perfunctory assessments without external review. Developmental trajectories and outcomes from before the social media era cannot be assumed to apply to those of the current era or the future. Research from youth with formal diagnoses and attending clinics cannot be extrapolated to self-identifying youth and those responding to surveys advertised on social media sites.

67. Further, treatment of gender dysphoria in children and adolescents presents novel-use cases very dissimilar to the contexts in which puberty blockers and cross-sex hormones have previously been studied. Whereas use of puberty blockers to treat precocious puberty *avoids* the medical risks caused by undergoing puberty growth before the body is ready (thus outweighing other risks), use of blockers to treat gender dysphoria in patients already at their natural puberty pushes them *away* from the mean age of the healthy population. Instead of avoiding an objective problem, one is created: Among other things, patients become subject to the issues and risks associated with being late-bloomers, *very* late-bloomers. This transforms the risk:benefit balance, where the offsetting benefit is primarily (however validly) cosmetic.

68. Similarly, administering testosterone to an adult male to treat testosterone deficiency addresses both a different condition and a different population than administration of that same drug to an adolescent female to treat gender dysphoria; the benefits and harms observed in the first case cannot be extrapolated to the second.

E. Mental health assessment used for gate-keeping medicalized transition establishes a *selection bias,* creating a statistical illusion of mental health improvement among the selected.

69. Importantly, clinics are expected to conduct mental health assessments of applicants seeking medicalized transition, disqualifying from medical services patients with poor mental health. (The adequacy of the assessment procedures of specific clinics and clinicians remains under

debate, however.) Such gate-keeping—which was also part of the original "Dutch Protocol" studies—can lead to misinterpretation of data unless care is explicitly taken. A side-effect of excluding those with significant mental health issues from medical transition is that when a researcher compares the average mental health of the gender dysphoric individuals first presenting to a clinic with the average mental health of those who completed medical transition, then the post-transition group would show better mental health—but only because of the *selection bias*, (Larzelere 2004; Tripepi 2010) even when the transition had no effect at all.

V. Systematic reviews of safety and effectiveness have been conducted by the health care ministries/departments of several governments. They *unanimously* concluded the evidence on medicalized transition in minors to be of poor quality.

A. Understanding safety and efficacy.

70. Plaintiffs' experts assert that use of puberty blockers and cross-sex hormones on adolescents is "safe." This claim is unsupported by any substantial scientific evidence, depreciates widely recognized risks of serious harm to minors so medicalized, and ignores both the many unknowns and the growing international doubts about their use.

71. At the outset, it is important to understand the meaning of "safety" in the clinical context. The criteria for assessing safety involve two independent components, and discussion of the safety of hormonal interventions on the natural development of children requires consideration of both of them. The term *safety* in the clinical context represents a "risk:benefit ratio," not an absolute statement that can be extrapolated across applications. In clinical research, assessing safety requires simultaneous consideration of both components of the risk:benefit ratio. That is, treatments are not deemed simply "safe" or "unsafe," as the plaintiffs' experts repeatedly use those words. These dual components are reflected in FDA regulation:

> There is reasonable assurance that a device is safe when it can be determined, based upon valid scientific evidence, that *the probable benefits* to health from use of the device for its intended uses and conditions of use, when accompanied by adequate directions and warnings against unsafe use, outweigh *any probable risks*. (Code of Federal Regulations Title 21 Sec. 860.7, italics added.)

72. Thus, for example, as I explain in further detail below, because the Endocrine Society did not undertake (or rely on) any systematic review of the efficacy of hormonal interventions to relieve gender dysphoria in minors (i.e., their benefits), and WPATH did not undertake (or rely on) any systematic review of the safety of hormonal interventions in minors (i.e., their risks), neither gathered the evidence necessary to assess the risk:benefit ratio of medicalized transition in

minors.

73. In fact, as I also review below, after conducting systematic reviews, the English, Finnish, and Swedish national health care institutions all concluded that there is insufficient evidence to determine that hormonal interventions as treatments for gender dysphoria in minors are safe. Reasons for these consistent conclusions include lack of research, insufficient research quality among the existing investigations, and insufficient investigation of long-term safety.

74. To understand the uniform conclusions of these national health care bodies, it is important to understand that—at least where there is *prima facie* reason to be concerned that certain harms may result—when the research has not been done, the absence of evidence cannot be taken as evidence of the absence of such harms. "We don't know" does not permit the conclusion "It is safe." Plaintiffs' experts and many advocates in the field of transgender medicine make this error.

B. The McMaster University systematic review of systematic reviews.

75. McMaster University is recognized as a center of expertise in the performance of methodologically sound systematic reviews. In 2022, authors associated with that McMaster University team (Dr. Romina Brignardello-Petersen and Dr. Wojtek Wiercioch) conducted a systematic review, "Effects of gender affirming therapies in people with gender dysphoria: evaluation of the best available evidence," spanning all the available systematic reviews in this area, including their methodological strength, the evidence they cited, and the conclusions they reached. (Brignardello-Petersen & Wiercioch 2022.) Applying carefully disclosed criteria and methods, they identified on-point systematic reviews, and graded the methodological quality of each on-point review as high, moderate, low, or critically low. With regard to systematic reviews relating to the effects of puberty blockers or cross-sex hormones, the authors included in their

analysis all reviews that achieved at least a "low" rating of methodological quality, while excluding those rated as "very low." No systematic reviews earned a "high" methodological rating, except a review performed by the highly respected Cochrane Library of the effects of cross-sex hormones on transitioning natal males (Haupt 2020), but that most careful review in turn found *no* published studies on this topic of sufficient methodological soundness to satisfy its inclusion criteria and thus merit review. After this careful review of the data and analysis contained in available systematic reviews, the McMaster authors concluded:

> Due to important limitations in the body of evidence, there is great uncertainty about the effects of puberty blockers, cross-sex hormones, and surgeries in young people with gender dysphoria. This evidence alone is not sufficient to support whether using or not using these treatments. (Brignardello-Petersen & Wiercioch 2022 at 5.)

C. The quality of the systematic reviews from governmental bodies and professional associations.

76. To ensure consideration of all available evidence, I compiled into a single table all the cohort studies of safety and effectiveness included by any of the systematic reviews from the international health care systems and (although they were incomplete) by the U.S.-based clinical associations issuing guidelines or standards. I discuss their specific findings in the following sections.

77. New studies continue to be conducted and published. I have identified two additional studies that were published after these reviews were released, but that meet their inclusion criteria: Tordoff, *et al.*, 2022, and Chen, *et al.*, 2023. The findings from both these studies are consistent with those already included and are noted here for completeness.

Table 1. Cohort studies of effectiveness and safety of puberty-blockers and cross-sex hormones in minors.

	Finland (2019)	NICE (2020a,b)	Sweden (2022)	E.S. (2017)	AAP (2018)	Baker (2021) (WPATH)
Effectiveness GnRHa	Costa et al, 2015 de Vries et al, 2011	Costa et al, 2015 de Vries et al, 2011	Becker-Hebly et al, 2020 Carmichael et al, 2021 Costa et al, 2015 *** Hisle-Gorman et al, 2021			de Vries et al, 2011
Effectiveness Sex Hormones	de Vries et al, 2014*	Achille et al, 2020 Allen et al, 2019 Kaltiala et al, 2020 Lopez de Lara et al, 2020	*** *** Cantu et al, 2020* de Vries et al, 2014* ***			Achille et al, 2020 de Vries et al, 2014* López de Lara et al, 2020
Safety (Bones) GnRHa		Brik et al, 2020 Joseph et al, 2019 Khatchadourian et al, 2014 Klink et al, 2015 Vlot et al, 2017	Joseph et al, 2019 Klink et al, 2015 Navabi et al, 2021 Schagen et al, 2020 Stoffers et al, 2019 Vlot et al, 2017 Lee et al, 2020 van der Loos et al, 2021			
Safety (Bloods) GnRHa		Klaver et al, 2020 Schagen et al, 2016	Klaver et al, 2018 Klaver et al, 2020 Nokoff et al, 2020 Perl et al, 2020 Schagen et al, 2016 Schulmeister et al, 2021			
Safety (Bones) Sex Hormones	****	Khatchadourian et al, 2014 Klaver et al, 2020 Klink et al, 2015 Kuper et al, 2020 Stoffers et al, 2019 Vlot et al, 2017		Klink et al, 2015		
Safety (Bloods) Sex Hormones			Jarin, 2017 Mullins et al, 2021 Tack et al, 2016			

*Included both puberty-blockers and cross-sex hormones.
**The Endocrine Society review included bone/skeletal health, but did not explicate whether the scope included minors.
***Sweden explicitly excluded due to high risk of bias: Achille, *et al.*, (2020), Allen, *et al.* (2019), de Vries, *et al.*, (2011), and López de Lara, *et al.*, (2020).
****The Finnish review adopted the Endocrine Society review, but did not indicate whether minors were included.

D. United Kingdom

78. The National Health Service (NHS) of the United Kingdom conducted an independent review of its services for minors with gender dysphoria. (Cass 2022.) Included in that process were two systematic, comprehensive reviews of the research literature, conducted by England's National Institute for Health Care Excellence (NICE) in 2020. One regarded the efficacy, safety, and cost-effectiveness of Gonadotrophin-Releasing Hormone (GnRH) analogs (or "puberty blockers") in minors. (NICE 2020a.) The other regarded the efficacy, safety, and cost-effectiveness of cross-sex hormones, or "gender-affirming hormones," in minors. (NICE 2020b.) (Only efficacy and safety are relevant to the present report.)

79. The puberty-blocker review was tasked with reviewing the research on two relevant questions. For one:

> *In children and adolescents with gender dysphoria, what is the clinical effectiveness of treatment with GnRH analogues compared with one or a combination of psychological support, social transitioning to the desired gender or no intervention?* (NICE 2020a at 4.)

Clinical effectiveness of puberty-blockers was composed of three factors deemed "critical outcomes": impact on gender dysphoria, impact on mental health, and impact on quality of life. The second question addressed in the review was:

> *In children and adolescents with gender dysphoria, what is the short-term and long-term safety of GnRH analogues compared with one or a combination of psychological support, social transitioning to the desired gender or no intervention?* (NICE 2020a at 6.)

Puberty-blocker safety was assessed as its effect on three categories of health: bone density, cognitive development or functioning, and "other."

80. The second review, for cross-sex hormone treatment, was tasked with the corresponding questions. For one:

> *In children and adolescents with gender dysphoria, what is the clinical effectiveness of treatment with gender-affirming hormones compared with one or a combination of psychological support, social transitioning to the desired gender or no intervention?* (NICE 2020b at 4.)

The critical outcomes were again deemed to be impact on gender dysphoria, on mental health, and on quality of life. The impact on mental health was composed of indicators of depression, anxiety, and suicidality and self-injury. The second question was:

> *In children and adolescents with gender dysphoria, what is the short-term and long-term safety of gender-affirming hormones compared with one or a combination of psychological support, social transitioning to the desired gender or no intervention?* (NICE 2020b at 7.)

Cross-sex hormone treatment safety was assessed as its effect on bone density and on "clinical parameters," which included insulin, cholesterol, and blood pressure levels.

81. These two reviews included a systematic consolidation of all the research evidence, following established procedures for preventing the "cherry-picking" or selective citation favouring or down-playing any one conclusion, carefully setting out the criteria for including or excluding specific studies from the review, and providing detailed analyses of each included study. The whole was made publicly available, consistent with good practice.

82. The reviews' results were unambiguous: For both puberty blockers and cross-sex hormones, "The critical outcomes for decision making are the impact on gender dysphoria, mental health and quality of life." The quality of evidence for these outcomes was assessed as "very low" using the established GRADE procedures for assessing clinical research evidence. (NICE 2020a at 4; NICE 2020b at 4.) The reviews also assessed as "very low" the quality of evidence regarding "body image, psychosocial impact, engagement with health care services, impact on extent of satisfaction with surgery and stopping treatment" or (in the case of cross-sex hormones) of "detransition." (NICE 2020a at 5; NICE 2020b at 6.) The review of puberty blockers concluded that of the existing research, "The studies included in this evidence review are all small,

uncontrolled observational studies, which are subject to bias and confounding," "They suggest little change with GnRH analogues [puberty blockers] from baseline to follow-up." (NICE 2020a at 13.) The cross-sex hormone review likewise reported a lengthy list of methodological defects or limitations affecting all available studies. (NICE 2020b at 13-14.)

83. The NHS changed the language on its website describing puberty blockers and cross sex hormones. It removed the statement that "The effects of treatment with GnRH analogues are considered to be fully reversible,"[2] replacing that text with:[3]

> Little is known about the long-term side effects of hormone or puberty blockers in children with gender dysphoria. . . . [I]t is not known what the psychological effects may be. It's also not known whether hormone blockers affect the development of the teenage brain or children's bones.

84. As mentioned in the McMaster review, the highly respected Cochrane Library, based in England, undertook a systematic review of studies of the safety and efficacy of the administration of cross-sex hormones to natal males. That review focused primarily on adults (age 16 and older). The results, including a detailed explanation of methodology and inclusion criteria, were published in 2020. Unfortunately, but importantly, the Cochrane review found *zero* studies, globally, that were sufficiently reliable to meet the inclusion criteria even at a "very low" level of evidentiary quality. The authors reported:

> Despite more than four decades of ongoing efforts to improve the quality of hormone therapy for women in transition, we found that no RCTs or suitable cohort studies have yet been conducted to investigate the efficacy and safety of hormonal treatment approaches for transgender women in transition….We found insufficient evidence to determine the efficacy or safety of hormonal treatment approaches…for transgender women in transition. The evidence is very incomplete, demonstrating a gap between current clinical practice and clinical research. (Haupt 2020 at 10-11.)

The authors' frustration at the total lack of reliable research was evident: "The lack of reliable data

[2] BBC. Retrieved from https://www.bbc.co.uk/sounds/play/m000kgsj; Kurkup, J. (2020, June 4). *The Spectator*. Available from https://www.spectator.co.uk/article/the-nhs-has-quietly-changed-its-trans-guidance-to-reflect-reality/
[3] NHS. Retrieved from https://www.nhs.uk/conditions/gender-dysphoria/treatment/

on hormone therapy for transitioning transgender women should encourage the development of well-planned RCTs and cohort studies to evaluate widespread empirical practice in the treatment of gender dysphoria." (Haupt 2020 at 10.)

E. Sweden

85. Sweden similarly commissioned a systematic review, published in 2022 and charged with addressing these three questions:

> *Are there any scientific studies explaining the increase in numbers seeking for gender dysphoria?*
>
> *Are there any scientific studies on long-term effects of treatment for gender dysphoria?*
>
> *What scientific papers on diagnosis and treatment of gender dysphoria has been published after the National Board of Health and Welfare in Sweden issued its national support for managing children and adolescents with gender dysphoria in 2015?* (SBU Scoping Review Summary 2019.)

The databases searched included CINAHL (EBSCO), Cochrane Library (Wiley), EMBASE (Embase.com), PsychINFO (EBASCO), PubMed (NLM), Scopus (Elsevier), and SocINDEX (EBSCO). A total of 8,867 abstracts were identified, from which 315 full text articles were assessed for eligibility. The review concluded that "literature on management and long-term effects in children and adolescents is sparse," that no RCTs have been conducted, and that there remains no explanation for the recent and dramatic increases in numbers of minors presenting with gender dysphoria. (SBU Scoping Review Summary 2019.) I have quoted other conclusions from the Swedish systematic review in Section II above.

F. Finland

86. Finland's Ministry of Social Affairs and Health commissioned a systematic review, completed in 2019, of the effectiveness and safety of medicalized transition. (COHERE Recommendation 2020.) The review spanned both minors and adults and included both puberty

blockers and cross-sex hormones (Pasternack 2019). Three reviewers tabulated the results. In total, 38 studies were identified, of which two pertained to minors: de Vries (2011) and Costa (2015). The report noted that, because the methodological quality of the studies was already "weak" (no study including any control groups), the assessors declined detailed quality assessment of the existing studies. (Pasternack 2019 at 3.) I have quoted other conclusions from the Finnish systematic review in Section II above.

G. Norway

87. Norway's investigation of its health care policy for gender dysphoric minors also revealed substantial safety concerns:

> There are unsettled questions related to puberty blockers in young people. A published study shows that puberty-inducing hormones cause slower height growth and a slower increase in bone density. It is also noted that the effects on cognitive development have not been mapped. Unexplained side effects and long-term effects of both puberty blockers (hormone treatment) and gender-affirming hormone treatments are increasingly being questioned. However, experience with other patient groups shows that long-term use of sex hormones can affect disease risk. When people with gender incongruence are treated, it is with significantly longer duration and intensity of hormone treatment than hormone treatments for other conditions. (Ukom 2023.)

VI. The Endocrine Society, WPATH, and the American Academy of Pediatrics did not conduct systematic reviews of safety and efficacy in establishing clinical guidelines, despite systematic reviews being the foundation and gold standard of evidence-based care.

88. I have also examined the reviews conducted by the U.S.-based professional associations that have published standards and guidelines for the treatment of gender dysphoric youth. As detailed herein, and unlike the European reviews, none of the U.S.-based professional associations conducted a systematic review of both effectiveness and safety, without which they are unable to assess the risk:benefit ratio posed by medicalized transition of minors.

A. The Endocrine Society reviewed cross-sex hormones, but not puberty blockers. They reviewed safety, but did not review effectiveness research.

89. The Endocrine Society appointed a task force which commissioned two systematic reviews as part of updating their 2009 recommendations. (Hembree 2017.) The scopes of the two reviews were limited to physiological effects of cross-sex hormones, narrowly defined: "The first one aimed to summarize the available evidence on the effect of sex steroid use in transgender individuals on lipids and cardiovascular outcomes….The second review summarized the available evidence regarding the effect of sex steroids on bone health in transgender individuals." (Hembree 2017 at 3873.) As described in the Endocrine Society Guidelines, those reviews did not, however, include the effectiveness of any treatment on mental health (quality of life, suicidality, rates of detransition, cosmetic or functional outcomes, or improvements in feelings of gender dysphoria). What appears to be the referenced review of lipids and cardiovascular outcomes (Maraka 2017) did not identity any study of adolescents, noting "literature addressing this clinical question in the pediatric/adolescent population is completely lacking." (Maraka at 3921.) What appears to be the referenced review of bone health (Singh-Ospina 2017) identified only one small study on adolescents, involving 15 male-to-female and 19 female-to-male cases. (Klink 2015.) Notably, the

median duration of puberty-blocker administration was 1.2 years, leaving unknown the effects on children receiving blockers from puberty onset (usually age 9–10) to age 14 or 16.

90. Further, the Endocrine Society does not claim to have conducted or consulted any systematic review of the efficacy of puberty blockers or cross-sex hormones to reduce gender dysphoria or increase mental health or well-being by any metric. Nor does it claim to have conducted or consulted any systematic review of safety of any of these treatments for minors with respect to brain development, future fertility, actual reversibility, or any other factor of safety or adverse event other than cardiovascular disease and bone strength.

91. For all these reasons, I concur with the opinion of Dr. Guyatt, who has said that he finds "serious problems" with the Endocrine Society guidelines, among other reasons because the only systematic reviews those guidelines refer to did not look at the efficacy of the recommended hormonal interventions to improve gender dysphoria, which he termed "the most important outcome." (Block, Gender Dysphoria 2023 at 4.)

92. The current Endocrine Society guidelines, released in 2017, include this disclaimer:

> The Endocrine Society makes no warranty, express or implied, regarding the guidelines and specifically excludes any warranties of merchantability and fitness for a particular use or purpose. The Society shall not be liable for direct, indirect, special, incidental, or consequential damages related to the use of the information contained herein. (Hembree 2017 at 3895.)

The previous, 2009, version included no disclaimers. (Hembree 2009.)

B. WPATH reviewed effectiveness, but not the safety of medicalized transition of minors.

93. WPATH engaged in a multi-step process in updating its Standards of Care from version 7 to version 8. That process included commissioning a systematic review, which was published as Baker, *et al.* (2021) which included the disclaimer "The authors are responsible for its content. Statements in this report do not necessarily reflect the official views of or imply endorsement by

WPATH." (Baker 2021 at 14.)

94. The literature search was completed in June 2020, and spanned 13 questions. Two questions related to the effectiveness of medicalized transition of minors: Question #10 was "[W]hat are the effects of suppressing puberty with GnRH agonists on quality of life?", and question #11 was "[W]hat are the psychological effects (including quality of life) associated with hormone therapy?" (Sharma 2018; Baker 2021.) That is, the review included studies of the effectiveness of puberty blockers and cross-sex hormones, but, remarkably did not include any effort to determine the *safety* of either.

95. Baker (2021) identified that among all experimental evidence published on medicalized transition, a total of "Three studies focused on adolescents." (Baker 2021 at 1.) These were Achille, *et al.* (2020), López de Lara, *et al.* (2020), and de Vries, *et al.* (2011, 2014). (Baker 2021 considered the two de Vries articles as a single study, because the later one included the subset of patients from the earlier one who continued in treatment. I will refer to this set as four studies, however, to be consistent with the other reviews.) Notably, in contrast with WPATH's review, the Swedish review entirely excluded Achille *et al.* (2020), López de Lara *et al.* (2020), and de Vries *et al.* (2011) due to their high risks of bias. (SBU Scoping Review Appendix 2.) The Baker team did not used the GRADE system for assessing the quality of evidence, instead using the Methods Guide for Conducting Comparative Effectiveness Reviews.

96. The Baker team noted "no study reported separate results by gender identity for transgender youth." (Baker 2021 at 3.) They also found that "No study reported on hormone therapy among nonbinary people." (at 3.) (Despite this finding, WPATH SOC-8 now includes recommendations for people who identify as nonbinary.)

97. My assessment of the Baker review revealed that there were substantial discrepancies

and misleading ambiguities in their reporting: Baker, *et al.* indicated in the abstract that "Hormone therapy was associated with increased QOL [quality of life], decreased depression, and decreased anxiety" (Baker 2021 at 1,) and that "Associations were similar across gender identity and age" (Baker 2021 at 12). This is not what its actual data tables showed, however. Table 2 presented the only study of QOL specifically among adolescents included in the review and indicated that "Mean QOL scores did *not* change." (Baker 2021 at 7, italics added.)

98. The review, however, did not rate the quality of the studies of adolescents on their own, instead combining them with the studies of adults. (at 10, italics added.) Table 4 of that study presented three analyses of anxiety: One showed a decrease, and on the other two, "Mean anxiety score did *not* change." (at 11, italics added.) Finally, the review also concluded, "It was impossible to draw conclusions about the effects of hormone therapy on death by suicide." (at 12.) Even for the combined set, the review read the strength of evidence to be "low" for each of QOL, depression, and anxiety, and to be "insufficient" for death by suicide. (Baker 2021 at 13, Table 6.) Specifically, the review indicated, "There is insufficient evidence to draw a conclusion about the effect of hormone therapy on death by suicide among transgender people." (at 13, Table 6.) Overall, "The strength of evidence for these conclusions is low due to methodological limitations." (at 12.) Of particular concern was that "Uncontrolled confounding was a major limitation in this literature." (at 12.)

99. Additionally, although WPATH commissioned the Baker review, WPATH did not follow its results. Baker 2021 indicated the use of two systematic quality assessment methods, called RoB 2 and ROBINS-I (Baker 2021 at 3); however, WPATH modified the conclusions that that process yielded. WPATH SOC-8 states, "This evidence is not only based on the published literature (direct as well as background evidence) but also on consensus-based expert opinion."

(Coleman 2022 at S8.) Moreover:

> Recommendations in the SOC-8 are based on available evidence supporting interventions, a discussion of risks and harms, as well as feasibility and acceptability within different contexts and country settings. Consensus on the final recommendations was attained using the Delphi process that included all members of the guidelines committee and required that recommendation statements were approved by at least 75% of members. (Coleman 2022 at S8.)

100. By allowing "consensus-based expert opinion" to modify or overrule conclusions supported by systematic reviews that apply accepted criteria of evidentiary strength, WPATH has explicitly abandoned evidence-based medicine. As indicated already by the Pyramid of Evidence, "expert opinion" represents the *lowest* level of evidence in science, whereas systematic review, the highest. (Also, it is unclear what the authors mean by "background evidence.") To modify systematic results according to committee opinion is to re-introduce the very biases that the systematic process is meant to overcome. The WPATH document attempts to claim the authority of a systematic review, while reserving the ability to "overrule" results that WPATH members did not like.

101. As to evidence supporting hormonal interventions in minors, WPATH asserted that "a systematic review regarding outcomes of [hormonal] treatment in adolescents is not possible" due to the lack of "outcome studies that follow youth into adulthood." (Coleman 2022 at S46.) WPATH is correct that essential outcome studies have not been done, but incorrect that this authorizes issuance of guidelines or standards in the absence of a systematic review. As Dr. Guyatt has stated, "systematic reviews are always possible"—and indeed an important conclusion from such a review may be (as here) that insufficient evidence exists to support any evidence-based guideline. As Dr. Guyatt further elaborated, if an organization issues recommendations without performing an on-point systematic review, "they'd be violating standards of trustworthy guidelines." (Block, Dysphoria Rising, 2023 at 3.)

102. Finally, the WPATH SOC-8 were revised immediately after their release, removing all age minimums to all recommendations. None of these studies and none of these reviews support such a change, and WPATH cites no studies or other document in support of the change.

103. In sum, the WPATH SOC8 cannot be called evidence-based guidelines under any accepted meaning of that term.

C. The American Academy of Pediatrics did not conduct a systematic review either of safety or effectiveness.

104. While the AAP policy statement is often referenced, the AAP did not report conducting any systematic review of any aspect of transgender care in producing its policy statement on gender-diverse children and adolescents. (Rafferty 2018.) Further, the AAP policy statement on its face is the work of a single author rather than of any committee or the membership more broadly (Dr. Rafferty "conceptualized," "drafted," "reviewed," "revised," and "approved" the statement), and the statement explicitly states that it does not "indicate an exclusive course of treatment" nor "serve as a standard of medical care." (Rafferty 2018 at 1.)

VII. Definitions of sex, gender identity, and gender dysphoria.

A. Sex and sex-assigned-at-birth represent objective features.

105. Sex is an *objective* feature: It can be ascertained regardless of any declaration by a person, such as by chromosomal analysis or visual inspection. Gender identity, however, is *subjective:* There exists no means of either falsifying or verifying people's declarations of their gender identities. In science, it is the objective factors—and only the objective factors—that matter to a valid definition. Objectively, sex can be ascertained, not only in humans or only in the modern age, but throughout the animal kingdom and throughout its long history in natural evolution.

106. I use the term "sex" in this report with this objective meaning, which is consistent with definitions articulated by multiple medical organizations:

Endocrine Society (Bhargava 2021 at 220.)

> "Sex is dichotomous, with sex determination in the fertilized zygote stemming from unequal expression of sex chromosomal genes."

American Academy of Pediatrics (Rafferty 2018 at 2 Table 1.):

> "An assignment that is made at birth, usually male or female, typically on the basis of external genital anatomy but sometimes on the basis of internal gonads, chromosomes, or hormone levels."

American Psychological Association (APA Answers 2014):

> "Sex is assigned at birth, refers to one's biological status as either male or female, and is associated primarily with physical attributes such as chromosomes, hormone prevalence, and external and internal anatomy."

American Psychological Association (APA Resolution 2021 at 1):

> "While gender refers to the trait characteristics and behaviors culturally associated with one's sex assigned at birth, in some cases, gender may be distinct from the physical markers of biological sex (e.g., genitals, chromosomes)."

American Psychiatric Association (Am. Psychiatric Ass'n Guide):

> "Sex is often described as a biological construct defined on an anatomical, hormonal, or genetic basis. In the U.S., individuals are assigned a sex at birth based on external genitalia."

107. The phrases "assigned male at birth" and "assigned female at birth" are increasingly popular, but they lack any scientific merit. Science is the systematic study of natural phenomena, and nothing objective changes upon humans' labelling or re-labelling it. That is, the objective sex of a newborn was the same on the day before as the day after the birth. Indeed, the sex of a fetus is typically known by sonogram or amniocentesis many months before birth. The use of the term "assign" insinuates that the label is arbitrary and that it was possible to have been assigned a different label that is equally objective and verifiable, which is untrue. Infants were born male or female before humans invented language at all. Indeed, it is exactly because an expected child's sex is known before birth that there can exist the increasingly popular "gender reveal" events. Biologically, the sex of an individual (for humans and almost all animal species) as male or female is irrevocably determined at the moment it is conceived. Terms such as "assign" obfuscate rather than clarify the objective evidence.

B. Gender identity refers to subjective feelings that cannot be defined, measured, or verified by science.

108. It is increasingly popular to define gender identity as a person's "inner sense," however, neither "inner sense" nor any similar phrase is scientifically meaningful. In science, a valid construct must be both objectively measurable and falsifiable with objective testing. The concept of an "inner sense" fits none of these requirements.

VIII. Gender Dysphoria is a mental health diagnosis.

109. Gender Dysphoria is a mental health condition defined by diagnostic criteria set out in the *Diagnostic and Statistical Manual of Mental Disorders* ("DSM") 5-TR. (American Psychiatric Ass'n 2022.) While the definitions contain multiple components and vary modestly for children, adolescents, and adults, all cases are characterized by a strong and lasting desire to be the opposite sex, and "clinically significant" distress of sufficient severity to impair the individuals' ability to function in their daily life setting. Gender dysphoria is nowhere defined as a medical (as opposed to mental health) condition, and it is not characterized by any disability or impairment or ill health affecting any part of the physical body.

IX. Distinct mental health phenomena must not be—but frequently are—confused or conflated.

110. One of the most widespread public misunderstandings about transsexualism and people with gender dysphoria is that all cases of gender dysphoria represent the same phenomenon; however, the clinical science has long and consistently demonstrated that prepubescent children expressing gender dysphoria represent a phenomenon distinct from that of adults starting to experience it. That is, gender dysphoric children are not simply younger versions of gender dysphoric adults. They differ in virtually every objective variable measured, including in their responses to treatments. A third presentation has recently become increasingly observed among people presenting to gender clinics: these cases appear to have an onset in adolescence—after the onset of puberty and before adulthood—and occur in the absence of any childhood history of gender dysphoria. Such cases have been called adolescent-onset or "rapid-onset" gender dysphoria (ROGD). Despite having only recently been observed, they have quickly and greatly outnumbered the better characterized types. Moreover, large numbers of adolescents are today self-identifying in surveys as "gender fluid" and "non-binary." These are not recognized mental health diagnoses, and do not relate in any known way to gender dysphoric groups that have been the subject of previous treatment outcome studies. Because each of these phenomena differ in multiple objective features, it is scientifically invalid to extrapolate findings from one type to the others.

A. Adult-Onset Gender Dysphoria consists predominantly of males sexually attracted to females.

111. Whereas Childhood-Onset Gender Dysphoria occurs in biological males and females and is strongly associated with later homosexuality (next section), Adult-Onset Gender Dysphoria consists primarily of biological males sexually attracted to females. (Lawrence 2010.) They typically report being sexually attracted to women and rarely showed gender atypical (effeminate)

behavior or interests in childhood (or adulthood). Some individuals express being sexually attracted to both men and women, and some profess asexuality, but very few indicate having a primary sexual interest only in men. (Blanchard 1998.) Cases of adult-onset gender dysphoria are typically associated with a sexual interest pattern involving themselves in female form (a paraphilia called autogynephilia). (Blanchard 1989a, 1989b, 1991.)

112. Because of the numerous objective differences between adult-, childhood-, and adolescent-onset gender dysphoria, it is not possible to extrapolate from these results to juvenile populations, which responsible authors are careful not to do.

B. Childhood-onset gender dysphoria (prepubertal-onset) is a distinct phenomenon characterized by high rates of desistance in the absence of social or medical transition.

113. For many decades, small numbers of prepubescent children have been brought to mental health professionals for help with their unhappiness with their sex and in the belief they would be happier living as the other sex. The large majority of childhood onset cases of gender dysphoria occur in biological males, with clinics reporting 2–6 biological male children to each female. (Cohen-Kettenis 2003; Steensma Evidence 2018; Wood 2013.)

1. Eleven cohort studies followed children not permitted social transition, all showing the majority to desist feeling gender dysphoric upon follow-up after puberty.

114. Currently, the studies of outcomes among children who experience gender dysphoria before puberty that provide the most evidentiary strength available are only "cohort studies," which follow people over time, recording the outcomes of the treatments they have undergone. Such studies supersede (i.e., overrule) the outcomes of surveys, which are much more prone to substantial error. As I have explained above, however, cohort studies can describe developmental pathways, but cannot provide evidence of causation.

115. In total, there have been 11 cohort studies showing the outcomes for these children, listed in Table 2. I first published this comprehensive list of studies in my own peer-reviewed article on the topic. (Cantor 2019.)

Table 2. Cohort studies of gender dysphoric, prepubescent children.

Count	Group	Study
2/16 4/16 10/16	gay trans-/crossdress straight/uncertain	Lebovitz, P. S. (1972). Feminine behavior in boys: Aspects of its outcome. *American Journal of Psychiatry, 128,* 1283–1289.
2/16 2/16 12/16	trans- uncertain gay	Zuger, B. (1978). Effeminate behavior present in boys from childhood: Ten additional years of follow-up. *Comprehensive Psychiatry, 19,* 363–369.
0/9 9/9	trans- gay	Money, J., & Russo, A. J. (1979). Homosexual outcome of discordant gender identity/role: Longitudinal follow-up. *Journal of Pediatric Psychology, 4,* 29–41.
2/45 10/45 33/45	trans-/crossdress uncertain gay	Zuger, B. (1984). Early effeminate behavior in boys: Outcome and significance for homosexuality. *Journal of Nervous and Mental Disease, 172,* 90–97.
1/10 2/10 3/10 4/10	trans- gay uncertain straight	Davenport, C. W. (1986). A follow-up study of 10 feminine boys. *Archives of Sexual Behavior, 15,* 511–517.
1/44 43/44	trans- cis-	Green, R. (1987). The "sissy boy syndrome" and the development of homosexuality. New Haven, CT: Yale University Press.
0/8 8/8	trans- cis-	Kosky, R. J. (1987). Gender-disordered children: Does inpatient treatment help? *Medical Journal of Australia, 146,* 565–569.
21/54 33/54	trans- cis-	Wallien, M. S. C., & Cohen-Kettenis, P. T. (2008). Psychosexual outcome of gender-dysphoric children. *Journal of the American Academy of Child and Adolescent Psychiatry, 47,* 1413–1423.
3/25 6/25 16/25	trans- lesbian/bi- straight	Drummond, K. D., Bradley, S. J., Badali-Peterson, M., & Zucker, K. J. (2008). A follow-up study of girls with gender identity disorder. *Developmental Psychology, 44,* 34–45.
47/127 80/127	trans- cis-	Steensma, T. D., McGuire, J. K., Kreukels, B. P. C., Beekman, A. J., & Cohen-Kettenis, P. T. (2013). Factors associated with desistence and persistence of childhood gender dysphoria: A quantitative follow-up study. *Journal of the American Academy of Child and Adolescent Psychiatry, 52,* 582–590.

17/139 122/139	trans- cis-	Singh, D., Bradley, S. J., Zucker, K. J. (2021). A follow-up study of boys with Gender Identity Disorder. *Frontiers in Psychiatry*, 12:632784.

*For brevity, the list uses "gay" for "gay and cis-", "straight" for "straight and cis-", etc.

116. The children in these studies were receiving professional mental health support during the study period, but did not "socially transition." In sum, despite coming from a variety of countries, conducted by a variety of labs, using a variety of methods, at various times across four decades, every study without exception has come to the identical conclusion: among prepubescent children who feel gender dysphoric, the majority cease to want to be the other gender over the course of puberty—ranging from 61–88% desistance across the large, prospective studies. Such cases are often referred to as "desisters," whereas children who continue to feel gender dysphoric are often called "persisters."

117. This interpretation of these studies is widely accepted, including by the Endocrine Society, which concluded:

> In most children diagnosed with GD/gender incongruence, it did not persist into adolescence. . . . [T]he large majority (about 85%) of prepubertal children with a childhood diagnosis did not remain GD/gender incongruent in adolescence. (Hembree 2017 at 3879.)

The developers of the Dutch Protocol, at the Vrije University gender clinic, likewise concluded based on these studies that "Although the persistence rates differed between the various studies…the results unequivocally showed that the gender dysphoria remitted after puberty in the vast majority of children." (Steensma & Cohen-Kettenis 2011 at 2.)

118. The consistent observation of high rates of desistance among pre-pubertal children who present with gender dysphoria demonstrates a pivotally important—yet often overlooked—feature: because gender dysphoria so often desists on its own, clinical researchers cannot assume that therapeutic intervention cannot facilitate or speed desistance for at least some patients. That

is, it cannot be assumed that gender identity is immune to influence such as from psychotherapy. Such is an empirical question, and there has not yet been any such research.

119. These same studies are often vaguely cited to assert that the high desistance rates uniformly reported in these 11 studies do not apply to children who have persisted until "the start of puberty" (which is taken to mean Tanner Stage 2), or in an alternative phrasing, that children "who persist until the start of puberty" are likely to continue to persist into adulthood. But these studies taken together do not support that degree of precision. Rather, the studies do not specify at exactly what developmental stage the reported desistance occurred—what they report is that the subjects had desisted by late adolescence or early adulthood. I am aware of no systematic study that establishes that— in the absence of social and/or medical transition—children who experience gender dysphoria are unlikely to desist if they have not desisted by the start of Tanner Stage 2.

2. One cohort study followed children who were permitted social transition. In contrast with children not permitted to transition socially, most persisted in expressing gender dysphoria.

120. In contrast, Olson et al. have now published a single cohort study of prepubescent children, ages 3–12 (average of 8), who had already made a complete, binary (rather than intermediate) social transition, including a change of pronouns. (Olson 2022.) The study did not employ DSM-5 diagnosis, as "Many parents in this study did not believe that such diagnoses were either ethical or useful and some children did not experience the required distress criterion." (Olson 2022.) Unlike the prior research studies, only 7.3% of these (socially transitioned) children ceased to feel gender dysphoric.

121. Although the team publishing this cohort study did not discuss it, their finding matches the prediction of other researchers, that social transition itself represents an active intervention, such that social transition may *cause* the persistence of gender dysphoria when it would have

otherwise resolved, avoiding any need for subsequent medicalization and its attendant risks. Conversely stated, social transition seems to prevent desistance. (Singh 2021; Zucker 2018, 2020.)

122. As recognized by multiple authors, the potential impact of social transition on rates of desistance is pivotal. The Endocrine Society cautions that "social transition...has been found to contribute to the likelihood of persistence." (Hembree 2017 at 3879.) WPATH has stated that after social transition, "A change back to the original gender role can be highly distressing and [social transition can] even result in postponement of this second transition on the child's part." (Coleman 2012 at 176.) In 2013, prominent Vrije University researchers observed:

> Childhood social transitions were important predictors of persistence, especially among natal boys. Social transitions were associated with more intense GD in childhood, but have never been independently studied regarding the possible impact of the social transition itself on cognitive representation of gender identity or persistence. [Social transition] may, with the hypothesized link between social transitioning and the cognitive representation of the self, influence the future rates of persistence. (Steensma 2013 at 588-589.)

3. There is no reliable method for predicting for which children who present with gender dysphoria will persist versus desist.

123. The Endocrine Society Guidelines stated in 2017 that "With current knowledge, we cannot predict the psychosexual outcome for any specific child" (Hembree 2017 at 3876), and this remains true today. Research has not yet identified any reliable procedure for discerning which children who present with gender dysphoria will persist, as against the large majority who will desist, absent transition and "affirmation." Such a method would be valuable, as the more accurately that potential persisters can be distinguished from desisters, the better the risks and benefits of options can be weighted. Such "risk prediction" and "test construction" are standard components of applied statistics in the behavioral sciences. Multiple research teams have reported that, on average, groups of persisters are somewhat more gender non-conforming than desisters, but not so different as to usefully predict the course of any particular child. (Singh 2021;

Steensma 2013.)

124. In contrast, one research team (the aforementioned Olson group) claimed the opposite, asserting that they developed a method of distinguishing persisters from desisters, using a single composite score representing a combination of children's "peer preference, toy preference, clothing preference, gender similarity, and gender identity." (Rae 2019 at 671.) They reported a statistical association (mathematically equivalent to a correlation) between that composite score and the probability of persistence. As they indicated, "Our model predicted that a child with a gender-nonconformity score of .50 would have roughly a .30 probability . . . of socially transitioning. By contrast, a child with gender-nonconformity score of .75 would have roughly a .48 probability." (Rae 2019 at 673.) Although the Olson team declared that "social transitions may be predictable from gender identification and preferences" (Rae 2019 at 669), their actual results suggest the opposite: the gender-nonconforming group who went on to transition (socially) had a mean composite score of .73 (which is less than .75), and the gender-nonconforming group who did not transition had a mean composite score of .61, also less than .75. (Rae 2019, Supplemental material at 6, Table S1.) Both of those are lower than the value of .75, so both of those would be more likely than not to desist, rather than to proceed to transition. That is, Olson's model does not distinguish likely from unlikely to transition; rather, it distinguishes unlikely from even less likely to transition.

125. Further, in the absence of long-term follow-up, it cannot be known what proportion of those who transition and persist through the early stages of puberty will later (for example as young adults) come to regret having transitioned and then *de*transition. Because only a minority of gender dysphoric children persist in feeling gender dysphoric in the first place, "transition-on-demand" increases the probability of unnecessary transition and unnecessary medical risks.

4. Temple Newhook's attempts to dismiss evidence of high rates of desistance from childhood gender dysphoria are invalid.

126. The unanimous consistency across all 11 cohort studies of (non-transitioned) gender dysphoric children offers high confidence in the conclusion that most childhood-onset cases desist during the course of puberty. In 2018, however, a commentary was published, contesting that conclusion, criticizing four studies. (Temple Newhook 2018.) Multiple accomplished international researchers studying outcomes of gender dysphoric children responded (Zucker 2018; Steensma & Cohen-Kettenis 2018), to which the Temple Newhook team wrote a rejoinder. (Winters 2018.) I have reviewed each of these arguments, finding that the Temple Newhook comments rely on demonstrable falsehoods, whereas the responses remain consistent with the peer-reviewed evidence. The Temple Newhook commentary has not altered the consensus of the international medical community, which continues to cite and rely upon these cohort studies.

127. Before delineating each of their arguments, it should be noted that the Temple Newhook team based their analysis on the wrong research reports, attacking only a straw-person version of the contents of the research literature. Table 3 repeats the 11 cohort studies (on the left left) and the four studies Temple Newhook criticized (right):

Table 3.

- Lebovitz (1972)
- Zuger (1978)
- Money & Russo (1979)
- Zuger (1984)
- Davenport (1986)
- Green (1987)
- Kosky (1987)
- Wallien & Cohen-Kettenis (2008)
- Drummond, *et al.* (2008)
- Steensma, *et al.* (2013)
- Singh, 2012/Singh, *et al.* (2021)[4]

- Wallien & Cohen-Kettenis (2008)
- Drummond, *et al.* (2008)
- Steensma, *et al.* (2011, 2013)

128. It should be noted that the Temple Newhook 2018 commentary does not represent a systematic review. Temple Newhook did not indicate search strategies, inclusion/exclusion criteria, coding methods, reliability checks, or other standard procedures used for ensuring objective and unbiased assessment of all relevant studies. Rather, the Temple Newhook analysis targeted a small and selective subset of the research available—a scientifically invalid endeavor, which the systematic review process is meant to prevent. Not only did Temple Newhook skip most of the relevant science, but conversely, Temple Newhook inserted the Steensma 2011 study, which should have been rejected. (The data it reported was already included in Wallien & Cohen-Kettenis 2008.) The Temple Newhook commentary claimed it was "systematically engaging scholarly literature" (Temple Newhook 2018 at 2); however, as the above reference lists demonstrate, that commentary involved no such systematic procedures.

129. Temple Newhook does not report any research evidence of its own. Rather, the commentary hypothesizes issues they assert could, theoretically, have affected the rates of desistance consistently detected. Scientifically, such a criticism is vacuous: In science, it is always possible for additional, external factors to have affected what was observed.

[4] At the time of the 2018 Temple Newhook commentary, the Singh *et al.*, 2021 study was available as Singh, 2012.

130. Also, as already detailed herein, the currently available level of evidence for outcomes of medicalized transition is the cohort study. The methodological issues highlighted by Temple Newhook are exactly why randomized, controlled trials (RCTs) need to be conducted, as such studies would be capable of resolving exactly those questions (in whichever direction). In the absence of randomized, controlled studies, however, the correct scientific process is to follow the results of the cohort studies (that is, the systematic reviews of the cohort studies).

131. In the science process, one cannot merely continue to retain a desired hypothesis, rejecting all counter-evidence until a perfect study emerges. This is especially important in clinical science, when the hypothesis relates to physical interventions, in children, with the potential to affect them for their entire lives. Rather, the scientific process proceeds by successive approximation, with results from the best available research replacing lesser quality research, increasing in confidence, but always with the possibility of changes imposed by future evidence.

132. By involving only a few of the full set of cohort studies, the Temple Newhook commentary removes one of the most compelling implications of the existing (cohort) studies: Their results are unanimous. However unlikely it might be for four studies to produce the same result randomly, it is even more unlikely for eleven studies all to come to the same result randomly.

133. Temple Newhook emphasized that gender identity issues differ across times and contexts/political environments, hypothesizing that children attending her clinic might differ from children attending the Toronto and the Amsterdam clinics. Returning once again to the full set of all studies, however, the evidence shows the very opposite: All studies yielded the same result, whether from the 1970s, 80s, 90s, 2000s, 2010s, and wherever in the world any clinic was. Acknowledging the possibility that future studies may lead to a different conclusion, the existing evidence shows majority desistance, constantly and across all time periods.

134. Consideration of the full set of studies also indicates that the contrast is not Toronto and Amsterdam versus whatever "reality" Temple Newhook perceives. Rather, they show the contrast is between Temple Newhook and every facility in every country ever reporting desistance data on childhood-onset gender dysphoria. Moreover, despite Temple Newhook's mention of influences of political cultures, that commentary does not point out that Canada and the Netherlands are much more politically liberal than the U.S. Although the commentary offers the hypothesis that the Canadian and Dutch contexts might decrease persistence, the commentary does not include the inverse possibility: that these liberal environments might be *"iatrogenic"*—that is, causing dysphoria to continue when it might otherwise remit.

135. Also, the very evidence suggesting that gender dysphoria can be influenced by local environmental factors is itself evidence that gender identity is not, in fact, an innate and immutable feature, potentially amenable to change.

C. Adolescent-Onset Gender Dysphoria, the predominant clinical population today, is a distinct and largely unstudied phenomenon.

136. Concurrent with the advent of social media, a third profile began appearing clinically and socially, characteristically distinct from the two previously identified profiles. (Kaltiala-Heino 2015; Littman 2018.) Despite lacking any history before the current generation, this profile has now numerically overwhelmed the previously known and better characterized types in clinics and on Internet surveys. Unlike adult-onset or childhood-onset gender dysphoria, this group is predominately biologically female. This group typically presents in adolescence, but lacks the history of cross-gender behavior in childhood like the childhood-onset cases have. It is that feature which led to the term Rapid Onset Gender Dysphoria (ROGD). (Littman 2018.)[5] Cases commonly

[5] After initial criticism, the publishing journal conducted a reassessment of the article. The article was expanded with additional detail and republished. The relevant results were unchanged. Littman's paper as revised has been widely cited.

appear to occur within clusters of peers in association with increased social media use (Littman 2018), and among people with autism or other mental health issues. (Kaltiala-Heino 2015; Littman 2018; Warrier 2020.) (See section XI on Mental Health.) The patterns reported by Littman have now been independently replicated by another study which also found it to be a predominantly female phenomenon, associated with very high rates of social media use, among youth with other mental health issues, and in association with peers expressing gender dysphoria issues. (Diaz 2023.) Due to the multiple differences across the epidemiological and other objective variables, there is no justification for extrapolating findings from adult-onset or childhood-onset gender dysphoria to this new presentation.

137. There do not yet exist any cohort studies of people with adolescent-onset gender dysphoria undergoing medicalized transition. Current studies are limited to surveys typically of volunteers from activist and support groups on the Internet.

138. Moreover, no study has yet been organized in such a way as to allow for a distinct analysis of the adolescent-onset group, as distinct from childhood-onset or adult-onset cases. Many published studies fail to distinguish between people who had childhood-onset gender dysphoria and have aged into adolescence versus people whose onset was not until adolescence. (Analogously, there are reports failing to distinguish people who had adolescent-onset gender dysphoria and aged into adulthood from adult-onset gender dysphoria.) Studies selecting groups according to their current age instead of their ages of onset produces confounded results, representing unclear mixes according to how many of each type of case wound up in the final sample.

X. Suicide and suicidality are distinct phenomena representing different mental health issues and indicating different clinical needs.

139. *Suicide* refers to completed suicides and the sincere intent to die. It is substantially associated with impulsivity, using more lethal means, and being a biological male. (Freeman 2017.) *Suicidality* refers to *para*-suicidal behaviors, including suicidal ideation, threats, and gestures.

A. Rates of suicidality among all adolescents have skyrocketed with the advent of social media.

140. The CDC's 2019 Youth Risk Behavior Survey found that 24.1% of female and 13.3% of male high school students reported "seriously considering attempting suicide." (Ivey-Stephenson 2019 at 48.)

141. The CDC survey reported not only that these already alarming rates of suicide attempt were still increasing (by 8.1%–11.0% per year), but also that this increase was occurring only among female students. No such trend was observed among male students. That is, the demographic increasingly reporting suicidality is the same demographic increasingly reporting gender dysphoria. (Ivey-Stephenson at 51.)

142. The U.S. Substance Abuse and Mental Health Services Administration (SAMHSA) produces a series of evidence-based resource guides which includes their Treatment for Suicidal Ideation, Self-Harm, and Suicide Attempts Among Youth. It noted (italics added):

> [F]rom 1999 through 2018, the suicide death rate doubled for females aged 15 to 19 and 20 to 24. For youth aged 10 to 14, the suicide death rate more than tripled from 2001 to 2018. Explanations for the increase in suicide may include bullying, social isolation, increase in technology and *social media*, increase in *mental illnesses*, and economic recession. (SAMHSA 2020 at 5.)

The danger potentially posed by social media follows from suicidality spreading as a social contagion, as suicidality increases after media reports, occurs in clusters of social groups, and in

adolescents after the death of a peer. (Gould & Lake 2013.)

143. Social media voices today loudly advocate "hormones-on-demand" while issuing hyperbolic warnings that teens will commit suicide unless this is not granted. Both adolescents and parents are exposed to the widely circulated slogan that "I'd rather have a living son than a dead daughter," and such baseless threats or fears are treated as a justification for referring to affirming gender transitions as 'life-saving' or 'medically necessary'. Such claims grossly misrepresent the research literature, however. Indeed, they are unethical: Suicide prevention research and public health campaigns repeatedly warn against circulating messages that can be taken to publicize or even glorify suicide, due to the risk of copy-cat behavior they encourage. (Gould & Lake 2013.)

144. Systematic review of 44 studies of suicidal thoughts and behaviors in LGBTQ youth and suicidality found only a small association between suicidality and sexual minority stress. (Hatchel 2021.) The quantitative summary of the studies (an especially powerful type of systematic review called *meta-analysis*) found no statistically significant association between suicidality and any of having an unsupportive school climate, stigma and discrimination, or outness/openness. There were, however, significant associations between suicidality and indicators of social functioning problems, including violence from intimate partners, victimization from LGBT peers and from non-LGBT peers, and sexual risk taking.

B. *Suicidality* is substantially more common among females, and *suicide*, among males. Sexual orientation is strongly associated with suicidality, but much less associated with suicide.

145. Notwithstanding public misconceptions about the frequency of suicide and related behaviors, the highest rates of death by suicide are among middle-aged and elderly men in high income countries. (Turecki & Brent 2016 at 3.) Males are at three times greater risk of death by suicide than are females, whereas suicidal ideation, plans, and attempts are three times more

common among females. (Klonsky 2016; Turecki & Brent 2016.) In contrast with completed suicides, the frequency of suicidal ideation, plans, and attempts is highest during adolescence and young adulthood, with reported ideation rates spanning 12.1–33%. (Borges 2010; Nock 2008.) Relative to other countries, Americans report elevated rates of each of suicidal ideation (15.6%), plans (5.4%), and attempts (5.0%). (Klonsky 2016.) Suicide attempts occur up to 30 times more frequently than completed suicides. (Bachmann 2018.) The rate of completed suicides in the U.S. population is 14.5 per 100,000 people. (WHO 2022.)

146. There is substantial research associating sexual orientation with suicidality, but much less so with completed suicide. (Haas 2014.) More specifically, there is some evidence suggesting gay adult men are more likely to die by suicide than are heterosexual men, but there is less evidence of an analogous pattern among lesbian women. Regarding suicidality, surveys of self-identified LGB Americans repeatedly report rates of suicidal ideation and suicide attempts 2–7 times higher than their heterosexual counterparts. Because of this association of suicidality with sexual orientation, one must apply caution in interpreting findings allegedly about gender identity: because of the overlap between people who self-identify as non-heterosexual and as transgender or gender diverse, correlations detected between suicidality and gender dysphoria may instead reflect (be confounded by) sexual orientation. Indeed, other authors have made explicit their surprise that so many studies, purportedly of gender identity, entirely omitted measurement or consideration of sexual orientation, creating the situation where features that seem to be associated with gender identity instead reflect the sexual orientation of the members of the sample. (McNeil 2017.)

C. There is no evidence that medicalized transition reduces rates of suicide or suicidality.

147. It is repeatedly asserted that despite the known risks, despite the lack of research into

the reality or severity of unquantified risks, it is essential and "the only ethical response" to provide medical transition to minors because medical transition is known to reduce the likelihood of suicide among minors who suffer from gender dysphoria. This is simply untrue. *No studies* have documented any reduction in suicide rates in minors (or any population) as a result of medical transition. No methodologically sound studies have provided meaningful evidence that medical transition reduces suicidality in minors. Instead, multiple studies show tragically high rates of suicide after medical transition, with that rate beginning to spike several years after medical transition.

148. Among post-transition adults, completed suicide rates remain elevated. (Wiepjes 2020.) Among post-operative transsexual adults in Sweden's highly tolerant society, death by suicide is 19 times higher than among the cisgendered. (Dhejne 2011.) Systematic review of 17 studies of suicidality in transsexual adults confirmed suicide rates remain elevated even after complete transition. (McNeil 2017.) Among post-operative patients in the Netherlands, long-term suicide rates of six times to eight times that of the general population were observed depending on age group. (Asscheman 2011 at 638.) Also studying patients in the Netherlands, Wiepjes et al. (2020) reported the "important finding" that "suicide occurs similarly" before and after medical transition. (Wiepjes 2020 at 490.) In other words, *transition did not reduce suicide*. A very large dataset from the U.K. GIDS clinic showed that those referred to the GIDS clinic for evaluation and treatment for gender dysphoria committed suicide at a rate five times that of the general population, both before and after commencement of medical transition (Biggs 2022). Finally, in a still-ongoing longitudinal study of U.S. patients, Chen *et al.* have reported a shockingly high rate of completed suicide among adolescent subjects in the first two years *after* hormonal transition, although they provide no pre-treatment data for this population to compare against. (Chen 2023 at 245.)

149. WPATH's systematic review of the effectiveness of puberty blockers and cross-sex hormones on suicide in minors concluded that "It was impossible to draw conclusions about the effects of [either] hormone therapy on death by suicide." (Baker 2021 at 12.) In short, I am aware of no respected voice that asserts that medical transition reduces suicide among minors who suffer from gender dysphoria.

150. As to the separate and far more common phenomenon of suicidality, of course, that claim is widely made. McNeil's systematic review revealed, however, a complicated set of interrelated factors rather than supporting the common hypothesis that rates of suicidal ideation and suicidal attempts would decrease upon transition. Rates of suicidal ideation did not show the same pattern as suicide attempts, male-to-female transitioners did not show the same patterns as female-to-male transitioners, and social transition did not show the same patterns as medical transition. Importantly, the review included one study that reported "a positive relationship between higher levels of social support from leaders (e.g., employers or teachers) and increased suicide attempt, which they suggested may be due to attempts instigating increased support from those around the person, rather than causing it." (McNeil 2017 at 348.)

151. Moreover, the 2020 Kuper, *et al.* cohort study of minors receiving hormone treatment found *increases* in each of suicidal ideation (from 25% to 38%), attempts (from 2% to 5%), and non-suicidal self-injury (10% to 17%). (Kuper 2020 at Table 5.) Research has found social support to be associated with *increased* suicide attempts, suggesting the reported suicidality may represent attempts to evoke more support. (Bauer 2015; Canetto 2021.)

152. Overall, the research evidence is only minimally consistent with the hypothesis that an absence of transition causes mental health issues and suicide, but very strongly consistent with the hypothesis that mental health issues, such as *Borderline Personality Disorder* (BPD), cause both

suicidality and unstable identity formation (including gender identity confusion). (See section XI.) BPD is repeatedly documented to be greatly elevated among sexuality minorities (Reuter 2016; Rodriguez-Seiljas 2021; Zanarini 2021), and both suicidality and identity confusion are symptoms of that disorder. Thus, diverting distressed youth towards transition necessarily diverts youth away from receiving the psychotherapies designed for treating the issues actually causing their distress.

153. Despite that mental health issues, including suicidality, are repeatedly required by clinical standards of care to be resolved before transition, threats of suicide are instead oftentimes used as the very justification for labelling transition a "medical necessity". However plausible it might seem that failing to affirm transition causes suicidality, the epidemiological evidence does not support that hypothesis.

XI. Mental health profiles differ across adult-, adolescent-, and childhood-onset gender dysphoria.

A. Mental health issues in Adult-Onset Gender Dysphoria.

154. Systematic review of all studies examining mental health issues in transgender adults identified 38 such studies. (Dhejne 2016.) The review indicated that many studies were methodologically weak, but nonetheless consistently found (1) that the average rate of mental health issues among adults is highly elevated both before *and after* transition, (2) but that the average was less elevated among adults who completed transition. It could not be concluded that transition improves mental health, however. Patients were commonly receiving concurrent psychotherapy, introducing a confound (meaning, again, that it cannot be determined whether the change was caused by the transitioning or the mental health treatment). Further, several studies showed more than 40% of patients to become "lost to follow-up." It remains unknowable to what extent the information from the remaining participants accurately reflects the whole population.

B. Mental health issues in Childhood-Onset Gender Dysphoria.

155. Elevated rates of multiple mental health issues among gender dysphoric children are reported throughout the research literature. A formal analysis of children (ages 4–11) undergoing assessment at the Dutch child gender clinic showed that 52% fulfilled criteria for a formal DSM diagnosis of a clinical mental health condition other than Gender Dysphoria. (Wallien 2007 at 1307.) A comparison of the children attending the Canadian versus Dutch child gender dysphoria clinic showed only few differences between them, and a large proportion in both groups were diagnosable with clinically significant mental health issues. Results of standard assessment instruments (Child Behavior Check List, or CBCL) demonstrated that among 6–11-year-olds, 61.7% of the Canadian and 62.1% of the Dutch sample satisfied the diagnostic criteria for one or more mental health conditions other than gender dysphoria. (Cohen-Kettenis 2003 at 46-47.)

156. A systematic review of all studies of Autism Spectrum Disorders (ASDs) and Attention-Deficit Hyperactivity Disorder (ADHD) among children diagnosed with gender dysphoria was recently conducted. (Thrower 2020.) It was able to identify a total of 22 studies examining the prevalence of ASD or ADHD youth with gender dysphoria. Studies reviewing medical records of children and adolescents referred to gender clinics showed 6–26% to have been diagnosed with ASD. (Thrower 2020 at 695.) Moreover, those authors gave specific caution on the "considerable overlap between symptoms of ASD and symptoms of gender variance, exemplified by the subthreshold group which may display symptoms which could be interpreted as either ASD or gender variance. Overlap between symptoms of ASD and symptoms of GD may well confound results." (Thrower 2020 at 703.) The rate of ADHD among children with GD was 8.3–11%. Conversely, data from children (ages 6–18) with Autism Spectrum Disorders (ASDs) show they are more than seven times more likely to have parent-reported "gender variance." (Janssen 2016 at 63.)

157. As shown by the outcomes studies (see Section XIII), there is little reliable evidence that transition improves the mental well-being of children. As shown repeatedly by clinical guidelines from multiple professional associations, mental health issues are expected or required to be resolved *before* undergoing transition. The reasoning behind these conclusions is that children may be expressing gender dysphoria, not because they are experiencing what gender dysphoric adults report, but because they mistake what their experiences indicate or to what they might lead. For example, a child experiencing depression from social isolation might develop the hope—and the unrealistic expectation—that transition will help them fit in, as a member of the other sex.

158. In cases where gender dysphoria is secondary to a different issue, efforts at transition

are aiming at the wrong target and leave the primary issue(s) unaddressed. Given the highly reliable, repeatedly replicated finding that childhood-onset gender dysphoria resolves with puberty for the large majority of children, the evidence indicates that blocking a child's puberty blocks the child's natural maturation that itself would resolve the dysphoria.

C. Mental health issues in Adolescent-Onset Gender Dysphoria (ROGD).

159. The literature varies in the range of gender dysphoric adolescents with co-occurring disorders. In addition to self-reported rates of suicidality (see Section X), clinical assessments reveal elevated rates not only of depression (Holt 2016; Skagerberg 2013; Wallien 2007), but also anxiety disorders, disruptive behavior difficulties, Attention Deficit/Hyperactivity Disorder, Autism Spectrum Disorder, and personality disorders, especially Borderline Personality Disorder (BPD). (Anzani 2020; de Vries 2010; Jacobs 2014; Janssen 2016; May 2016; Strang 2014, 2016; Swedish Socialstyrelsen, Evolution 2020.)

160. Of particular concern in the context of adolescent-onset gender dysphoria is Borderline Personality Disorder (BPD; diagnostic criteria in Table X below). Symptoms of BPD overlap in important respects with symptoms commonly interpreted as signs of gender dysphoria, and it is increasingly hypothesized that very many cases appearing to be adolescent-onset gender dysphoria actually represent cases of BPD. (E.g. Anzani 2020; Zucker 2019.) That is, some people may be misinterpreting their experiencing of the broader "identity disturbance" of symptom Criterion 3 to represent a gender identity issue specifically. Like adolescent-onset gender dysphoria, BPD begins to manifest in adolescence, is three times more common in biological females than males, and occurs in 2–3% of the population, rather than 1-in-5,000 people. (Thus, if even only a portion of people with BPD experienced an identity disturbance, and focused that disturbance on gender identity resulting in transgender identification, they could easily overwhelm the number of genuine

cases of gender dysphoria.)

Table 4. DSM-5-TR Diagnostic Criteria for Borderline Personality Disorder.

> A pervasive pattern of instability of interpersonal relationships, self-image, and affects, and marked impulsivity beginning by early adulthood and present in a variety of contexts, as indicated by five (or more) of the following:
>
> 1. Frantic efforts to avoid real or imagined abandonment. (Note: Do not include suicidal or self-mutilating behaviour covered in Criterion 5.)
> 2. A pattern of unstable and intense interpersonal relationship characterized by alternating between extremes of idealization and devaluation.
> 3. *Identity disturbance: markedly and persistently unstable self-image or sense of self.*
> 4. Impulsivity in at least two areas that are potentially self-damaging (e.g., spending, sex, substance abuse, reckless driving, binge eating). (Note: Do not include suicidal or self-mutilating behavior covered in Criterion 5.)
> 5. *Recurrent suicidal behaviour, gestures, or threats, or self-mutilating behavior.*
> 6. Affective instability due to a marked reactivity of mood (e.g., intense episodic dysphoria, irritability, or anxiety usually lasting a few hours and only rarely more than a few days).
> 7. Chronic feelings of emptiness.
> 8. Inappropriate, intense anger or difficulty controlling anger (e.g., frequent displays of temper, constant anger, recurrent physical fights).
> 9. Transient, stress-related paranoid ideation or severe dissociative symptoms.
>
> (Italics added.)

(American Psychiatric Association 2022 at 752-753.)

161. Mistaking cases of BPD for cases of Gender Dysphoria may prevent such youth from receiving the correct mental health services for their condition. A primary cause for concern is symptom Criterion 5: *recurrent suicidality.* (See Section X on suicide and suicidality.) Regarding the provision of mental health care, the distinction between these conditions is crucial: A person with BPD going undiagnosed will not receive the appropriate treatments (the currently most effective of which is Dialectical Behavior Therapy). The problem was not about *gender* identity, but about having an *unstable* identity.

162. Regarding research, there have now been several attempts to document rates of suicidality among gender dysphoric adolescents. The scientific concern presented by BPD is that

it poses a potential confound: samples of gender dysphoric adolescents could appear to have elevated rates of suicidality, not because of the gender dysphoria (or transphobia in society), but because of the number of people with BPD in the sample.

D. Neuroimaging studies have associated brain features with sex and with sexual orientation, but not gender identity.

163. Claims that transgender identity is an innate property resulting from brain structure remain unproven. Neuroimaging and other studies of brain anatomy repeatedly identify patterns distinguishing male from female brains, but when analyses search for those patterns among transgender individuals, "gender identity and gender incongruence could not be reliably identified." (Baldinger-Melich 2020 at 1345.) Although much smaller than male/female differences, statistically significant neurological differences are repeatedly associated with sexual orientation (termed "homosexual" vs "nonhomosexual" in the research literature). Importantly, despite the powerful associations between transsexuality and homosexuality, as explicated by Blanchard, many studies analyzing gender identity failed to control for sexual orientation, representing a problematic and centrally important confound. I myself pointed this out in the research literature, noting that neuroanatomical differences attributed to gender dysphoria should instead be attributed to sexual orientation. (Cantor 2011, Cantor 2012.) A more recent review of the science, by Guillamon, et al. (2016), agreed, stating:

> Following this line of thought, Cantor (2011, 2012, but also see Italiano, 2012) has recently suggested that Blanchard's predictions have been fulfilled in two independent structural neuroimaging studies. Specifically, Savic and Arver (2011) using VBM on the cortex of untreated nonhomosexual MtFs and another study using DTI in homosexual MtFs (Rametti et al., 2011b) illustrate the predictions. *Cantor seems to be right*". (Guillamon 2016 at 1634, italics added; see also Italiano 2012.)

In addition to this confound, because snapshot neurobiological studies can provide only correlational data, it would not be not possible for such studies to distinguish whether brain

differences cause gender identity or if gender atypical behavior modifies the brain over time, such as through neuroplasticity. As noted by one team of neuroscientists, "[I]t remains unclear if the differences in brain phenotype of transgender people may be the result of a sex-atypical neural development or of a lifelong experience of gender non-conformity." (Fisher 2020 at 1731.) In sum, at present assertions that transgender identity is caused by neurology represent faith, not science.

XII. Medicalized transition of gender remains *experimental,* lacking causal evidence of mental health improvement.

A. Criteria distinguishing *'experimental'* from *'established'*.

164. In science, the term "experimental" has a specific technical meaning. Within the scientific method, research studies can be *observational* or *experimental*. Among observational studies, such as surveys, the researchers do not administer any treatment and instead only describe the features of the group observed. Among experimental studies, treatments are actively administered by the researchers, who then compare the treated and untreated groups (or compare a group to itself, before versus after treatment). Also, within a given treatment study, the term "experimental treatment" would be used to distinguish it from the "control treatment" or "treatment-as-usual" being provided to the control group.

165. Outside research studies and within public and legal contexts, the term 'experimental' typically denotes '*unverified by experimental evidence'*. A treatment would continue to be experimental until the demonstration of (1) reliable, clinically meaningful improvement and (2) the reliable estimation of safety risks in randomized, controlled trials (RCTs) or research of equivalent level of evidence. A treatment would remain experimental while its effects, including side effects, remain uninvestigated.

166. Being long-standing, popular, or familiar do not, of themselves, impact whether a treatment is experimental—they suggest opportunities for the experiments to have been done. Clinicians' feelings of self-confidence do not impact status as experimental.

B. International consensus explicitly regards gender transition to be experimental.

167. In England, after a thorough review of the literature and the current practice, Dr. Cass stated that the critical and currently unanswered question "is whether the evidence for the use and

safety of the medication is strong enough as judged by reasonable clinical standards." She recognized that these treatments cannot formally be called "experimental" not because they are proven, but because the experiments needed to test their efficacy and safety have not only not been done, but are not even being attempted. (Cass 2022 at 37.) To address this, Dr. Cass called for "the rapid establishment of the necessary research infrastructure to prospectively enrol young people being considered for hormone treatment into a formal research programme." (Cass Review Letter 2022). In response, in its interim service specification NHS England states that it "will only commission GnRHa [i.e., puberty blockers] in the context of a formal research protocol." (NHS 2022 at 12.)

168. Finland, by law, restricts all assessment and treatment activities for gender dysphoric minors to its two research clinics, Helsinki University Central Hospital and Tampere University Hospital. (COHERE Summary.) Further, after conducting a systematic review of the research, the council responsible for the assessment of public health care services in Finland (COHERE Finland) concluded, "In light of available evidence, gender reassignment of minors is *an experimental practice*." (COHERE Summary, italics added.)

169. Sweden's research on gender transition is conducted at the Karolinska Institutet in Stockholm. In 2015, that facility registered its research on medicalized transition with the U.S. National Institutes for Health (NIH), noting "[H]ormonal treatment includes inhibition of one's own sex hormone production followed by treatment with testosterone or estrogen levels that are normal for the opposite sex. *Seen as experimental model*, this is a process that provides an opportunity to study the sex hormone dependent influences." (Clinicaltrials.gov.) In its policy updates in 2021, Sweden limited medicalized treatments for gender dysphoria in minors to clinical research studies approved by the Swedish national research ethics board ("EPM"). (Medscape

Psychiatry 2021.)

170. Norway reviewed its own national policy on transition in minors in 2023, explicitly concluding such medical procedures to be experimental. (Ukom 2023.)

171. The widely cited Dutch studies were co-conducted by Dr. Thomas Steensma. Despite being an originator and international leader of medicalized transition of gender dysphoric minors, Dr. Steensma stated in an interview in 2021 that he still considers it to be experimental: "Little research has yet been done on the treatment with puberty inhibitors and hormones in young people. That is why it is also *seen as experimental*." Dr. Steensma decried other clinics for "blindly adopting our research" despite the indications that those results may not actually apply: "We don't know whether studies we have done in the past are still applicable to today. Many more children are registering, and also a different type." Steensma opined that "every doctor or psychologist who is involved in transgender care should feel the obligation to do a good pre- and post-test." (Tetelepta 2021.) But few if any are doing so.

C. Claims that medical transition is "medically necessary" are undefined, unsupported, and self-interested.

172. While European health authorities have examined the science and concluded that medical transition for minors remains "experimental" and of unproven benefit, terminology has been distorted in the U.S. because the U.S. lacks a public health care system and the terms "medically necessary" and "experimental" impact health insurance coverage. "Medically necessary" justifies coverage for these procedures; advocates know or fear that the term "experimental" will preclude coverage.

173. WPATH's 2016 statement asserting "medical necessity" was explicitly made in order to facilitate insurance claims, as is clear in their document entitled, "Position Statement on Medical Necessity of Treatment, Sex Reassignment, and Insurance Coverage in the U.S.A." (WPATH

Position Statement.) The AMA released a similar statement supporting insurance coverage for medical transition as a result of being assertedly medically necessary.[6] U.S. medical associations' advocacy corresponds to the financial interests of their members.

174. Moreover, there do not exist a scientific definition or objective criteria of "medically necessary." An analysis published in the *Canadian Medical Association Journal,* however (not pertaining to gender dysphoria or transition), attempted to define 'medically necessary.' (Caulfield 2012.) The article quoted Timothy Caulfield, Research Chair in Health, Law, and Policy at the University of Alberta (Edmonton), Canada: "As for putting great effort into coming up with a tidy, all-encompassing definition of 'medically necessary'—it's probably a waste of time…Given the history of the concept of 'medically necessary' and the numerous failed attempts to define it, a practical, operational and meaningful definition is likely unattainable." (Caulfield at 1771–1772.) According to Mark Stabile, director of the School of Public Policy and Governance and professor of economics and public policy at the Rotman School of Management at the University of Toronto, "Providers of those services will naturally be critical of the decision if they feel that the demand for their services will decline as a result." (Caulfield at 1772.)

D. WPATH repeatedly warns of untested hypotheses, continuing unknowns, and lack of research.

175. The latest (2022) WPATH Standards of Care v8 document avoided the word "experimental" in its guidelines, but instead repeatedly deployed terms and phrases that are synonymous with being experimental: "The criteria in this chapter [on assessment of adults] have been significantly revised from SOC-7 to reduce requirements and unnecessary barriers to care. *It is hoped that future research will explore the effectiveness* of this model." (Coleman 2022 at S33, italics added.)

[6] Available from https://www.ama-assn.org/system/files/2019-03/transgender-coverage-talking-points.pdf

176. The WPATH Standards of Care v8 (Coleman 2022.) indicates the lack of experimental evidence available again and again (italics added):

- "It primarily includes an assessment approach that uses specific criteria that are examined by [a Health Care Provider, or] HCP in close cooperation with a TGD adult and does not include randomized controlled trials or long-term longitudinal research" (at S33.)
- "While there was *limited supportive research,* this recommendation was considered to be good clinical practice as it allows a more reversible experience prior to the irreversible experience of surgery" (at S40.)
- "Due to *the limited research in this area,* clinical guidance is based primarily on individual case studies and the expert opinion of HCPs" (at S41.)
- "While available research shows consistent positive outcomes for the majority of TGD adults who choose to transition…some TGD adults may decompensate or experience a worsened condition following transition. *Little research has been conducted to systematically examine variables that correlate with poor or worsened biological, psychological, or social conditions following transition"* (at S42.)
- "Future research would shed more light on gender identity development if conducted over long periods of time with diverse cohort groups" (at S45.)
- "In addition, elevated scrotal temperatures can be associated with poor sperm characteristics, and genital tucking could theoretically affect spermatogenesis and fertility (Marsh 2019) although *there are no definitive studies evaluating these adverse outcomes.* Further *research is needed to determine the specific benefits and risks* of tucking in youth" (at S54.)
- *"There is no formal research evaluating* how menstrual suppression may impact gender incongruence and/or dysphoria" (at S54-55.)
- "Currently, there are only preliminary results from retrospective studies evaluating transgender adults and the decisions they made when they were young regarding the consequences of medical-affirming treatment on reproductive capacity. It is important not to make assumptions about what future adult goals an adolescent may have" (at S57.)
- *"Only limited empirical research exists* to evaluate such interventions" (at S75.)
- *"Research has not been conclusive* about when in the life span such detransition is most likely to occur, or what percentage of youth will eventually experience gender fluidity and/or a desire to detransition" (at S77.)
- "Research on pitch-lowering surgeries is limited" (at S139.)
- "The number and quality of research studies evaluating pitch-lowering surgeries are currently insufficient" (at S141.)
- "To date, *research on the long-term impact of [Gender Affirming Hormone Treatment*

or] GAHT on cancer risk is limited…We have *insufficient evidence* to estimate the prevalence of cancer of the breast or reproductive organs among TGD populations (Joint et al., 2018.)" (at S144.)

- "Contraceptive *research gaps within this population are profound. No studies have examined* how the use of exogenous androgens (e.g., testosterone) may modify the efficacy or safety profile of hormonal contraceptive methods (e.g., combined estrogen and progestin hormonal contraceptives, progestin-only based contraceptives) or non-hormonal and barrier contraceptive methods" (at S162.)
- "TGD individuals AFAB undergoing abortion still represents a critical gap in research" (at S162.)
- "The effects of current TGD-related medical treatments on sexuality are heterogeneous (Ozer et al., 2022; T'Sjoen et al., 2020), and *there has been little research on the sexuality of TGD adolescents"* (at S163.)
- "While sex-positive approaches to counseling and treatment for sexual difficulties experienced by TGD individuals have been proposed (Fielding, 2021; Jacobson et al., 2019; Richards, 2021), to date *there is insufficient research on the effectiveness of such interventions"* (at S163.)

XIII. There have been 11 cohort studies of puberty blockers and cross-sex hormones in minors. They provide no reliable evidence of effectiveness for improving mental health relative to mental health treatments that lack medical risk.

177. Several studies are cited by plaintiffs' experts and in the media as purporting to show that medical transition in minors brings important improvements in mental health beyond the issues of suicide and suicidality that I have already addressed. In fact, there is no reliable evidence of any such benefit.

178. In this section, I summarize the results of all cohort studies investigating the mental health outcomes of puberty blockers and cross-sex hormones on minors. These include all such studies identified by any of the systematic reviews of effectiveness from England, Sweden, Finland, and WPATH. (Listed in Table 1, *Cohort studies of effectiveness and safety of puberty blockers and cross-sex hormones in minors.*)

179. As enumerated in the following section, all of these studies that reported improved mental health among transitioners were also providing psychotherapy at the same time. (See Section VI on confounding.) None of these studies was able to differentiate which of them was contributing to the improvement.

180. The problem imposed by confounding medicalized transition with psychotherapy is widely recognized. As explicated in the NICE review from England:

> [V]ery little data are reported on how many children and adolescents needed additional mental health support, and for what reasons, or whether additional interventions, and what form and duration (for example drug treatment or counselling) that took. This is a possible confounder for the treatment outcomes in the studies because *changes in critical and important outcomes may be attributable to external care rather than the psychological support or GnRH analogues used in the studies.* (NICE 2020a at 41, italics added.)

Similarly, WPATH's own systematic review noted that "[T]his conclusion is limited by high risk of bias in study designs, small sample sizes, and *confounding with other interventions."* (Baker

2021 at 1, italics added.)

181. The need to disentangle the roles of these two treatments has been largely ignored despite that several issues depend upon them. If medicalized transition does not show mental health improvement superior to that of mental health treatment, it cannot readily be called "medically necessary" for insurance purposes or other institutional needs. Clinicians may be subjecting minors to known and potential (but unstudied) harms without any scientific justification.

182. Moreover, without a control group for comparison (i.e., another group of similar age, sex, and mental health status), these studies are also unable to identify when and if any changes are due to regression to the mean or maturation over time.

A. Of the cohort studies, four found little to no improvement in mental health.

183. Kaltiala, *et al.* (2020) similarly reported that after cross-sex hormone treatment, "Those who had psychiatric treatment needs or problems in school, peer relationships and managing everyday matters outside of home continued to have problems during real-life." (Kaltiala 2020 at 213.) They concluded:

> Medical gender reassignment is not enough to improve functioning and relieve psychiatric comorbidities among adolescents with gender dysphoria. Appropriate interventions are warranted for psychiatric comorbidities and problems in adolescent development. (Kaltiala 2020 at 213.)

184. Cantu, *et al.* (2020) studied 80 youth, 11–18 years of age (average of 15.1 years), measuring patients' levels of anxiety, depression, and suicidality. This sample was 18.75% male-to-female, 72.5% female-to-male, and 8.75% nonbinary, but the report did not include the patients' ages of onset. The study authors compared youth according to those receiving puberty blockers only, cross-sex hormones only, both treatments, or neither. No significant differences in mental health were detected on any of these variables. Of the 27 youth reporting suicidality before

medicalized treatment, 81% continued to report suicidality after medicalized treatment. Remarkably, although the authors reported that "the results of this study suggest that no clinically significant changes in mood symptoms occur" (Cantu 2020 at 199), they did not convey the logical interpretation that transition failed to help these youth. Instead, they emphasized that "findings suggest changes may actually take longer to occur." (Cantu 2020 at 196.)

185. Carmichael, *et al.* (2021) released their findings from the Tavistock and Portman clinic in the U.K. (Carmichael 2021.) Study participants were ages 12–15 (Tanner stage 3 and above for natal males, Tanner stage 2 and above for natal females) and were repeatedly tested before beginning puberty-blocking medications and then every six months thereafter. Cases exhibiting serious mental illnesses (*e.g.*, psychosis, bipolar disorder, anorexia nervosa, severe body-dysmorphic disorder unrelated to gender dysphoria) were excluded. Relative to the time point before beginning puberty suppression, there were *no* significant changes in any psychological measure, from either the patients' or their parents' perspective.

186. Hisle-Gorman, *et al.* (2021) analyzed military families' healthcare data to compare 963 transgender and gender-diverse youth before versus after hormonal treatment, using their non-gender dysphoric siblings as a control group. The study participants included youth undergoing puberty-blocking as well as those undergoing cross-sex hormone treatment, but these subgroups did not differ from each other. Study participants had a mean age of 18 years when beginning hormonal treatments, but their initial clinical contacts and diagnoses occurred at a mean age of 10 years. According to the study, "mental health care visits overall did not significantly change following gender-affirming pharmaceutical care" (Hisle-Gorman 2021 at 1448), yet, "psychotropic medication use *increased*," (Hisle-Gorman 2021 at 1448, italics added.) indicating *deteriorating* mental health.

B. Six of the cohort studies confounded medical treatment with psychotherapy.

187. The initial enthusiasm for medical blocking of puberty followed largely from early reports from the Dutch clinical research team suggesting at least some mental health improvement. (de Vries 2011, 2014.)

188. The Dutch clinical research team followed up a cohort of youth at their clinic undergoing puberty suppression (de Vries 2011), and later cross-sex hormone treatment and surgical sex reassignment (de Vries 2014). The youth improved on several variables upon follow-up as compared to pre-suppression measurement, including depressive symptoms and general functioning. No changes were detected in feelings of anxiety, or anger, or in gender dysphoria itself as a result of puberty suppression. Moreover, natal females suffered *increased* body dissatisfaction both with their secondary sex characteristics and with nonsexual characteristics. (Biggs 2020.)

189. The reports' own authors noted that while it remains possible that the improvement on some variables was due to the puberty blockers, it was also possible that the improvement was due to the mental health support or to natural maturation. The study authors noted this explicitly: "All these factors may have contributed to the psychological well-being of these gender dysphoric adolescents." (de Vries 2011 at 2281.)

190. van der Miesen, et al. (2020) provided an update of the Dutch clinic's sample, reporting continued improvement in transitioners' psychological functioning, but the medical and psychological treatments remained confounded. Also, the authors indicate that the changing demographic and other features among gender dysphoric youth might have caused the treated group to differ from the control group in unknown ways. The study authors expressly noted, "The present study can, therefore, not provide evidence about the direct benefits of puberty suppression

over time and long-term mental health outcomes." (van der Miesen 2020 at 703.)

191. Allen, *et al.* (2019) reported on a sample of 47 youth, ages 13–20, undergoing cross-sex hormone treatment. They reported observing increases in measures of well-being and decreases in measures of suicidality; however, as the authors also noted, "whether a patient is actively receiving psychotherapy" may have been a confounding variable. (Allen 2019.)

192. Becker-Hebley, *et al.* (2021) assessed the quality of life and overall functioning of a sample of German youth both before and after undergoing treatment with GnRHa, CSHT, or both. Excluded from participating were youth with severe psychiatric issues, including suicidality. Of the sample, 79% of the sample participated in psychotherapy at the same time. As the study authors were careful to indicate, "Because this study did not test for statistically significant differences between the four intervention groups or before and after treatment, the findings cannot be generalized to other samples of transgender adolescents." (Becker-Hebly 2021 at 1755.)

193. In Kuper, *et al.* (2020), a multidisciplinary team from Dallas used a battery of mental health tests to assess 148 youth undergoing either puberty-blocking or cross-sex hormone treatment. The tests revealed highly inconsistent results: Most revealed no significant change, some indicated improvement, and some indicated deterioration. Because 144 of the 148 participants were also in treatment with a therapist or counselor (Kuper at 7, Table 4), no conclusions can be drawn regarding the cause of the improvements. Similarly, 47% of the sample were receiving psychiatric medication at the time of their initial assessments, but it was 61% of the sample at the follow-up time: It cannot be known to what extent mental health improvement was associated with transition-related or with psychiatric medication. Importantly, the variables demonstrating deterioration included each of the ones indicating suicidality and self-harm: At follow-up time, the sample showed *higher* levels of suicidal ideation (from 25% to 38%), suicide

attempts (from 2% to 5%), and "non-suicidal self-injury" (from 10% to 17%) (Kuper at 8, Table 5).

194. This evidence of worsening mental health was highly obscured in the Kuper report, however. Rather than provide the standard comparison of pre- and post-treatment rates, Kuper instead listed the post-treatment rates along side the full *lifetime* rates: "Lifetime and follow-up rates were 81% and 39% for suicidal ideation, 16% and 4% for suicide attempt, and 52% and 18% for NSSI, respectively" (p. 1). Rates from over a lifetime are necessarily higher numbers, and putting them where pre-treatment rates normally appear conveys the statistical illusion of a decrease, exactly opposite to the actual pattern.

C. Two found no advantage of medicalization over psychotherapy.

195. Costa, *et al.* (2015) provided preliminary outcomes from a small study conducted with patients of the GIDS clinic in the UK. They compared the psychological functioning of one group of youth receiving psychological support with a second group receiving both psychological support as well as puberty blocking medication (representing an "active comparator" group. See Section III.C.2). The "untreated" group, however, was different from the treated group in another important respect, in that these were the patients who began with such severe psychiatric co-morbidities that they were deemed ineligible to begin puberty blockers until mental health improved. Further, the study suffered a dramatic loss-to-follow-up, with almost two thirds of participants dropping out across just 18 months. (Biggs 2019.) In this preliminary report, both groups improved in psychological functioning over the course of the study, but no statistically significant difference between the groups was detected at any point. (Costa 2015 at 2212, Table 2.) In any event, all these findings have been superseded, however, and are moot. The final outcomes report for this cohort was subsequently published (as Carmichael 2021, above), finding

that neither group actually had experienced any significant improvement at all. (Carmichael 2021.)

196. Achille, *et al.* (2020) at Stony Brook Children's Hospital in New York studied a sample of 95 youth with gender dysphoria, but 45 were lost-to-follow-up within just 12 months, failing to complete follow-up surveys at 6 month and or 1 year. That is, outcomes were available only for the 50 who remained in the study. As well as receiving puberty blocking medications, "Most subjects were followed by mental health professionals. Those that were not were encouraged to see a mental health professional." (Achille 2020 at 2.) Upon follow-up, some incremental improvements were noted; however, after statistically adjusting for psychiatric medication and engagement in counselling, "*most predictors did not reach statistical significance*." (Achille 2020 at 3, italics added.) That is, puberty blockers did not improve mental health any more than did mental health care on its own. More specifically, only one of the 12 predictors reached statistical significance. (Achille 2020 at Table 4.) That is, medicalized transition was not associated with improved mental health beyond improvement associated with the mental health care received. Moreover, the single predictor reaching the threshold for statistical significance is not reliable: the study authors made a methodological error by failing to account for the multiple comparisons it conducted. Had the study applied the standard adjustment for correcting for multiple comparisons, that remaining predictor would also have ceased to be statistically significant.

197. Tordoff, et al. (2022) reported on the mental health of youth (mean age 15.8) as they underwent their first year of puberty blocker or cross-sex hormone treatment. Of the initial 104, 62.5% were receiving psychotherapy at the same time. (Tordoff 2022 at 5 Table 1.) An unknown number of participants were also receiving psychiatric medications, which the report acknowledged as a potential confounding factor. There were 104 participants at the beginning of the study, but by the end, only 65 remained. Importantly, the report failed to indicate its procedures

for assessing the mental health readiness of prospective transitioners, and the results are highly susceptible to selection bias between those deemed eligible for hormones or puberty blockers, and those who were not.

D. One failed to report whether psychotherapy was provided.

198. Chen, *et al.* (2023) reported finding some improvement in some mental health variables associated with the cosmetic changes after two years of cross-sex hormone treatment in a sample of 315 youth (mean age, 16 years). Unlike the other studies, Chen et al. did not report how many participants were receiving psychotherapy or psychiatric medication at the same time as the hormone treatments. It is therefore not possible to assess to what extent any changes were due to hormone treatment versus the potential confounds. Because the study did not include a control group, it is not possible to assert that changes were due to hormone treatment rather than representing regression to the mean. Potential conclusions are also hampered by the large proportion of mental health data that were missing: Of the 315 youth in the sample, analyses could be conducted with only 208–217 (Chen 2023, supp. Material at 12, Table S5). The purported changes in mental health variables were statistically significant, but not clinically meaningful. The depression test used by Chen et al consisted of 21 items, with each item contributing up to 3-points to the total score. For example:

> 0 I do not feel sad.
> 1 I feel sad.
> 2 I am sad all the time and I can't snap out of it.
> 3 I am so sad and unhappy that I can't stand it.

Thus, the total scores range from 0 to 63. Scores 0–13 represent minimal difficulty; 14–19 represent mild depression; 20–28, moderate; and 29–63, severe. The change that Chen et al. found after two years of hormone treatment was from 16.39 to 13.95 (at Table S5). Changes of this size are unlikely to be associated with patients reporting they feel better. Such scores are below the

"minimum clinically important difference". (Button 2015.) Although the report did not include data on co-morbid mental health diagnoses, it noted that two patients receiving cross-hormone treatment died by suicide (representing 0.6% mortality within just two years). (Chen 2023 at 240.)

199. In addition to the incomplete reporting of key aspects of the project and large proportion of missing data, Chen et al appears to have provided only a selected subportion of the information it collected. A knowledgeable journalist investigating transgender issues, Jesse Singal, identified documentation representing the full set of information the Chen et al team planned to collect. I have verified that documentation and have come to the same conclusion. As described by Singal:

> In their study protocol, including a version that they submitted into a preregistration database, the researchers hypothesized that members of this cohort would experience improvement on eight measures, including ones that are just about universally recognized by youth gender researchers as important outcomes, such as gender dysphoria, suicidality, and self-harm. Then, in the published *NEJM* paper, the researchers changed their hypothesis and six of those variables were nowhere to be found. The two remaining—anxiety and depression—moved in a positive direction for trans boys (natal females) but not trans girls (natal males). The researchers reported on three other variables, too, without explaining how they picked them (two improved for trans girls and boys, and one just for trans boys). (Singal 2023.)

200. This appears to represent "cherry-picking" of the findings being reported, rather than a comprehensive reporting on the complete set of evidence. Further, Chen et al. failed to balance the concrete and strikingly high rate of *completed* suicide among their sample against the very incremental mental health changes they claim, even though the ethical and clinical importance of those suicides is obvious.

XIV. Known and potential harms associated with administration of puberty blockers and cross-sex hormones to children and adolescents.

201. As I have explained, any conclusion about safety requires knowledge about and balancing of both risks and benefits.

202. In concluding that safety has not been established (see Section V above), national health authorities, authors of systematic reviews, and researchers have identified a number of harms which are either known to result from administration of puberty blockers and cross-sex hormones to children and adolescents, or can be reasonably anticipated but have not been sufficiently studied to reach any conclusion as to the likelihood or severity of harm.

203. When applying research regarding harms to clinical policy, several considerations need to be included: (1) The harms of medicalized transition of gender does or may differ between male-to-female and female-to-male cases, differ between ages of transition, and differ according to age-of-onset of the gender dysphoria. Evidence and conclusions about harms (and safety) cannot be generalized or extrapolated across such cases. (2) The evidence has strongly shown that after social transition of gender, minors are much more likely than otherwise to undergo medicalized transition of gender. Thus, the appropriate assessment of the risk:benefit ratio for social transition must include the increased risks posed by the medicalized path to which it is likely to lead. (3) The evidence has shown strongly that youth who undergo puberty blocking are highly likely to undergo cross-sex hormone treatment. Thus, the appropriate risk:benefit evaluation must also consider its potential implications over the full lifespan.

204. Systematic reviews of the evidence have identified fewer than 10 studies investigating potential harms of medicalized transition of minors at all, (NICE 2020a at 6.) and most of these have been limited to bone and skeletal health. As concluded by the NICE systematic review, "A key limitation to identifying the effectiveness and safety of GnRH analogues for children and

adolescents with gender dysphoria is the lack of reliable comparative studies." (NICE 2020a at 40.) With that said, numerous harms are either known, or reasonably anticipated by respected health authorities but thus far unmeasured.

A. Sterilization without proven fertility preservation options.

205. Clinical guidelines for the medical transition of gender among children include the need to caution and counsel patients and parents about what are euphemistically called "options for fertility preservation." (e.g., Endocrine Society Guidelines, Hembree 2017 at 3872.) For children who are placed on puberty blockers at Tanner Stage 2, however, because most continue onto cross-sex hormones once they begin a medicalized approach to their dysphoria, no viable fertility preservation options exist. The decision to undergo medicalized transition also represents the decision never to have biological children of one's own.

206. For the large new population of young people who are first being put on puberty blockers and/or cross-sex hormones at a somewhat later stage of puberty, no studies at all have been done of when, whether, or with what probability either males or females can achieve healthy fertility if they later regret their transition decision and cease taking puberty blockers and/or cross-sex hormones. Much less has this been studied as a function of the stage of development at which they began puberty blockers and/or cross-sex hormones, and how long their gonads were subjected to cross-sex hormones.

B. Permanent loss of capacity for breast-feeding in adulthood.

207. While the removal of the breasts of a biological female adolescent or young adult may be cosmetically revised, it is functionally irreversible; even if the person later regrets and detransitions before or during adulthood, breast-feeding a child will never be possible. To the adolescent determined to transition, this may seem no cost at all. To the future adult mother, it may

be a very severe harm indeed.

C. Lifetime lack of orgasm and sexual function.

208. There has not been systematic investigation of the effects on adult sexuality among people medically transitioned at an early stage of puberty. Notably, Dr. Marci Bowers, current President of WPATH, and surgeon with substantial experience conducting penis-to-vagina operations, opined, "If you've never had an orgasm pre-surgery, and then your puberty's blocked, it's very difficult to achieve that afterwards…I consider that a big problem, actually. It's kind of an overlooked problem that in our 'informed consent' of children undergoing puberty blockers, we've in some respects overlooked that a little bit." (Shrier 2021.) In my opinion as a psychologist and sex and couple's therapist, this represents a large potential harm to future relationships and mental health to "overlook," and must be taken into consideration in any serious risk:benefit analysis of "safety."

D. Hormonal treatments during puberty interfere with neurodevelopment and cognitive development.

209. It is well known that pubertal hormone levels drive important stages of neural development and resulting capabilities, although the mechanisms are not yet well understood. Dr. John Strang (Research Director of the Gender Development Program at Children's National Hospital in Washington, D.C.) (Terhune 2022), the Cass Report from the U.K., and the systematic review from Finland all reiterated the central importance and unknown effects of GnRH-agonists on windows, or "sensitive periods," in brain development, notably including adolescence. As Dr. Cass put it:

> A further concern is that adolescent sex hormone surges may trigger the opening of a critical period for experience-dependent rewiring of neural circuits underlying executive function (i.e. maturation of the part of the brain concerned with planning, decision making and judgement). If this is the case, brain maturation may be temporarily or permanently disrupted by puberty blockers, which could have

> significant impact on the ability to make complex risk-laden decisions, as well as possible longer-term neuropsychological consequences. To date, there has been very limited research on the short-, medium- or longer-term impact of puberty blockers on neurocognitive development. (Cass Review Letter 2022 at 6.)

210. In a meta-analysis (a highly rigorous type of systematic review) of studies of neuropsychological performance, non-transsexual males undergoing puberty earlier show a different cognitive profile than those underdoing puberty later. The association of brain development with age of pubertal onset exists in humans as well as non-human animals. (Shirazi 2022.)

211. Even in adults, neuroscience studies employing MRI and other methods have shown that the blockade of normal levels of hormones associated with puberty and adulthood degrade brain performance. Thus, when GnRH-agonists are administered to adult biological women, several brain networks decrease in activity and cognitive performance, such as in working memory, declines. (Craig 2007; Grigorova 2006.)

212. In light of this science, multiple voices have expressed concern that blocking the process of puberty during its natural time could have a negative and potentially permanent impact on brain development (Cass 2022 at 38–39; Chen 2020; Hembree 2017 at 3874.) As Chen *et al.* (2020) observed:

> [I]t is possible these effects are temporary, with youth 'catching up'…However, pubertal suppression may prevent key aspects of development during a sensitive period of brain organization. Neurodevelopmental impacts might emerge over time, akin to the 'late effects' cognitive findings associated with certain [other] oncology treatments. (Chen 2020 at 249.)

Chen et al. (2020) noted that no substantial studies have been conducted to identify such impacts outside "two small studies" (at 248) with conflicting results. I have not identified any systematic review of neurodevelopment or cognitive capacity.

213. A related concern is that by slowing or preventing stages of neural development,

puberty blockers may impair precisely the mature cognitive capabilities that would be necessary to evaluation of, and meaningful informed consent to, the type of life-changing impacts that accompany cross-sex hormones. (See Section XV.)

E. Substantially delayed puberty is associated with medical harms.

214. The research cited by the WPATH Standards of Care includes the evidence that children whose natural puberty started very late (top 2.3% in age) have elevated risks of multiple health issues in adulthood. (Zhu & Chan 2017.) These include elevations in metabolic and cardiovascular disease, lower height, and decreased bone mineral density. It has not been studied whether these correlations also occur in children whose puberty is chemically delayed. Undergoing puberty much later than one's peers is also associated with poorer psychosocial functioning and lesser educational achievement. (Koerselman & Pekkarinen 2018.)

F. Elevated risk of Parkinsonism in adult females.

215. Epidemiological research has shown adult, non-transsexual women who undergo surgical removal of both ovaries to have substantially elevated odds of developing parkinsonism, including Parkinson's Disease, relative to age-matched women randomly selected from the local population in an on-going epidemiological study. (Rocca 2022.) The effect was greater among younger women, showing 7–8 times greater odds among women under 43. The observed delay between removal of ovaries and the onset of parkinsonism was 26.5 years. Whether chemically suppressing the ovaries of a biological female via puberty blockers during adolescence followed by cross-sex hormones will cause a similar increase in parkinsonism, or when, remains unknown.

G. Reduced bone density.

216. The systematic reviews by Sweden, Finland, and England all included bone health as an outcome. *The New York Times* also recently commissioned its own independent review of the

available studies. (Twohey & Jewett 2022.) These reviews all identified subsets of the same group of eight studies of bone health. (Carmichael 2021; Joseph 2019; Klink 2015; Navabi 2021; Schagen 2020; Stoffers 2019; van der Loos 2021; Vlot 2017.) These studies repeatedly arrived at the same conclusion. As described by *The New York Times* review:

> [I]t's increasingly clear that the drugs are associated with deficits in bone development. During the teen years, bone density typically surges by about 8 to 12 percent a year. The analysis commissioned by *The Times* examined seven studies from the Netherlands, Canada and England involving about 500 transgender teens from 1998 through 2021. Researchers observed that while on blockers, the teens did not gain any bone density, on average—and lost significant ground compared to their peers.[7] (Twohey & Jewett 2022.)

217. There is some evidence that some of these losses of bone health are regained in some of these youth when cross-sex hormones are later administered. The rebounding appears to be limited to female-to-male cases, while bone development remains deficient among male-to-female cases.

218. The long-term effects of the deficient bone growth of people who undergo hormonal interventions at puberty remain unstudied. The trajectory of bone quality over the human lifetime includes decreases during aging in later adulthood. Because these individuals may enter their senior years with already deficient bone health, greater risks of fracture and other issues are expectable in the long term. As the *New York Times'* analysts summarized, "That could lead to heightened risk of debilitating fractures earlier than would be expected from normal aging—in their 50s instead of 60s." Such harms, should they occur, would not be manifest during the youth and younger adulthood of these individuals. This distinction also represents one of the differences between adult transitioners and childhood transitioners and why their experiences cannot be extrapolated between them.

[7] The eighth study was Lee, *et al.*, 2020, which reported the same deficient bone development.

219. There does not exist an evidence-based method demonstrated to prevent these outcomes. The recommendations offered by groups endorsing puberty blockers are quite limited. As summarized by *The Times:*

> A full accounting of blockers' risk to bones is not possible. While the Endocrine Society recommends baseline bone scans and then repeat scans every one to two years for trans youths, WPATH and the American Academy of Pediatrics provide little guidance about whether to do so. Some doctors require regular scans and recommend calcium and exercise to help to protect bones; others do not. Because most treatment is provided outside of research studies, there's little public documentation of outcomes. (Twohey & Jewett 2022.)

H. Short-term/Immediate side-effects of puberty blockers include sterile abscesses, leg pain, headache, mood swings, and weight gain.

220. The Cass Report summarized that "In the short-term, puberty blockers may have a range of side effects such as headaches, hot flushes, weight gain, tiredness, low mood and anxiety, all of which may make day-to-day functioning more difficult for a child or young person who is already experiencing distress." (Cass 2022 at 38.)

221. In 2016, the U.S. FDA began requiring drug manufacturers to add a warning about the psychiatric side effects, after reports of suicidal ideation and a suicide attempt began to emerge among children prescribed GnRH-agonists (for precocious puberty).[8] The warning label on Lupron reads that "Psychiatric events have been reported in patients…such as crying, irritability, impatience, anger and aggression."

222. Other than the suicide attempt, such adverse effects may seem minor relative to the major health and developmental risks I have reviewed above, and they may be dismissed by children and by parents confronted by fears of suicidality and an urgent hope that transition will resolve the child's unhappiness and mental health issues. However, when assessing risk:benefit

[8] Reuters Special Report; 2022, Oct. 6. Retrieved from https://www.reuters.com/investigates/special-report/usa-transyouth-care/

ratio for "safety" against the undemonstrated benefits claimed for hormonal interventions, these observed harms should not be ignored.

I. Long-term use of cross-sex hormones in adult transsexuals is associated with unfavorable lipid profiles (cholesterol and triglycerides) and other issues.

223. As the Cass Report correctly and succinctly indicated, "Sex hormones have been prescribed for transgender adults for several decades, and the long-term risks and side effects are well understood. These include increased cardiovascular risk, osteoporosis, and hormone-dependent cancers." (Cass 2022 at 36.)

224. Minors who begin puberty blockers and proceed to cross-sex hormones—as almost all do—will require continuing treatment with cross-sex hormones for life, unless they go through the very difficult process of detransition. Because a lifetime dependence on cross-sex hormones is the expected course, the known adverse effects of cross-sex hormones on adults must also be part of the risk:benefit analysis of the "safety" of putting a minor on cross-sex hormones (and indeed, of the initial decision to put a child on puberty blockers).

225. Systematic review identified 29 studies of the effects of cross-sex hormone treatment on cardiovascular health in adults. (Maraka 2017.) By the two-year follow-up mark among female-to-male transitioners, hormone administration was associated with increased serum triglycerides (indicating poorer health), increased low-density-lipid (LDL) cholesterol (indicating poorer health), and decreased high-density-lipid (HDL) cholesterol (indicating poorer health). Among male-to-female transitioners at the two-year mark, cross-sex hormone treatment was associated with increased serum triglycerides (indicating poorer health).

XV. Assertions that puberty blockers act only as a "fully reversible" "pause button" are not supported by scientific evidence.

226. Plaintiffs' experts, along with many advocates and organizations, have boldly asserted that the administration of puberty blockers to adolescents is "fully reversible." The assertion is not consistent with or supported by any objective assessment of the existing science. Although withdrawal of the medication will allow the pubertal process to resume, that is very far from establishing that the impact of that interruption of natural development is "fully reversible." The evidence is not that the person's life will proceed as if the medical intervention never happened, as the popularized phrase suggests. Rather, the evidence repeatedly indicates that stopping a healthy child's natural onset of puberty imposes multiple substantial harms, risks, or opportunity costs.

227. First, as I have previously mentioned (Section IV.D), it is scientifically invalid to extrapolate results from using puberty blockers to prevent precocious puberty by delaying the pubertal process to its normal age range, to using them to *prevent* normally occurring healthy puberty, merely assuming the effects and side-effects will be the same. The two are very different populations and very different uses.

228. Second, not all the effects of GnRHa's in otherwise healthy children are known: It is therefore not possible to assess whether all effects are reversed or to what extent. Indeed, within the scientific method, it is never possible to demonstrate that any intervention is "fully reversible." In science, it always remains possible for future evidence to identify an effect that does not reverse. To assert that all the effects of GnRHa's are fully reversible is to assert that all its effects have been investigated and checked for reversibility, which is false.

229. Third, and more concretely, I have reviewed above a large number of medical and developmental risks which multiple responsible voices have associated with administration of

puberty blockers to adolescents, and which are either established by studies or have not been shown not to exist. In the face of this knowledge and lack of knowledge, it is scientifically unsupported and irresponsible to assert that this use of puberty blockers is "fully reversible" and "just a pause."

230. Here, I identify additional psycho-social developmental impacts of delaying healthy, naturally-occurring puberty which are likely to be irreversible, but have not been meaningfully studied.

A. Stopping puberty does not stop time: Patients' peers continue to develop and mature, with patients falling increasingly behind.

231. Initiating puberty blockers at Tanner Stage 2 (at the very first signs of puberty, typically ages 9 or 10) holds the child in a prepubescent state, while their peer group and classmates continue to grow. By the time many patients begin cross-sex hormone treatment, their peers will have completed puberty and progressed far into adolescence. Puberty may become unblocked, but these children have irreversibly lost the opportunity and experience of developing with their peers and must instead do so alone.

232. Being a "late bloomer," indeed among the latest possible bloomers, has psychological consequences of its own. Having the body and mind of a prepubescent child while one's friends have grown into physically mature sixteen-year-olds is extreme. Despite being a teenager chronologically, remaining prepubescent both physically and mentally while the lives of one's peers have advanced to teenagers' interests only increases the isolation of children already reporting social distress. There does not exist a means of distinguishing how much of any improvement in mental health that might be observed across these years in a particular study is simply the result of finally undergoing at least some pubertal development and finally catching up with one's peers in at least some parameters.

233. Concretely, undergoing puberty much later than one's peers (as a result of naturally

occurring rather than medically induced conditions) has been associated with poorer psychosocial functioning and lesser educational achievement. (Koerselman & Pekkarinen 2018.) Whether this holds true when the late puberty is the result of puberty blockers has not been studied.

B. Blocking puberty blocks the awareness of sexuality and sexual orientation that can play an important role in the individual's understanding of gender identity.

234. As demonstrated unanimously by the cohort studies of prepubescent children with gender dysphoria, the great majority cease to feel gender dysphoric during the course of puberty. (Section IX.B.) Studies also find that many such children subsequently identify as gay or lesbian, providing a potential alternative source and understanding of their atypical childhood gender interests. But for all children, blocking puberty necessarily blocks the onset of adult sexual interest, sexual arousal, and sexual response which are part of "the usual process of sexual orientation and gender identity development." (Cass 2022 at 38.) That is, blocking the experience of sexual feelings and development blocks normal phenomena that enable the young person to understand sexuality and sexual orientation, as distinct from gender identity. As Dr. Cass summarized:

> We do not fully understand the role of adolescent sex hormones in driving the development of both sexuality and gender identity through the early teen years, so by extension we cannot be sure about the impact of stopping these hormone surges on psychosexual and gender maturation. We therefore have no way of knowing whether, rather than buying time to make a decision, puberty blockers may disrupt that decision-making process. (Cass Review Letter 2022 at 5.)

Thus, contrary to the hypothesis that providing time might permit more considered understanding and decision-making, the prevention of puberty blocks the awareness of a central factor that may well influence that understanding.

235. Because puberty blockers prevent prepubescent children from developing any understanding of sexual arousal and sexual relationships, such children are necessarily incapable of providing informed consent. There does not exist—indeed, there cannot exist—an age-

appropriate way to equip a child who has not gone through puberty to make an informed decision about age-inappropriate issues, such as their future sex life, choices of sexual partners, sex-bonded relationships including marriage, and sacrificing ever experiencing orgasm.

C. Blocking puberty may block development of adult decision-making capacity.

236. As I have explained above, there are reasons to fear that use of puberty blockers may have permanent negative effects on brain development. That long-term risk aside, blocking puberty nevertheless threatens to prevent the child from growing towards adult decision-making capability during precisely the years in which he or she is being asked to make life-altering decisions about gender identity, gender presentation and cross-sex hormones. Pubertal brain development includes pervasive change in structural and functional connectivity (Chen 2020), re-balancing its capabilities between the acquisition of skills and knowledge and their application. Foremost among these are acquiring the abilities to control impulsivity and engage in rational and long-term decision-making (Crone & Steinbeis 2017), in association with development of a brain region called the "prefrontal cortex," and similarly acquiring the capacity to process adult social interaction, in association with the development of a network of brain areas (Kilford 2016), collectively called the "social brain." To understand medicalized transition of gender and its known and unknown consequences is one of the most complicated questions that a young person today could face, and a prepubescent brain is not equipped to process that information rationally, objectively, and with a whole lifetime rather than immediate desires and social pressures in mind.

D. Time spent on puberty blockers poses significant opportunity costs.

237. One of the primary, if not the foremost, justifications for medically transitioning children and adolescents is to reduce the psychological distress they report. That hypothesis interprets these children's psychological concerns (e.g., anxiety and depression) to gender

dysphoria and/or external sources (e.g., transphobia). As I have noted here previously, however, many gender dysphoric children and adolescents suffer from multiple other mental health issues. In several studies of minors on puberty blockers, a substantial portion of the subjects do not report ongoing psychological care. If years spent on puberty blockers in the hopes that that will relieve distress distract from systematic efforts to directly address comorbidities through psychotherapy, then it diverts the minors from treatment which exhibits substantial evidence of effectiveness for improving mental health and lacks the multiple and significant side-effects of puberty blockers.

XVI. Assessments of clinical guidelines, standards, and position statements.

238. Several sets of recommendations have been offered regarding the clinical treatment of people with gender dysphoria. In this section, I comment on these protocols or recommendations individually.

A. The Dutch Protocol (aka Dutch Approach).

239. The Netherlands' child gender identity clinic in Amsterdam associated with the Vrije University (VU) was one of the international leaders in the use of hormonal interventions to treat gender dysphoria in minors. Researchers associated with that clinic have generated a large portion of the seminal research literature in the field. Key early publications from that group spelled out criteria and procedures that are collectively referred to as the "Dutch Protocol," and this approach has been widely influential internationally.

240. The purpose of the protocol was to compromise conflicting desires and considerations including: clients' initial wishes upon assessment; the long-established and repeated observation that those wishes will change in the majority of (but not in all) childhood cases; and that cosmetic aspects of medical transition are perceived to be better when they occur earlier rather than later in pubertal development.

241. The VU team summarized and explicated their approach in their paper, *Clinical management of gender dysphoria in children and adolescents: The Dutch Approach*. (de Vries & Cohen-Kettenis 2012.) Key components of the Dutch Approach are:

- no social transition at all considered before age 12 (watchful waiting period),
- no puberty blockers considered before age 12,
- cross-sex hormones considered only after age 16, and
- resolution of mental health issues before any transition.

242. For youth under age 12, "the general recommendation is watchful waiting and carefully

observing how gender dysphoria develops in the first stages of puberty." (de Vries & Cohen-Kettenis 2012 at 301.)

243. The age cut-offs of the Dutch Approach were not based on any research demonstrating their superiority over other potential age cut-offs. Rather, they were chosen to correspond to the ages of consent to medical procedures under Dutch law. Nevertheless, whatever the original rationale, the data from this clinic simply contain no information about the safety or efficacy of employing these measures at younger ages.

244. The authors of the Dutch Approach repeatedly and consistently emphasize the need for extensive mental health assessment, including clinical interviews, formal psychological testing with validated psychometric instruments, and multiple sessions with the child and the child's parents.

245. Within the Dutch Approach, there is no social transition before age twelve. That is, social affirmation of the new gender may not begin until age 12—as desistance is less likely to occur past that age. "Watchful Waiting" refers to a child's developmental period up to that age. Watchful waiting does not mean do nothing but passively observe the child. Rather, such children and families typically present with substantial distress involving both gender and non-gender issues, and it is during the watchful waiting period that a child (and other family members as appropriate) would undergo therapy, resolving other issues which may be exacerbating psychological stress or dysphoria. As noted by the Dutch clinic, "[T]he adolescents in this study received extensive family or other social support [and they] were all regularly seen by one of the clinic's psychologists or psychiatrists." (de Vries 2011 at 2281.) One is actively treating the person, while carefully "watching" the dysphoria.

246. The use of hormonal interventions described in the Dutch Protocol, while markedly

more conservative than today's practice in many U.S. clinics, has recently been criticized in detail in a peer-reviewed article as unjustified by reliable evidence (Biggs 2022; Levine 2023; Levine 2022). Certainly, the published research evidence base concerning safety and efficacy available to the VU clinicians is and was no greater than the global evidence base that the NICE review recently labelled as uniformly of "very low quality."

247. Because clinical practices are often justified by alluding to the Dutch Protocol, however, it is important to be aware of the limitations on the use of hormones and puberty blockers specified by the Dutch Protocol and listed above (and thus the limits of the clinical evidence published out of the VU clinic) which are regularly ignored by clinicians in the U.S.

B. World Professional Association for Transgender Health (WPATH).

248. The WPATH standards of care have been lauded as long-established and high quality procedures. This does not reflect any objective assessment, however. The previous WPATH standards (version 7) were subjected to standardized evaluation, the Appraisal of Guidelines for Research and Evaluation ("AGREE II") method. (Dahlen 2021.) That assessment concluded "[t]ransition-related [clinical practice guidelines] tended to lack methodological rigour and rely on patchier, lower-quality primary research." (Dahlen 2021 at 6.) The WPATH guidelines were not merely given low scores, but received unanimous ratings of "Do not recommend." (Dahlen 2021 at 7.)

249. Immediately after the release of the current (2023) version of WPATH's standards (version 8), WPATH fundamentally altered it by removing from it minimum ages previously required for undergoing social or medical transition of gender. (WPATH Correction 2022.) This is despite the fact that age is the central component to young people's emerging understanding of their sexual identities through social identity formation, pubertal development, and the onset of

sexual interest. The removal of age restrictions was not based on any research evidence at all—WPATH provided no reference to any study as justification, and the WPATH leadership have been explicit in indicating that the change was intended to prevent clinical care providers from legal liability for physicians rejecting those minimums. The implementation of such fundamental and dramatic changes, in the complete absence of any supporting science whatsoever, negates entirely any claim that WPATH represents evidence-based or empirically-supported treatment. As explicated herein, on Table 1, the systematic review on which WPATH based its standards for minors included exactly one study on puberty blockers and three studies on cross-sex hormones. All other references represent cherry-picked citations of studies rejected by its own systematic process. Moreover, even among the four studies in WPATH's review, three were rejected by the Swedish review, due to the low quality of the science they contained.

C. Endocrine Society (ES).

250. As I have noted, in preparing its guidelines the Endocrine Society did not conduct systematic reviews of evidence relating to efficacy of any hormonal intervention in children or adolescents, and instead conducted reviews on only two safety-related endpoints.

251. Although outside the professional expertise of endocrinologists, mental health issues were also addressed by the Endocrine Society, repeating the need to handle such issues before engaging in transition, "In cases in which severe psychopathology, circumstances, or both seriously interfere with the diagnostic work or make satisfactory treatment unlikely, clinicians should assist the adolescent in managing these other issues." (Hembree 2017 at 3877.) This ordering—to address mental health issues before embarking on transition—avoids relying on the unproven belief that transition will solve such issues.

252. The Endocrine Society did not endorse any affirmation-only approach. The guidelines

were neutral with regard to social transitions before puberty, instead advising that such decisions be made only under clinical supervision: "We advise that decisions regarding the social transition of prepubertal youth are made with the assistance of a mental health professional or similarly experienced professional." (Hembree 2017 at 3870.)

253. The Endocrine Society guidelines make explicit that, after gathering information from adolescent clients seeking medical interventions and their parents, the clinician "provides correct information to prevent unrealistically high expectations [and] assesses whether medical interventions may result in unfavorable psychological and social outcomes." (Hembree 2017 at 3877.)

254. The 2017 update of the Endocrine Society's guidelines added a disclaimer not previous appearing:

> The guidelines cannot guarantee any specific outcome, nor do they establish a standard of care….The Endocrine Society makes no warranty, express or implied, regarding the guidelines and specifically excludes any warranties of merchantability and fitness for a particular use or purpose. The Society shall not be liable for direct, indirect, special, incidental, or consequential damages related to the use of the information contained herein. (Hembree 2017 at 3895-3896.)

255. The Endocrine Society guidelines do not rely on any systematic review of evidence of *efficacy* of any form of treatment for gender dysphoria. The Dahlen et al. team also subjected these guidelines to review according to the AGREE II criteria, and two out of three independent reviewers concluded that they should *not* be used clinically. (Dahlen 2021 at 7.)

D. American Academy of Pediatrics (AAP).

256. A "Policy Statement" issued by the American Academy of Pediatrics (AAP) in 2018, but on its face declared to represent exclusively the work of one author who alone is "accountable for all aspects of the work," is unique among the major medical associations in being the only one to endorse an affirmation-on-demand policy, including social transition before puberty without

any watchful waiting period. (Rafferty 2018.) Although changes in recommendations can obviously be appropriate in response to new research evidence, the AAP identified no such new evidence to justify a radical departure from the "therapy first" approach of the Dutch Protocol. Rather, the research studies AAP cited in support of its policy simply did not say what AAP claimed they did. In fact, the references that AAP cited as the basis of their policy instead outright contradicted that policy, repeatedly endorsing watchful waiting. (Cantor 2019.) Moreover, of all the outcomes research published, the AAP policy cited *one*, and that without mentioning the outcome data it contained. (Cantor 2019.)

257. Immediately following the publication of the AAP policy, I conducted a point-by-point fact-check of the claims it asserted and the references it cited in support. I submitted that to the *Journal of Sex & Marital Therapy*, a well-known research journal of my field, where it underwent blind peer review and was published. I append that article as part of this report. *See* Appendix 2. A great deal of published attention ensued; however, the AAP has yet to respond to the errors I demonstrated its policy contained. Writing for *The Economist* about the use of puberty blockers, Helen Joyce asked AAP directly, "Has the AAP responded to Dr Cantor? If not, have you any response now?" The AAP Media Relations Manager, Lisa Black, responded: "We do not have anyone available for comment."

XVII. Assessment of plaintiffs' experts' reports.

258. In the body of my report above I have addressed the nature and strength of the scientific evidence concerning the primary scientific issues raised in the expert reports of Plaintiffs' experts. Here, I add a few remarks directed to specific evidentiary or logical defects in the opinions offered by specific experts.

A. Adkins

259. Dr. Adkins indicated she was an expert witness for the plaintiffs in B.P.J. v West Virginia Board of Education et al. I am an expert witness for the defense in that case, which is currently in process.

260. Dr. Adkins' employment in programs and centers for gender care represents a significant conflict of interest: The income she derives from her medical treatment of these children would be directly affected by the outcome of this case. Individuals who stand to lose income on the basis of research findings cannot be objective in their assessment of those findings. (See Section I.B. on *Clinical vs. Scientific Expertise* and Section I.C. on the *Professional Standard on Conflict of Interest.)*

261. Dr. Adkins reported training in pediatric endocrinology, not mental health. She is not qualified to assess the mental health of her patients. Patients undergoing medicalized transition requires screening for mental health issues before entering her care at all.

262. Dr. Adkins' declaration made explicit that her opinions repeatedly derived from her personal experiences rather than on the contents of the peer reviewed literature. Because Dr. Adkins is not qualified to assess mental health status, she is not able to offer reliable opinions about changes in mental health status. However qualified she is to assess physical health, she is not qualified to evaluate the mental health outcomes of the physical interventions she provides, not qualified to predict effects on mental health of withdrawing the treatments she provides, and not qualified to opine on whether or when mental health treatments such as psychotherapies can provide an equally (or superior) effective alternative lacking the risks of physical interventions.

263. Dr. Adkins claimed "a person's gender identity…cannot be changed voluntarily or by external forces" citing page 3874 of the Endocrinology Society guidelines (Adkins, paragraph 20).

Regarding "external forces," the Endocrine Society guidelines claim the very opposite of what Dr. Adkins attributed to them: That document actually says, "Results of studies from a variety of biomedical disciplines—genetic, endocrine, and neuroanatomic—support the concept that gender identity and/or gender expression (20) likely reflect a complex interplay of biological, environmental, and cultural factors." (Hembree 2017 at 3874.) The Endocrine Society explicitly included the influence of exactly the factors Dr. Adkins claimed it excluded.

264. Regarding gender identity being "changed voluntarily," Dr. Adkins mistakes the pertinent issue: The central issue is youth who are *mistaken* about their gender identity. These youth are *misinterpreting* their experiences to indicate they are transgender, or are exaggerating descriptions of their experiences in service of attention-seeking, calls for help, or other psychological needs. Finally, Dr. Adkins' claim is not merely lacking any science to support it; the claim itself defies the scientific method itself. In science, it is not possible to know that gender identity cannot be changed: We can know only that we lack evidence of such a procedure. In science, it remains eternally possible for evidence of such a treatment to emerge, and unlike sexual orientation's long history with conversion therapy, there have not been systematic attempts to change gender identity.

265. Dr. Adkins claimed that "untreated" gender dysphoria can result in mental health issues including suicidality, citing two sources, Spack et al. (2012) and Olson et al. (2016) (Adkins ¶22.) Her claim does not at all reflect the contents of the research on suicidality, however. (See Section X. *Suicide and Suicidality.)* Dr. Adkins's claim directly contradicts the contents of Spack et al. (2012). Whereas Adkins cites Spack in support of her medicalized treatment of gender dysphoria, Spack instead repeatedly and unambiguously indicated that "Gender dysphoric children who do not receive *counseling* have a high risk of behavioural and emotional problems and psychiatric

diagnoses." (Spack 2012 at 422, italics added.) In direct opposition to Adkins' claims that medical transition is needed to treat this medical condition, Spack has instead written that "*mental health intervention* should persist for the long term, even after surgery, as patients *continue to be* at mental health risk, *including for suicide.* While the causes of suicide are multifactorial, the possibility cannot be ruled out that some patients unrealistically believe that surgery(ies) solves their psychological distress." (Spack 2013 at 484 italics added.) Whereas Adkins cited Spack to support her insinuations that transition relieves distress, Spack instead explicitly warned against drawing exactly the conclusion that Adkins presented to the court.

266. While Spack notes the mental health issues of these youth require mental health treatments (which Adkins is not qualified to provide), Adkins cites him to claim the reverse: that the mental health issues instead require the *medical* interventions (which she can provide). It is situations likes these that the aforementioned conflict of interest policies are meant to prevent.

267. Dr. Adkins' declaration also misleads the court in citing Olson et al. (2016). First, that study did not report on medical interventions at all: It compared the mental health of children who had *socially* transitioned (not medically transitioned) with a non-transgender control group, finding no significant differences between them. Second, the Olson report turned out to be have been incorrectly analyzed. After correcting for the statistical errors, the data instead showed that the socially transitioned children in the Olson clinic showed significantly *lower* mental health than the controls. (Schumm 2019; Schumm & Crawford 2020.)

268. I conducted an electronic search of the research literature to identify any responses from the Olson team regarding the Schumm and Crawford re-analysis of the Olson data and was not able to locate any. I contacted Professor Schumm by email on August 22, 2021 to verify that conclusion, to which he wrote there has been: "No response [from Olson]." (Schumm, email

communication, 22 Aug 2021, on file with author.[9])

269. In her deposition, Adkins claims to have achieved a level of success in her medical practice unlike that reported by any other anywhere in the world: "I currently treat hundreds of transgender patients. All of my patients who have received medical treatment for gender dysphoria have benefitted from clinically appropriate treatment." (Adkins ¶24.) No clinic has published success rates even approximating this. (See Section XIII. *Studies of Puberty Blockers and Cross-Sex Hormones.*) By contrast, the peer-reviewed research literature repeatedly indicates that clients misrepresent themselves to their care-providers, engaging in "image management" so as to appear as having better mental health than they actually do. (Anzani et al. 2020; Lehmann et al. 2021.)

270. Dr. Adkins did not describe engaging any systematic file review, tabulation of cases who dropped out and whose outcomes became invisible to her, no consideration of patients receiving mental health treatment as the same time as medical treatment, and no use of validated methods to assess (or define) "benefit." In the absence of any structured method, it is not possible to evaluate to what extent Dr. Adkins' conclusion reflects human recall bias, the aforementioned impression management efforts of clients, or just general maturation during which patients would have improved regardless of medical intervention. Indeed, the very purpose of engaging in systematic, peer-reviewed outcomes research instead of anecdotal recollection is to rule out exactly these biases. (See Section III. *Pyramid of Evidence.*) As already noted, Dr. Adkins is not qualified to assess mental health status or changes to it. In the absence of objective evidence, it is not possible to differentiate Adkins' claims of the unbridled success of her own work from the simpler explanation that she and her patients are telling each other what they want and expect to hear.

[9] The date of these emails precedes the filing of the present case. As indicated already, Dr. Adkins and I previously were expert witnesses in BPJ v West Virginia. In her declaration in that case, Dr. Adkins made the same claims as here using these same citations. It was in preparing my response for that case, in 2021, that I contacted Dr. Schumm. Despite having been alerted to her factual errors, however, Dr. Adkins knowingly repeats them here.

271. Instead of any systematic reviews of the science, the Adkins declaration repeatedly cited the guidelines from the Endocrine Society (aka Hembree et al. 2017, the World Professional Association for Transgender Health (WPATH SOC 8; aka Coleman et al. 2022), the American Association of Pediatrics (AAP; aka Rafferty et al. 2018). As already detailed herein, those documents did not include systematic reviews of the research on the safety or effectiveness medicalized transition. (See Section VI. *Endocrine Society, WPATH, and AAP*.) Adkins' declaration did not include, or mention the existence of, any of the systematic reviews that have been conducted. (See Section V. *Systematic Reviews.*)

B. Antommaria

272. Dr. Antommaria's declaration included his participation as an expert witness for the plaintiffs in three cases for which I am an expert witness for the defense: Dekker v Weida (Florida), Doe v Abbot (Texas), and Boe v Marshal (Alabama).

273. Dr. Antommaria repeatedly argued against professional standards by noting conditions for which exceptions are made, but failed to indicate that any of those conditions are met in the present case.

274. Dr. Antommaria cited the AAP to assert "Clinical practice guidelines are developed using systematic processes to select and review scientific evidence" (Antommaria ¶16). Missing from Dr. Antommaria's report is that the AAP failed to engage in exactly that process for their policy on medical transition of minors. (See XVI. *American Academy of Pediatrics.*)

275. Dr. Antommaria noted that even when a patient did not qualify for a given research study "a clinician *may,* however, recommend a treatment to a patient…because the clinician believes the treatment will benefit the patient." (Antommaria ¶17.) Missing from Dr. Antommaria's reasoning is that this does not excuse clinicians from assessing the risk:benefit ratio,

ignoring evidence of risk, or overconfidently treating their beliefs as superior to objective evidence.

276. In his ¶18, Dr. Antommaria insinuates that one may ignore the conclusion of the international medical community on the medical transition of minors because "'low' does *not necessarily* mean poor or inadequate," (italics added) but he provides no evidence that the present situation represents such an exception. Dr. Antommaria similarly noted "The labels 'high" and "low" quality evidence *can be misleading* if the latter is used in the colloquial sense of poor or inadequate" (Antommaria ¶21). He provided no evidence that the terms are misleading as used here. Moreover, the fulsome descriptions within each of the systematic reviews of the topic make clear that the research is indeed inadequate for justifying the medical procedure they are being used to support.

277. Dr. Antommaria indicates his belief that "The major benefit of a randomized trial is that it decreases the likelihood that any differences in the outcomes between the groups is the result of baseline differences" (Antommaria ¶19). That belief ignores the much more important benefit that the RCT design is what permits us to conclude that the treatment *caused* whatever changes. RCTs are required to distinguish cause from correlation, which is, in turn, required to assessing whether the attendant risks are worth the potential benefits. Because there does not exist evidence that the potential benefits *sometimes* reported on *some* variables in *some* cohort studies (Section XIII. *Cohort Studies*) are caused by medical interventions instead of by the psychotherapy that accompanies it, the medical risks cannot be justified. (See IV. *Methodological Defects.*)

278. In ¶20, Dr. Antommaria cites a survey as an example of a cross-sectional study which "permits investigators to examine *potential* associations between factors" (italics added). Surveys are limited to showing correlational results, for which there are multiple potential interpretations.

(See IV.B. *Correlation Does Not Imply Causation.*) Of the multiple possibilities, Dr. Antommaria's language insinuates only the one suggesting that puberty blockers caused decreases in suicidal ideation, but ignores the others, including for example that only the mentally healthier children were permitted to receive the blockers in the first place, especially because the clinical assessment procedures are meant to do exactly that.

279. Dr. Antommaria claimed "randomized controlled trials *may* not be feasible or ethical, *may* have intrinsic methodological limitations, or *may* be unavailable in some contexts" (Antommaria ¶21); however, his declaration provided no evidence that any of these hypothetical situations applied in the present case. The routine and ethical alternative procedure in clinical science is to use what is called an "active comparator," such as comparing youth receiving both psychotherapy and medicalized transition with youth receiving psychotherapy only, as spelled out in the systematic review by NICE in the U.K. (NICE 2020a at 40; NICE 2020b at 47.)

280. The public cannot be confident in medicine when doctors can claim to be performing evidence-based medicine but get out of producing any evidence by relying only on their own self-confidence. This appears to be the same illogic as Dr. Adkins' positive assertions of her own success.

281. Dr. Antommaria's next justification for foregoing the standard methods of testing medical procedures before using them on children was that "there must be uncertainty about whether the efficacy of the intervention or the control is greater" (¶22), referring to an ethical principle called *clinical equipoise.* Dr. Antommaria did not, however, spell out uncertainty *among whom:* Physicians avoiding the need to demonstrate their effectiveness simply by declaring certainty about their own performance is exactly the situation evidence-based medicine is designed to prevent. According to bioethicist Benjamin Freedman, the originator of the concept of clinical

equipoise, "The requirement is satisfied if there is genuine uncertainty within *the expert medical community*—not necessarily on the part of the individual investigator—about the preferred treatment." (Freedman 1987.) The international expert medical community is indeed highly uncertain, as thoroughly documented throughout the present report (Section II.F. *There Is 'No Debate'*) and in the international medical press, such as the British Medical Journal's recent article: *Gender Dysphoria in young people is rising and so is professional disagreement.* (Block 2023.) The peer reviewed studies that have attempted to do so have been unable to demonstrate differences in efficacy between medicalized and psychotherapeutic treatment of gender dysphoria in minors. (See Section XIII. *Cohort Studies of Puberty Blockers and Cross-Sex Hormones.*)

282. Dr. Antommaria declared "Gender-affirming medical care is not experimental" (¶27–28). Every institution conducing systematic reviews of the safety and efficacy of those procedures, however, came to the opposite conclusion. (See Section XII. *Experimental.*) Ignoring the international conclusion, Dr. Antommaria instead cites claims by groups that did *not* conduct systematic reviews of effectiveness and safety (Antommaria ¶¶29–30). These have been reviewed in their own section. (Section VI. *Endocrine Society, WPATH, and AAP.*)

283. Dr. Antommaria is incorrect to compare the use of puberty blocking medication for gender dysphoria with its use for precocious puberty (Antommaria ¶¶31, 33, 45). Precocious puberty can be diagnosed with much greater accuracy and upon the basis of objective findings, unlike gender dysphoria, which is based entirely on subjective self-report. With precocious puberty, treatment ends upon attaining typical pubertal age, whereas youth with gender dysphoria instead go on to receive cross-sex hormones, for life, sterilizing them upon its initiation. Because the risks are higher in this situation, the standards for its ethical use is higher in this situation. Pediatric obesity and congenital adrenal hyperplasia, again unlike gender dysphoria, are

diagnosable with high accuracy using objective findings, without entailing the destruction of healthy, functioning tissue.

284. Dr. Antommaria claimed the legislative findings "overstate the potential effects of gender-affirming care on fertility" because "puberty blockers do not, by themselves, permanently impair fertility" (¶45). Dr. Antommaria does not provide the whole truth: As already noted, gender-affirming care includes both puberty blockers and cross-sex hormones, and it is their *combination* that causes infertility. Dr. Antommaria's verbal slight-of-hand, claiming relative safety when using only one and not the other, is to hide the actual risks in question. Any consent provided after receiving only this select sub-portion of the relevant information would not constitute *informed* consent, and withholding this information would be a terrible violation of medical ethics.

285. Dr. Antommaria cited a (cherry-picked) set of studies seeming to suggest that medicalized transition benefits its patients (¶¶34, 51) and that doing any further research would therefore be unethical (¶35). The systematic reviews comprising the full set of all such studies came to the opposite conclusion as Dr. Antommaria, as reviewed herein (Section XIII *Cohort Studies of Puberty Blockers and Cross-Sex Hormones*.)

286. Dr. Antommaria also asserted an RCT would be unlikely to enroll a sufficient number of participants because few people would volunteer for a study in which they might not get the medicalized treatment they want (¶35). However, several *entire countries* have banned medicalized transition *except* for research studies. Directly opposite to Dr. Antommaria's scenario, it is *only* by such participation that minors could receive medicalized treatment, so one should actually predict *high* participation rates.

287. In ¶49, Dr. Antommaria indicates that the associations between medicalized transition

and various health and mental health issue are not established to be causally related. He applies his ethical logic incorrectly. Under the medical ethics principle of *primum no nocere*, evidence of the *possibility* of doing harm has the higher priority. It is the evidence of *benefit* that must be *causal*, in order to outweigh the potential harm, whereas evidence of harm may be only correlational. The potential harm must be ruled out, whereas benefits must be causally demonstrated.

288. Dr. Antommaria is incorrect to compare gender dysphoria with DSD's (¶ 54): Such disorders are diagnosed with very high accuracy on the basis of objective features, unlike the subjective basis of diagnosing gender dysphoria.

289. Dr. Antommaria is incorrect to compare hormone therapy of gender dysphoria with chemotherapy (¶54). Gender dysphoria involves objectively healthy and functioning tissue, whereas cancers involve the very opposite (and, again, are diagnosed on the basis of objective features).

290. Standards for clinical practice comprise multiple, mutually reinforcing principles and procedures. This overlap can sometimes permit some flexibility in some circumstances where the other principles with high reliability can compensate, such as allowing some reports of pain and sensation when diagnosing a physical disease before prescribing a short-acting and low-risk medication. Dr. Antommaria's advocacy for medicalized transition, however, entails the simultaneous removal of multiple overlapping protections, leaving no meaningful protection at all. Dr. Antommaria is accepting, at face-value only, purely subjective reports, of a diagnosis with no objective evidence of validity, requiring long-term and life-long physical intervention, on the basis of the lowest possible quality evidence, despite all objective counterevidence, and without first exhausting the safer and less invasive alternatives.

C. Janssen

291. Dr. Janssen's declaration indicated he was deposed as an expert witness by the plaintiffs in *BPJ v WV Board of Education.* I testified as an expert witness for the defense in that case. Although he did not include it, Dr. Janssen has also submitted an expert witness declaration for the plaintiffs in *Boe v Alabama.* I have submitted an expert witness declaration for the defense in that case, for which I am scheduled to be deposed and to testify at trial.

292. Dr. Janssen's declaration that 90% of the patients in his clinical practice are transgender children and adolescents represents a significant conflict of interest: The income he derives from his medical treatment of these children would be directly affected by the outcome of this case. Individuals who stand to lose income on the basis of research findings cannot be objective in their assessment of those findings. (See Section I.B. *Clinical vs. Scientific Expertise* and Section I.C. *Professional Standard on Conflict of Interest.)*

293. Dr. Janssen cites de Vries et al. (2014) as the basis of his claim that puberty-blocking medication is responsible for "forestalling increased distress and dysphoria" (Janssen ¶48) and that the benefits "increase over the long term" (Janssen ¶48). Dr. Janssen's claim contradicts that study's own authors, who instead acknowledged "the positive results may also be attributable to supportive parents, open-minded peers, and the social and financial support (treatment is covered by health insurance) that gender dysphoric individuals can receive in the Netherlands." (de Vries 2014.) Also, as noted herein, the participants in this study were receiving not only medicalized services, but also psychotherapy, which may instead have caused the mental health improvements. (See Section XIII.B. *Studies Confounded Medical Treatment.*) It is not scientifically possible for Dr. Janssen (or anyone else) to know whether mental health improvement came from the medical interventions, from mental health treatment, or from any of the other possibilities noted by that

study's authors.

294. Moreover, Dr. de Vries continues to express the very opposite of what Dr. Janssen attributed to her: Writing in 2023, she repeated that "rigorous longitudinal outcomes studies that provide evidence about whether this approach [hormonal interventions in minors] is effective and safe are needed" and that "Future studies that compare outcomes with different care models are needed." (de Vries 2023 at 276.)

295. SB-1 found that "many of these types procedures, *when performed on a minor* for such purposes, are experimental in nature and not supported by high-quality, long-term medical studies" (SB-1, Section 1, 68-33-101 *Findings.* Paragraph (b), italics added.) Dr. Janssen's declaration quoted only the final part of that sentence, excluding the text indicating it referred only to minors. Dr. Janssen then claimed of the legislative finding "This statement is false." (Janssen ¶52.) To justify his assessment, Dr. Janssen wrote "There have been scores of studies *in adult transgender patients* from prospective data collection among this population over decades." (Janssen ¶52, italics added.) This represents highly manipulative and misleading wordplay. Regarding research on minors, Dr. Janssen cited only a single study, Chen et al., 2023, which is *not* a high quality one, as per the widely accepted standards of clinical research, and entirely consistent with the legislative finding. (See Section XIII *No Reliable Evidence*.)

D. Turban

296. Although it was not included in his declaration, Dr. Turban is an expert witness for the plaintiffs in *K.C. et al v Medical Licensing Board of Indiana.* I am an expert witness for the defense in that case, which is currently in progress.

297. Dr. Turban's employment in programs and centers for gender care represents a significant conflict of interest: The income he derives from his medical treatment of these children

would be directly affected by the outcome of this case. Individuals who stand to lose income on the basis of research findings cannot be objective in their assessment of those findings. (See Section I.B. *Clinical vs. Scientific Expertise* and Section I.C. *Professional Standard on Conflict of Interest.*)

298. Dr. Turban summarized his opinions in his ¶11 with three points. All three deploy vague and ambiguous language that suggest the research literature contains evidence which it does not. Dr. Turban's language repeatedly asserted that medical interventions are causing improvements, in violation of basic scientific principles. (Section IV.B. *Correlation does not imply causation.*) Examples include:

- "interventions improve mental health outcomes" (¶11)
- "statistically significant improvements" (¶16)
- "shown improvements in mental health" (¶17)
- "well-documented benefits of gender-affirming medical care" (¶22)

Correlational research studies do not—indeed cannot—support such claims. In all these situations, the group differences are best explained, not as a result of medicalized transition, but as the better functioning youth being the ones who were permitted to transition in the first place (and other factors).

299. Dr. Turban's declaration repeatedly employed language that insinuate causal relationships where only correlation relationships were found, easily misleading readers. Examples include his repeated use of "linked to" (e.g., Turban ¶¶12, 18, 19) and "associated with" (Turban ¶15). As detailed herein, multiple situations can produce correlational associations and links, only one of which is that X causes Y. Dr. Turban conveys one of these possibilities and withholds from readers the other, even the more logical and parsimonious explanations.

300. Dr. Turban asserted "the claims made by the legislature…are not supported by data"

(Turban ¶12). That assertion is the very opposite of the conclusion of every systematic review conducted of the safety and effectiveness research. Dr. Turban provides no comment or even mention of any of these reviews.

301. Dr. Turban asserted the legislature's claims "are counter to the widely accepted views of the mainstream medical community" (Turban ¶12). That assertion is the very opposite of the conclusion of every systematic review of the safety and effectiveness research. Dr. Turban provides no comment or even mention of any of these reviews.

302. Dr. Turban denied the status of medicalized transition as "experimental." (Turban ¶14.) Every institution conducing systematic reviews of the safety and efficacy of those procedure came to the opposite conclusion. (See Section XII. *Experimental.*) Dr. Turban did not mention, never mind challenge, any of them.

303. Dr. Turban claimed "pubertal suppression is associated with a range of improved mental health outcomes," (Turban ¶15) on the basis of one survey study of his own (Turban 2020) and five studies by other authors (Achille 2020, Costa 2015, de Vries 2011, de Vries 2014, van der Miesen 2020). The set of five studies are considered within the international systematic reviews (along with the other relevant research), and were not found to demonstrate the conclusion Dr. Turban asserted. (See Section V. *Systematic Reviews.*) These studies are also individually described herein. (See Section XIII. *Studies of Puberty Blockers and Cross-Sex Hormones.*) Dr. Turban's own study represents a survey, and lacked the scientific quality for inclusion in the systematic reviews.

304. Moreover, as already detailed, Dr. Turban violates the scientific method in describing this survey as evidence of treatment causing benefits. Existing standards emphasize that major mental health issues need to be "reasonably under control" before transition is permitted. It was

not the case that people became healthier *because of* transition, but that only the healthier people were permitted to transition: As already detailed, surveys do not represent meaningful evidence of clinical outcomes. (See Section III.F. *Surveys and Cross-Sectional Studies.*)

305. Dr. Turban claimed "studies have likewise found improved mental health outcomes following gender-affirming hormone treatment" (Turban ¶16), on the basis of one survey study of his own (Turban 2022) and five studies by other authors (footnotes 9–12: Achille 2020, Allen 2019, Chen 2023, Green 2022, López de Lara 2020). Already considered within the international systematic reviews and the present report are: Achille 2020, Allen 2012, and Chen 2023. López de Lara 2020 studied 23 volunteers from whom psychiatric comorbidities had already been filtered out, and that study has been rejected from systematic review because of its high risk of bias. (SBU 2022, Appendix 2: *Studies excluded due to high risk of bias.*) Dr. Turban's 2022 study and Green 2022 both represent still more analyses from the same survey as Turban 2020, and both are unable to yield reliable causal evidence for the same reasons.

306. In his ¶¶23–26, Dr. Turban warns against conflating gender dysphoria studies of children and adolescents, but then proceeds to misrepresent the literature by doing exactly that. Specifically, he removed the word "onset" from childhood-onset and adolescent-onset cases, misdirecting focus to patients' *current* age instead of the age at which their dysphoria began. As the research demonstrates, there are entirely different features and outcomes among childhood-onset, adolescent-onset (and adult-onset) gender dysphoria. (Section IX. *Distinct Mental Health Phenomena.*) That is, Dr. Turban misrepresents cases of childhood-*onset* who age into adolescence to be the same as cases of adolescent-*onset*, despite their *not* having experienced/expressed dysphoria in childhood and differing on all the other objective features assessed. (See Section IX.C. *Adolescent-Onset Gender Dysphoria.*) Dr. Turban's section title

claims "Adolescents who experience gender dysphoria at the onset of puberty rarely come to identify with the assigned sex at birth." That is not accurate: It is the childhood-*onset* cases who *persist* in experiencing dysphoria into adolescence for whom the dysphoria appears to remain, whereas Dr. Turban's vague language insinuates this would also apply also to cases whose dysphoria only just began at puberty/adolescence. Dr. Turban applies the outcomes of childhood-onset *persisters* to adolescent-*onset* cases, immediately after his warning against doing so. Despite noting that "this distinction is vital in the realm of 'desistence studies'" (Turban ¶24), Dr. Turban deploys the same vague and misleading language in his summary of opinions, "adolescents who experience gender dysphoria at the onset of puberty rarely come to identity with their assigned sex at birth" (Turban ¶11).

307. Dr. Turban's goes on to reverse entirely the application of how children "identify" in the diagnosis research literature. He claimed that the studies demonstrating majority desistance were wrong, because the prior diagnostic category, titled *Gender Identity Disorder in Children* in the DSM-IV[10] "did not require a child to identify as a sex different than their sex assigned at birth" (Turban ¶26) and that it is therefore unsurprising that they "did not identify as transgender" later in life (Turban ¶26). In contrast, Dr. Turban asserted the current diagnostic category, titled *Gender Dysphoria in Children* in the DSM-5, requires that "one must identify as a gender different than one's sex assigned at birth" (Turban ¶26). Dr. Turban calls this "a vital distinction" whose implications are true "by definition" (Turban ¶26).

308. Despite Dr. Turban's confident wording, his claim is the very reverse of the truth. This is seen simply by putting the criteria for these two version against each other (italics added). It is

[10] There are no differences in the diagnostic criteria between the DSM-IV and DSM-IV-TR or between the DSM-5 and DSM-5-TR. The suffix "-TR" designates "text revision," which indicates changes to the commentary accompanying the diagnostic criteria without changes to the criteria themselves.

the earlier DSM-IV version that *includes* identity and the subsequent DSM-5 version that *excludes* it:

DSM-IV Diagnostic Criteria for Gender Identity Disorder in Children

A. A strong and persistent cross-gender *identification* (not merely a desire for any perceived cultural advantages of being the other sex).

In children, the disturbance is manifested by four (or more) of the following:

(1) repeatedly stated desire to be, or insistence that he or she is, the other sex

(2) in boys, preference for cross-dressing or simulating female attire; in girls, insistence on wearing only stereotypical masculine clothing

(3) strong and persistent preferences for cross-sex roles in make believe play or persistent fantasies of being the other sex

(4) intense desire to participate in the stereotypical games and pastimes of the other sex

(5) strong preference for playmates of the other sex

B. Persistent discomfort with his or her sex or sense of inappropriateness in the gender role of that sex.

In children, the disturbance is manifested by any of the following: in boys, assertion that his penis or testes are disgusting or will disappear or assertion that it would be better not to have a penis, or aversion toward tough-and-tumble play and rejection of male stereotypical toys, games, and activities; in girls, rejection or urinating in a sitting position, assertion that she has or will grow a penis, or assertion that she does not want to grow breasts or menstruate, or marked aversion towards normative feminine clothing.

C. The disturbance is not concurrent with a physical intersex condition.

D. The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.

DSM-5 Diagnostic Criteria for Gender Dysphoria in Children

A. A marked incongruence between one's experienced/expressed gender and assigned gender, of at least 6 months' duration, as manifested by at least six of the following (one of which must be Criterion A1):

1. A strong desire to be of the other gender or an insistence that one is the other gender (or some alternative gender different from one's assigned gender).
2. In boys (assigned gender), a strong preference for cross-dressing or simulating female attire; or in girls (assigned gender), a strong preference

for wearing only typical masculine clothing and a strong resistance to the wearing of typical feminine clothing.

3. A strong preference for cross-gender roles in make-believe play or fantasy play.
4. A strong preference for the toys, games, or activities stereotypically used or engaged in by the other gender.
5. A strong preference for playmates of the other gender.
6. In boys (assigned gender), a strong rejection of typically masculine toys, games, and activities and a strong avoidance of rough-and-tumble play; or in girls (assigned gender), a strong rejection of typically feminine toys, games, and activities.
7. A strong dislike of one's sexual anatomy.
8. A strong desire for the primary and/or secondary sex characteristics that match one's experienced gender.

B. The condition is association with clinically significant distress or impairment in social, school, or other important areas of functioning.

309. Dr. Turban's citation of Olson et al. (2022) similarly fails to support his point that only the recent criteria are acceptable. According to Olson et al. (2022): "This study *did not assess* whether participants met criteria for the Diagnostic and Statistical Manual of Mental Disorders, Fifth edition, diagnosis of gender dysphoria in children." (Olson 2022 at 2, italics added).

310. Dr. Turban's next section, "De-transition and regret among individuals receiving medical treatment for gender dysphoria are uncommon" (¶¶27–31) is internally contradictory. He correctly noted in ¶28 that "the term 'de-transition' is used inconsistently," yet in ¶29 applies the term as if others had used it all with the same one ("the broad heterogeneous category"). Despite having just asserted in the prior section that early diagnoses were "outdated," Dr. Turban in this section now cites as valid research on cases spanning the very same time period (1972–2015) (in Wiepjes 2018). Moreover, the outcomes from the Dutch clinic do not pertain to the current situation: The outcomes from that clinic reflect the strong gate-keeping procedures then applied by that clinic, unlike those being used now.

311. The remaining citation in this section it is again to a survey study of Dr. Turban's (Turban 2021). It represents a survey of people who *are* transgender (and are adults). It is not possible to estimate the number of people who *ceased* to identify as transgender with a survey of people who *currently* identify as transgender (and who participate in the online forums where the survey was advertised). The number reported by Turban 2021 represents the proportion of *re*-transitioners, not *de*-transitioners.

312. Although Dr. Turban conceded "While there is undoubtedly a small number of people who start gender-affirming medical interventions…" (Turban ¶31), there exists no means by which he can know what the correct number is.

I declare under penalty of perjury that the foregoing is true and correct.
Executed on May 19, 2023.

James M. Cantor, Ph.D.

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LIST OF APPENDICES

Appendix 1

Curriculum Vita

Appendix 2

Cantor, J. M. (2020). Transgender and gender diverse children and adolescents: Fact-checking of AAP policy. *Journal of Sex & Marital Therapy*, *46*, 307–313. doi: 10.1080/0092623X.2019.1698481

James M. Cantor, PhD

Toronto Sexuality Centre
2 Carlton Ave., suite 1804
Toronto, Ontario, Canada M5B 1J3

416-766-8733 (o)
416-352-6003 (f)
jamescantorphd@gmail.com

EDUCATION

Postdoctoral Fellowship Jan., 2000–May, 2004
Centre for Addiction and Mental Health • Toronto, Canada

Doctor of Philosophy Sep., 1993–Jun., 2000
Psychology • McGill University • Montréal, Canada

Master of Arts Sep., 1990–Jan., 1992
Psychology • Boston University • Boston, MA

Bachelor of Science Sep. 1984–Aug., 1988
Interdisciplinary Science • Rensselaer Polytechnic Institute • Troy, NY
Concentrations: Computer science, mathematics, physics

EMPLOYMENT HISTORY

Director Feb., 2017–Present
Toronto Sexuality Centre • Toronto, Canada

Senior Scientist (Inaugural Member) Aug., 2012–May, 2018
Campbell Family Mental Health Research Institute
Centre for Addiction and Mental Health • Toronto, Canada

Senior Scientist Jan., 2012–May, 2018
Complex Mental Illness Program
Centre for Addiction and Mental Health • Toronto, Canada

Head of Research Nov., 2010–Apr. 2014
Sexual Behaviours Clinic
Centre for Addiction and Mental Health • Toronto, Canada

Research Section Head Dec., 2009–Sep. 2012
Law & Mental Health Program
Centre for Addiction and Mental Health • Toronto, Canada

Psychologist May, 2004–Dec., 2011
Law & Mental Health Program
Centre for Addiction and Mental Health • Toronto, Canada

Clinical Psychology Intern Sep., 1998–Aug., 1999
Centre for Addiction and Mental Health • Toronto, Canada

Teaching Assistant Sep., 1993–May, 1998
Department of Psychology
McGill University • Montréal, Canada

Pre-Doctoral Practicum Sep., 1993–Jun., 1997
Sex and Couples Therapy Unit
Royal Victoria Hospital • Montréal, Canada

Pre-Doctoral Practicum May, 1994–Dec., 1994
Department of Psychiatry
Queen Elizabeth Hospital • Montréal, Canada

ACADEMIC APPOINTMENTS

Associate Professor Jul., 2010–May, 2019
Department of Psychiatry
University of Toronto Faculty of Medicine • Toronto, Canada

Adjunct Faculty Aug. 2013–Jun., 2018
Graduate Program in Psychology
York University • Toronto, Canada

Associate Faculty (Hon) Oct., 2017–Dec., 2017
School of Behavioural, Cognitive & Social Science
University of New England • Armidale, Australia

Assistant Professor Jun., 2005–Jun., 2010
Department of Psychiatry
University of Toronto Faculty of Medicine • Toronto, Canada

Adjunct Faculty Sep., 2004–Jun., 2010
Clinical Psychology Residency Program
St. Joseph's Healthcare • Hamilton, Canada

PUBLICATIONS

1. Cantor, J. M. (2020). Transgender and gender diverse children and adolescents: Fact-checking of AAP policy. *Journal of Sex & Marital Therapy, 46,* 307–313. doi: 10.1080/0092623X.2019.1698481
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PUBLICATIONS

LETTERS AND COMMENTARIES

1. Cantor, J. M. (2015). Research methods, statistical analysis, and the phallometric test for hebephilia: Response to Fedoroff [Editorial Commentary]. *Journal of Sexual Medicine, 12,* 2499–2500. doi: 10.1111/jsm.13040
2. Cantor, J. M. (2015). In his own words: Response to Moser [Editorial Commentary]. *Journal of Sexual Medicine, 12,* 2502–2503. doi: 10.1111/jsm.13075
3. Cantor, J. M. (2015). Purported changes in pedophilia as statistical artefacts: Comment on Müller et al. (2014). *Archives of Sexual Behavior, 44,* 253–254. doi: 10.1007/s10508-014-0343-x
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6. Cantor, J. M. (2012). Reply to Italiano's (2012) comment on Cantor (2011) [Letter to the Editor]. *Archives of Sexual Behavior, 41,* 1081–1082. doi: 10.1007/s10508-012-0011-y
7. Cantor, J. M. (2012). The errors of Karen Franklin's *Pretextuality* [Commentary]. *International Journal of Forensic Mental Health, 11,* 59–62. doi: 10.1080/14999013.2012.672945
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9. Cantor, J. M. (2011). New MRI studies support the Blanchard typology of male-to-female transsexualism [Letter to the Editor]. *Archives of Sexual Behavior, 40*, 863–864. doi: 10.1007/s10508-011-9805-6
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11. Cantor, J. M. (2003, Summer). Review of the book *The Man Who Would Be Queen* by J. Michael Bailey. *Newsletter of Division 44 of the American Psychological Association, 19*(2), 6.
12. Cantor, J. M. (2003, Spring). What are the hot topics in LGBT research in psychology? *Newsletter of Division 44 of the American Psychological Association, 19*(1), 21–24.
13. Cantor, J. M. (2002, Fall). Male homosexuality, science, and pedophilia. *Newsletter of Division 44 of the American Psychological Association, 18*(3), 5–8.
14. Cantor, J. M. (2000). Review of the book *Sexual Addiction: An Integrated Approach. Journal of Sex and Marital Therapy, 26*, 107–109.

EDITORIALS

1. Cantor, J. M. (2012). Editorial. *Sexual Abuse: A Journal of Research and Treatment, 24*.

2. Cantor, J. M. (2011). Editorial note. *Sexual Abuse: A Journal of Research and Treatment, 23,* 414.
3. Barbaree, H. E., & Cantor, J. M. (2010). Performance indicates for *Sexual Abuse: A Journal of Research and Treatment* (SAJRT) [Editorial]. *Sexual Abuse: A Journal of Research and Treatment, 22,* 371–373.
4. Barbaree, H. E., & Cantor, J. M. (2009). *Sexual Abuse: A Journal of Research and Treatment* performance indicators for 2007 [Editorial]. *Sexual Abuse: A Journal of Research and Treatment, 21,* 3–5.
5. Zucker, K. J., & Cantor, J. M. (2009). Cruising: Impact factor data [Editorial]. *Archives of Sexual Research, 38,* 878–882.
6. Barbaree, H. E., & Cantor, J. M. (2008). Performance indicators for *Sexual Abuse: A Journal of Research and Treatment* [Editorial]. *Sexual Abuse: A Journal of Research and Treatment, 20,* 3–4.
7. Zucker, K. J., & Cantor, J. M. (2008). The *Archives* in the era of online first ahead of print[Editorial]. *Archives of Sexual Behavior, 37,* 512–516.
8. Zucker, K. J., & Cantor, J. M. (2006). The impact factor: The *Archives* breaks from the pack [Editorial]. *Archives of Sexual Behavior, 35,* 7–9.
9. Zucker, K. J., & Cantor, J. M. (2005). The impact factor: "Goin' up" [Editorial]. *Archives of Sexual Behavior, 34,* 7–9.
10. Zucker, K., & Cantor, J. M. (2003). The numbers game: The impact factor and all that jazz [Editorial]. *Archives of Sexual Behavior, 32,* 3–5.

FUNDING HISTORY

Principal Investigators:	Doug VanderLaan, Meng-Chuan Lai
Co-Investigators:	James M. Cantor, Megha Mallar Chakravarty, Nancy Lobaugh, M. Palmert, M. Skorska
Title:	*Brain function and connectomics following sex hormone treatment in adolescents experience gender dysphoria*
Agency:	Canadian Institutes of Health Research (CIHR), Behavioural Sciences-B-2
Funds:	$650,250 / 5 years (July, 2018)

Principal Investigator:	Michael C. Seto
Co-Investigators:	Martin Lalumière , James M. Cantor
Title:	*Are connectivity differences unique to pedophilia?*
Agency:	University Medical Research Fund, Royal Ottawa Hospital
Funds:	$50,000 / 1 year (January, 2018)

Principal Investigator:	Lori Brotto
Co-Investigators:	Anthony Bogaert, James M. Cantor, Gerulf Rieger
Title:	*Investigations into the neural underpinnings and biological correlates of asexuality*
Agency:	Natural Sciences and Engineering Research Council (NSERC), Discovery Grants Program
Funds:	$195,000 / 5 years (April, 2017)

Principal Investigator:	Doug VanderLaan
Co-Investigators:	Jerald Bain, James M. Cantor, Megha Mallar Chakravarty, Sofia Chavez, Nancy Lobaugh, and Kenneth J. Zucker
Title:	*Effects of sex hormone treatment on brain development: A magnetic resonance imaging study of adolescents with gender dysphoria*
Agency:	Canadian Institutes of Health Research (CIHR), Transitional Open Grant Program
Funds:	$952,955 / 5 years (September, 2015)

Principal Investigator:	James M. Cantor
Co-Investigators:	Howard E. Barbaree, Ray Blanchard, Robert Dickey, Todd A. Girard, Phillip E. Klassen, and David J. Mikulis
Title:	*Neuroanatomic features specific to pedophilia*
Agency:	Canadian Institutes of Health Research (CIHR)
Funds:	$1,071,920 / 5 years (October, 2008)

Principal Investigator:	James M. Cantor
Title:	*A preliminary study of fMRI as a diagnostic test of pedophilia*
Agency:	Dean of Medicine New Faculty Grant Competition, Univ. of Toronto
Funds:	$10,000 (July, 2008)

Principal Investigator:	James M. Cantor
Co-Investigator:	Ray Blanchard
Title:	*Morphological and neuropsychological correlates of pedophilia*
Agency:	Canadian Institutes of Health Research (CIHR)
Funds:	$196,902 / 3 years (April, 2006)

KEYNOTE AND INVITED ADDRESSES

1. Cantor, J. M. (2021, September 28). *No topic too tough for this expert panel: A year in review.* Plenary Session for the 40th Annual Research and Treatment Conference, Association for the Treatment of Sexual Abusers.
2. Cantor, J. M. (2019, May 1). *Introduction and Q&A for 'I, Pedophile.'* StopSO 2nd Annual Conference, London, UK.
3. Cantor, J. M. (2018, August 29). *Neurobiology of pedophilia or paraphilia? Towards a 'Grand Unified Theory' of sexual interests.* Keynote address to the International Association for the Treatment of Sexual Offenders, Vilnius, Lithuania.
4. Cantor, J. M. (2018, August 29). *Pedophilia and the brain: Three questions asked and answered.* Preconference training presented to the International Association for the Treatment of Sexual Offenders, Vilnius, Lithuania.
5. Cantor, J. M. (2018, April 13). *The responses to* I, Pedophile *from We, the people.* Keynote address to the Minnesota Association for the Treatment of Sexual Abusers, Minneapolis, Minnesota.
6. Cantor, J. M. (2018, April 11). *Studying atypical sexualities: From vanilla to* I, Pedophile. Full day workshop at the Minnesota Association for the Treatment of Sexual Abusers, Minneapolis, Minnesota.
7. Cantor, J. M. (2018, January 20). *How much sex is enough for a happy life?* Invited lecture to the University of Toronto Division of Urology Men's Health Summit, Toronto, Canada.
8. Cantor, J. M. (2017, November 2). Pedophilia as a phenomenon of the brain: Update of evidence and the public response. Invited presentation to the 7th annual SBC education event, Centre for Addiction and Mental Health, Toronto, Canada.
9. Cantor, J. M. (2017, June 9). Pedophilia being in the brain: The evidence and the public's reaction. Invited presentation to *SEXposium at the ROM: The science of love and sex,* Toronto, Canada.
10. Cantor, J. M., & Campea, M. (2017, April 20). *"I, Pedophile" showing and discussion.* Invited presentation to the 42nd annual meeting of the Society for Sex Therapy and Research, Montréal, Canada.
11. Cantor, J. M. (2017, March 1). *Functional and structural neuroimaging of pedophilia: Consistencies across methods and modalities.* Invited lecture to the Brain Imaging Centre, Royal Ottawa Hospital, Ottawa, Canada.
12. Cantor, J. M. (2017, January 26). *Pedophilia being in the brain: The evidence and the public reaction.* Inaugural keynote address to the University of Toronto Sexuality Interest Network, Toronto, Ontario, Canada.
13. Cantor, J. M. (2016, October 14). *Discussion of CBC's "I, Pedophile."* Office of the Children's Lawyer Educational Session, Toronto, Ontario, Canada.
14. Cantor, J. M. (2016, September 15). *Evaluating the risk to reoffend: What we know and what we don't.* Invited lecture to the Association of Ontario Judges, Ontario Court of Justice Annual Family Law Program, Blue Mountains, Ontario, Canada. [Private link only: https://vimeo.com/239131108/3387c80652]
15. Cantor, J. M. (2016, April 8). *Pedophilia and the brain: Conclusions from the second generation of research.* Invited lecture at the 10th annual Risk and Recovery Forensic Conference, Hamilton, Ontario.

16. Cantor, J. M. (2016, April 7). *Hypersexuality without the hyperbole.* Keynote address to the 10th annual Risk and Recovery Forensic Conference, Hamilton, Ontario.
17. Cantor, J. M. (2015, November). *No one asks to be sexually attracted to children: Living in Daniel's World.* Grand Rounds, Centre for Addiction and Mental Health. Toronto, Canada.
18. Cantor, J. M. (2015, August). *Hypersexuality: Getting past whether "it" is or "it" isn't.* Invited address at the 41st annual meeting of the International Academy of Sex Research. Toronto, Canada.
19. Cantor, J. M. (2015, July). *A unified theory of typical and atypical sexual interest in men: Paraphilia, hypersexuality, asexuality, and vanilla as outcomes of a single, dual opponent process.* Invited presentation to the 2015 Puzzles of Sexual Orientation conference, Lethbridge, AL, Canada.
20. Cantor, J. M. (2015, June). *Hypersexuality.* Keynote Address to the Ontario Problem Gambling Provincial Forum. Toronto, Canada.
21. Cantor, J. M. (2015, May). *Assessment of pedophilia: Past, present, future.* Keynote Address to the International Symposium on Neural Mechanisms Underlying Pedophilia and Child Sexual Abuse (NeMUP). Berlin, Germany.
22. Cantor, J. M. (2015, March). *Prevention of sexual abuse by tackling the biggest stigma of them all: Making sex therapy available to pedophiles.* Keynote address to the 40th annual meeting of the Society for Sex Therapy and Research, Boston, MA.
23. Cantor, J. M. (2015, March. *Pedophilia: Predisposition or perversion?* Panel discussion at Columbia University School of Journalism. New York, NY.
24. Cantor, J. M. (2015, February). *Hypersexuality.* Research Day Grand Rounds presentation to Ontario Shores Centre for Mental Health Sciences, Whitby, Ontario, Canada.
25. Cantor, J. M. (2015, January). *Brain research and pedophilia: What it means for assessment, research, and policy.* Keynote address to the inaugural meeting of the Netherlands Association for the Treatment of Sexual Abusers, Utrecht, Netherlands.
26. Cantor, J. M. (2014, December). *Understanding pedophilia and the brain: Implications for safety and society.* Keynote address for The Jewish Community Confronts Violence and Abuse: Crisis Centre for Religious Women, Jerusalem, Israel.
27. Cantor, J. M. (2014, October). *Understanding pedophilia & the brain.* Invited full-day workshop for the Sex Offender Assessment Board of Pennsylvania, Harrisburg, PA.
28. Cantor, J. M. (2014, September). *Understanding neuroimaging of pedophilia: Current status and implications.* Invited lecture presented to the Mental Health and Addition Rounds, St. Joseph's Healthcare, Hamilton, Ontario, Canada.
29. Cantor, J. M. (2014, June). *An evening with Dr. James Cantor.* Invited lecture presented to the Ontario Medical Association, District 11 Doctors' Lounge Program, Toronto, Ontario, Canada.
30. Cantor, J. M. (2014, April). *Pedophilia and the brain.* Invited lecture presented to the University of Toronto Medical Students lunchtime lecture. Toronto, Ontario, Canada.
31. Cantor, J. M. (2014, February). *Pedophilia and the brain: Recap and update.* Workshop presented at the 2014 annual meeting of the Washington State Association for the Treatment of Sexual Abusers, Cle Elum, WA.
32. Cantor, J. M., Lafaille, S., Hannah, J., Kucyi, A., Soh, D., Girard, T. A., & Mikulis, D. M. (2014, February). *Functional connectivity in pedophilia.* Neuropsychiatry Rounds, Toronto Western Hospital, Toronto, Ontario, Canada.

33. Cantor, J. M. (2013, November). *Understanding pedophilia and the brain: The basics, the current status, and their implications.* Invited lecture to the Forensic Psychology Research Centre, Carleton University, Ottawa, Canada.
34. Cantor, J. M. (2013, November). *Mistaking puberty, mistaking hebephilia.* Keynote address presented to the 32nd annual meeting of the Association for the Treatment of Sexual Abusers, Chicago, IL.
35. Cantor, J. M. (2013, October). *Understanding pedophilia and the brain: A recap and update.* Invited workshop presented at the 32nd annual meeting of the Association for the Treatment of Sexual Abusers, Chicago, IL.
36. Cantor, J. M. (2013, October). *Compulsive-hyper-sex-addiction: I don't care what we all it, what can we* do*?* Invited address presented to the Board of Examiners of Sex Therapists and Counselors of Ontario, Toronto, Ontario, Canada.
37. Cantor, J. M. (2013, September). *Neuroimaging of pedophilia: Current status and implications.* McGill University Health Centre, Department of Psychiatry Grand Rounds presentation, Montréal, Québec, Canada.
38. Cantor, J. M. (2013, April). *Understanding pedophilia and the brain.* Invited workshop presented at the 2013 meeting of the Minnesota Association for the Treatment of Sexual Abusers, Minneapolis, MN.
39. Cantor, J. M. (2013, April). *The neurobiology of pedophilia and its implications for assessment, treatment, and public policy.* Invited lecture at the 38th annual meeting of the Society for Sex Therapy and Research, Baltimore, MD.
40. Cantor, J. M. (2013, April). *Sex offenders: Relating research to policy.* Invited roundtable presentation at the annual meeting of the Academy of Criminal Justice Sciences, Dallas, TX.
41. Cantor, J. M. (2013, March). *Pedophilia and brain research: From the basics to the state-of-the-art.* Invited workshop presented to the annual meeting of the Forensic Mental Health Association of California, Monterey, CA.
42. Cantor, J. M. (2013, January). *Pedophilia and child molestation.* Invited lecture presented to the Canadian Border Services Agency, Toronto, Ontario, Canada.
43. Cantor, J. M. (2012, November). *Understanding pedophilia and sexual offenders against children: Neuroimaging and its implications for public safety.* Invited guest lecture to University of New Mexico School of Medicine Health Sciences Center, Albuquerque, NM.
44. Cantor, J. M. (2012, November). *Pedophilia and brain research.* Invited guest lecture to the annual meeting of the Circles of Support and Accountability, Toronto, Ontario, Canada.
45. Cantor, J. M. (2012, January). *Current findings on pedophilia brain research.* Invited workshop at the San Diego International Conference on Child and Family Maltreatment, San Diego, CA.
46. Cantor, J. M. (2012, January). *Pedophilia and the risk to re-offend.* Invited lecture to the Ontario Court of Justice Judicial Development Institute, Toronto, Ontario, Canada.
47. Cantor, J. M. (2011, November). *Pedophilia and the brain: What it means for assessment, treatment, and policy.* Plenary Lecture presented at the Association for the Treatment of Sexual Abusers, Toronto, Ontario, Canada.
48. Cantor, J. M. (2011, July). *Towards understanding contradictory findings in the neuroimaging of pedophilic men.* Keynote address to 7th annual conference on Research in Forensic Psychiatry, Regensberg, Germany.

49. Cantor, J. M. (2011, March). *Understanding sexual offending and the brain: Brain basics to the state of the art.* Workshop presented at the winter conference of the Oregon Association for the Treatment of Sexual Abusers, Oregon City, OR.
50. Cantor, J. M. (2010, October). *Manuscript publishing for students.* Workshop presented at the 29th annual meeting of the Association for the Treatment of Sexual Abusers, Phoenix, AZ.
51. Cantor, J. M. (2010, August). *Is sexual orientation a paraphilia?* Invited lecture at the International Behavioral Development Symposium, Lethbridge, Alberta, Canada.
52. Cantor, J. M. (2010, March). *Understanding sexual offending and the brain: From the basics to the state of the art.* Workshop presented at the annual meeting of the Washington State Association for the Treatment of Sexual Abusers, Blaine, WA.
53. Cantor, J. M. (2009, January). *Brain structure and function of pedophilia men.* Neuropsychiatry Rounds, Toronto Western Hospital, Toronto, Ontario.
54. Cantor, J. M. (2008, April). *Is pedophilia caused by brain dysfunction?* Invited address to the University-wide Science Day Lecture Series, SUNY Oswego, Oswego, NY.
55. Cantor, J. M., Kabani, N., Christensen, B. K., Zipursky, R. B., Barbaree, H. E., Dickey, R., Klassen, P. E., Mikulis, D. J., Kuban, M. E., Blak, T., Richards, B. A., Hanratty, M. K., & Blanchard, R. (2006, September). *MRIs of pedophilic men.* Invited presentation at the 25th annual meeting of the Association for the Treatment of Sexual Abusers, Chicago.
56. Cantor, J. M., Blanchard, R., & Christensen, B. K. (2003, March). *Findings in and implications of neuropsychology and epidemiology of pedophilia.* Invited lecture at the 28th annual meeting of the Society for Sex Therapy and Research, Miami.
57. Cantor, J. M., Christensen, B. K., Klassen, P. E., Dickey, R., & Blanchard, R. (2001, July). *Neuropsychological functioning in pedophiles.* Invited lecture presented at the 27th annual meeting of the International Academy of Sex Research, Bromont, Canada.
58. Cantor, J. M., Blanchard, R., Christensen, B., Klassen, P., & Dickey, R. (2001, February). *First glance at IQ, memory functioning and handedness in sex offenders.* Lecture presented at the Forensic Lecture Series, Centre for Addiction and Mental Health, Toronto, Ontario, Canada.
59. Cantor, J. M. (1999, November). *Reversal of SSRI-induced male sexual dysfunction: Suggestions from an animal model.* Grand Rounds presentation at the Allan Memorial Institute, Royal Victoria Hospital, Montréal, Canada.

PAPER PRESENTATIONS AND SYMPOSIA

1. Cantor, J. M. (2020, April). "I'd rather have a trans kid than a dead kid": Critical assessment of reported rates of suicidality in trans kids. *Paper presented at the annual meeting of the Society for the Sex Therapy and Research.* Online in lieu of in person meeting.
2. Stephens, S., Lalumière, M., Seto, M. C., & Cantor, J. M. (2017, October). *The relationship between sexual responsiveness and sexual exclusivity in phallometric profiles.* Paper presented at the annual meeting of the Canadian Sex Research Forum, Fredericton, New Brunswick, Canada.
3. Stephens, S., Cantor, J. M., & Seto, M. C. (2017, March). *Can the SSPI-2 detect hebephilic sexual interest?* Paper presented at the annual meeting of the American-Psychology Law Society Annual Meeting, Seattle, WA.
4. Stephens, S., Seto, M. C., Goodwill, A. M., & Cantor, J. M. (2015, October). *Victim choice polymorphism and recidivism.* Symposium Presentation. Paper presented at the 34th annual meeting of the Association for the Treatment of Sexual Abusers, Montréal, Canada.
5. McPhail, I. V., Hermann, C. A., Fernane, S. Fernandez, Y., Cantor, J. M., & Nunes, K. L. (2014, October). *Sexual deviance in sexual offenders against children: A meta-analytic review of phallometric research.* Paper presented at the 33rd annual meeting of the Association for the Treatment of Sexual Abusers, San Diego, CA.
6. Stephens, S., Seto, M. C., Cantor, J. M., & Goodwill, A. M. (2014, October). *Is hebephilic sexual interest a criminogenic need?: A large scale recidivism study.* Paper presented at the 33rd annual meeting of the Association for the Treatment of Sexual Abusers, San Diego, CA.
7. Stephens, S., Seto, M. C., Cantor, J. M., & Lalumière, M. (2014, October). *Development and validation of the Revised Screening Scale for Pedophilic Interests (SSPI–2).* Paper presented at the 33rd annual meeting of the Association for the Treatment of Sexual Abusers, San Diego, CA.
8. Cantor, J. M., Lafaille, S., Hannah, J., Kucyi, A., Soh, D., Girard, T. A., & Mikulis, D. M. (2014, September). *Pedophilia and the brain: White matter differences detected with DTI.* Paper presented at the 13th annual meeting of the International Association for the Treatment of Sexual Abusers, Porto, Portugal.
9. Stephens, S., Seto, M., Cantor, J. M., Goodwill, A. M., & Kuban, M. (2014, March). *The role of hebephilic sexual interests in sexual victim choice.* Paper presented at the annual meeting of the American Psychology and Law Society, New Orleans, LA.
10. McPhail, I. V., Fernane, S. A., Hermann, C. A., Fernandez, Y. M., Nunes, K. L., & Cantor, J. M. (2013, November). *Sexual deviance and sexual recidivism in sexual offenders against children: A meta-analysis.* Paper presented at the 32nd annual meeting of the Association for the Treatment of Sexual Abusers, Chicago, IL.
11. Cantor, J. M. (2013, September). *Pedophilia and the brain: Current MRI research and its implications.* Paper presented at the 21st annual World Congress for Sexual Health, Porto Alegre, Brazil. [Featured among Best Abstracts, top 10 of 500.]
12. Cantor, J. M. (Chair). (2012, March). *Innovations in sex research.* Symposium conducted at the 37th annual meeting of the Society for Sex Therapy and Research, Chicago.
13. Cantor, J. M., & Blanchard, R. (2011, August). fMRI versus phallometry in the diagnosis of pedophilia and hebephilia. In J. M. Cantor (Chair), *Neuroimaging of men's object*

preferences. Symposium presented at the 37th annual meeting of the International Academy of Sex Research, Los Angeles, USA.

14. Cantor, J. M. (Chair). (2011, August). *Neuroimaging of men's object preferences.* Symposium conducted at the 37th annual meeting of the International Academy of Sex Research, Los Angeles.
15. Cantor, J. M. (2010, October). A meta-analysis of neuroimaging studies of male sexual arousal. In S. Stolerú (Chair), *Brain processing of sexual stimuli in pedophilia: An application of functional neuroimaging.* Symposium presented at the 29th annual meeting of the Association for the Treatment of Sexual Abusers, Phoenix, AZ.
16. Chivers, M. L., Seto, M. C., Cantor, J. C., Grimbos, T., & Roy, C. (April, 2010). *Psychophysiological assessment of sexual activity preferences in women.* Paper presented at the 35th annual meeting of the Society for Sex Therapy and Research, Boston, USA.
17. Cantor, J. M., Girard, T. A., & Lovett-Barron, M. (2008, November). *The brain regions that respond to erotica: Sexual neuroscience for dummies.* Paper presented at the 51st annual meeting of the Society for the Scientific Study of Sexuality, San Juan, Puerto Rico.
18. Barbaree, H., Langton, C., Blanchard, R., & Cantor, J. M. (2007, October). *The role of age-at-release in the evaluation of recidivism risk of sexual offenders.* Paper presented at the 26th annual meetingof the Association for the Treatment of Sexual Abusers, San Diego.
19. Cantor, J. M., Kabani, N., Christensen, B. K., Zipursky, R. B., Barbaree, H. E., Dickey, R., Klassen, P. E., Mikulis, D. J., Kuban, M. E., Blak, T., Richards, B. A., Hanratty, M. K., & Blanchard, R. (2006, July). *Pedophilia and brain morphology.* Abstract and paper presented at the 32nd annual meeting of the International Academy of Sex Research, Amsterdam, Netherlands.
20. Seto, M. C., Cantor, J. M., & Blanchard, R. (2006, March). *Child pornography offending is a diagnostic indicator of pedophilia*. Paper presented at the 2006 annual meeting of the American Psychology-Law Society Conference, St. Petersburg, Florida.
21. Blanchard, R., Cantor, J. M., Bogaert, A. F., Breedlove, S. M., & Ellis, L. (2005, August). *Interaction of fraternal birth order and handedness in the development of male homosexuality.* Abstract and paper presented at the International Behavioral Development Symposium, Minot, North Dakota.
22. Cantor, J. M., & Blanchard, R. (2005, July). *Quantitative reanalysis of aggregate data on IQ in sexual offenders.* Abstract and poster presented at the 31st annual meeting of the International Academy of Sex Research, Ottawa, Canada.
23. Cantor, J. M. (2003, August). *Sex reassignment on demand: The clinician's dilemma.* Paper presented at the 111th annual meeting of the American Psychological Association, Toronto, Canada.
24. Cantor, J. M. (2003, June). *Meta-analysis of VIQ–PIQ differences in male sex offenders.* Paper presented at the Harvey Stancer Research Day, Toronto, Ontario, Canada.
25. Cantor, J. M. (2002, August). *Gender role in autogynephilic transsexuals: The more things change…* Paper presented at the 110th annual meeting of the American Psychological Association, Chicago.

26. Cantor, J. M., Christensen, B. K., Klassen, P. E., Dickey, R., & Blanchard, R. (2001, June). *IQ, memory functioning, and handedness in male sex offenders.* Paper presented at the Harvey Stancer Research Day, Toronto, Ontario, Canada.
27. Cantor, J. M. (1998, August). *Convention orientation for lesbian, gay, and bisexual students*. Papers presented at the 106th annual meeting of the American Psychological Association.
28. Cantor, J. M. (1997, August). *Discussion hour for lesbian, gay, and bisexual students*. Presented at the 105th annual meeting of the American Psychological Association.
29. Cantor, J. M. (1997, August). *Convention orientation for lesbian, gay, and bisexual students*. Paper presented at the 105th annual meeting of the American Psychological Association.
30. Cantor, J. M. (1996, August). *Discussion hour for lesbian, gay, and bisexual students*. Presented at the 104th annual meeting of the American Psychological Association.
31. Cantor, J. M. (1996, August). *Symposium: Question of inclusion: Lesbian and gay psychologists and accreditation*. Paper presented at the 104th annual meeting of the American Psychological Association, Toronto.
32. Cantor, J. M. (1996, August). *Convention orientation for lesbian, gay, and bisexual students*. Papers presented at the 104th annual meeting of the American Psychological Association.
33. Cantor, J. M. (1995, August). *Discussion hour for lesbian, gay, and bisexual students*. Presented at the 103rd annual meeting of the American Psychological Association.
34. Cantor, J. M. (1995, August). *Convention orientation for lesbian, gay, and bisexual students*. Papers presented at the 103rd annual meeting of the American Psychological Association.
35. Cantor, J. M. (1994, August). *Discussion hour for lesbian, gay, and bisexual students*. Presented at the 102nd annual meeting of the American Psychological Association.
36. Cantor, J. M. (1994, August). *Convention orientation for lesbian, gay, and bisexual students*. Papers presented at the 102nd annual meeting of the American Psychological Association.
37. Cantor, J. M., & Pilkington, N. W. (1992, August). *Homophobia in psychology programs: A survey of graduate students.* Paper presented at the Centennial Convention of the American Psychological Association, Washington, DC. (ERIC Document Reproduction Service No. ED 351 618)
38. Cantor, J. M. (1991, August). *Being gay and being a graduate student: Double the memberships, four times the problems*. Paper presented at the 99th annual meeting of the American Psychological Association, San Francisco.

POSTER PRESENTATIONS

1. Klein, L., Stephens, S., Goodwill, A. M., Cantor, J. M., & Seto, M. C. (2015, October). *The psychological propensities of risk in undetected sexual offenders.* Poster presented at the 34th annual meeting of the Association for the Treatment of Sexual Abusers, Montréal, Canada.
2. Pullman, L. E., Stephens, S., Seto, M. C., Goodwill, A. M., & Cantor, J. M. (2015, October). *Why are incest offenders less likely to recidivate?* Poster presented at the 34th annual meeting of the Association for the Treatment of Sexual Abusers, Montréal, Canada.
3. Seto, M. C., Stephens, S. M., Cantor, J. M., Lalumiere, M. L., Sandler, J. C., & Freeman, N. A. (2015, August). *The development and validation of the Revised Screening Scale for Pedophilic Interests (SSPI-2).* Poster presentation at the 41st annual meeting of the International Academy of Sex Research. Toronto, Canada.
4. Soh, D. W., & Cantor, J. M. (2015, August). *A peek inside a furry convention.* Poster presentation at the 41st annual meeting of the International Academy of Sex Research. Toronto, Canada.
5. VanderLaan, D. P., Lobaugh, N. J., Chakravarty, M. M., Patel, R., Chavez, S. Stojanovski, S. O., Takagi, A., Hughes, S. K., Wasserman, L., Bain, J., Cantor, J. M., & Zucker, K. J. (2015, August). *The neurohormonal hypothesis of gender dysphoria: Preliminary evidence of cortical surface area differences in adolescent natal females.* Poster presentation at the 31st annual meeting of the International Academy of Sex Research. Toronto, Canada.
6. Cantor, J. M., Lafaille, S. J., Moayedi, M., Mikulis, D. M., & Girard, T. A. (2015, June). *Diffusion tensor imaging (DTI) of the brain in pedohebephilic men: Preliminary analyses.* Harvey Stancer Research Day, Toronto, Ontario Canada.
7. Newman, J. E., Stephens, S., Seto, M. C., & Cantor, J. M. (2014, October). *The validity of the Static-99 in sexual offenders with low intellectual abilities.* Poster presentation at the 33rd annual meeting of the Association for the Treatment of Sexual Abusers, San Diego, CA.
8. Lykins, A. D., Walton, M. T., & Cantor, J. M. (2014, June). *An online assessment of personality, psychological, and sexuality trait variables associated with self-reported hypersexual behavior.* Poster presentation at the 30th annual meeting of the International Academy of Sex Research, Dubrovnik, Croatia.
9. Stephens, S., Seto, M. C., Cantor, J. M., Goodwill, A. M., & Kuban, M. (2013, November). *The utility of phallometry in the assessment of hebephilia.* Poster presented at the 32nd annual meeting of the Association for the Treatment of Sexual Abusers, Chicago.
10. Stephens, S., Seto, M. C., Cantor, J. M., Goodwill, A. M., & Kuban, M. (2013, October). *The role of hebephilic sexual interests in sexual victim choice.* Poster presented at the 32nd annual meeting of the Association for the Treatment of Sexual Abusers, Chicago.
11. Fazio, R. L., & Cantor, J. M. (2013, October). *Analysis of the Fazio Laterality Inventory (FLI) in a population with established atypical handedness.* Poster presented at the 33rd annual meeting of the National Academy of Neuropsychology, San Diego.
12. Lafaille, S., Hannah, J., Soh, D., Kucyi, A., Girard, T. A., Mikulis, D. M., & Cantor, J. M. (2013, August). *Investigating resting state networks in pedohebephiles.* Poster presented at the 29th annual meeting of the International Academy of Sex Research, Chicago.

13. McPhail, I. V., Lykins, A. D., Robinson, J. J., LeBlanc, S., & Cantor, J. M. (2013, August). *Effects of prescription medication on volumetric phallometry output.* Poster presented at the 29th annual meeting of the International Academy of Sex Research, Chicago.
14. Murray, M. E., Dyshniku, F., Fazio, R. L., & Cantor, J. M. (2013, August). *Minor physical anomalies as a window into the prenatal origins of pedophilia.* Poster presented at the 29th annual meeting of the International Academy of Sex Research, Chicago.
15. Sutton, K. S., Stephens, S., Dyshniku, F., Tulloch, T., & Cantor, J. M. (2013, August). *Pilot group treatment for "procrasturbation."* Poster presented at 39th annual meeting of the International Academy of Sex Research, Chicago.
16. Sutton, K. S., Pytyck, J., Stratton, N., Sylva, D., Kolla, N., & Cantor, J. M. (2013, August). *Client characteristics by type of hypersexuality referral: A quantitative chart review.* Poster presented at the 39th annual meeting of the International Academy of Sex Research, Chicago.
17. Fazio, R. L., & Cantor, J. M. (2013, June). *A replication and extension of the psychometric properties of the Digit Vigilance Test.* Poster presented at the 11th annual meeting of the American Academy of Clinical Neuropsychology, Chicago.
18. Lafaille, S., Moayedi, M., Mikulis, D. M., Girard, T. A., Kuban, M., Blak, T., & Cantor, J. M. (2012, July). *Diffusion Tensor Imaging (DTI) of the brain in pedohebephilic men: Preliminary analyses.* Poster presented at the 38th annual meeting of the International Academy of Sex Research, Lisbon, Portugal.
19. Lykins, A. D., Cantor, J. M., Kuban, M. E., Blak, T., Dickey, R., Klassen, P. E., & Blanchard, R. (2010, July). *Sexual arousal to female children in gynephilic men.* Poster presented at the 38th annual meeting of the International Academy of Sex Research, Prague, Czech Republic.
20. Cantor, J. M., Girard, T. A., Lovett-Barron, M., & Blak, T. (2008, July). *Brain regions responding to visual sexual stimuli: Meta-analysis of PET and fMRI studies.* Abstract and poster presented at the 34th annual meeting of the International Academy of Sex Research, Leuven, Belgium.
21. Lykins, A. D., Blanchard, R., Cantor, J. M., Blak, T., & Kuban, M. E. (2008, July). *Diagnosing sexual attraction to children: Considerations for DSM-V.* Poster presented at the 34th annual meeting of the International Academy of Sex Research, Leuven, Belgium.
22. Cantor, J. M., Blak, T., Kuban, M. E., Klassen, P. E., Dickey, R. and Blanchard, R. (2007, October). *Physical height in pedophilia and hebephilia.* Poster presented at the 26th annual meeting of the Association for the Treatment of Sexual Abusers, San Diego.
23. Cantor, J. M., Blak, T., Kuban, M. E., Klassen, P. E., Dickey, R. and Blanchard, R. (2007, August). *Physical height in pedophilia and hebephilia.* Abstract and poster presented at the 33rd annual meeting of the International Academy of Sex Research, Vancouver, Canada.
24. Puts, D. A., Blanchard, R., Cardenas, R., Cantor, J., Jordan, C. L., & Breedlove, S. M. (2007, August). *Earlier puberty predicts superior performance on male-biased visuospatial tasks in men but not women.* Abstract and poster presented at the 33rd annual meeting of the International Academy of Sex Research, Vancouver, Canada.
25. Seto, M. C., Cantor, J. M., & Blanchard, R. (2005, November). *Possession of child pornography is a diagnostic indicator of pedophilia.* Poster presented at the 24th annual meeting of the Association for the Treatment of Sexual Abusers, New Orleans.

26. Blanchard, R., Cantor, J. M., Bogaert, A. F., Breedlove. S. M., & Ellis, L. (2005, July). *Interaction of fraternal birth order and handedness in the development of male homosexuality.* Abstract and poster presented at the 31st annual meeting of the International Academy of Sex Research, Ottawa, Canada.
27. Cantor, J. M., & Blanchard, R. (2003, July). *The reported VIQ–PIQ differences in male sex offenders are artifactual?* Abstract and poster presented at the 29th annual meeting of the International Academy of Sex Research, Bloomington, Indiana.
28. Christensen, B. K., Cantor, J. M., Millikin, C., & Blanchard, R. (2002, February). *Factor analysis of two brief memory tests: Preliminary evidence for modality-specific measurement.* Poster presented at the 30th annual meeting of the International Neuropsychological Society, Toronto, Ontario, Canada.
29. Cantor, J. M., Blanchard, R., Paterson, A., Bogaert, A. (2000, June). *How many gay men owe their sexual orientation to fraternal birth order?* Abstract and poster presented at the International Behavioral Development Symposium, Minot, North Dakota.
30. Cantor, J. M., Binik, Y., & Pfaus, J. G. (1996, November). *Fluoxetine inhibition of male rat sexual behavior: Reversal by oxytocin*. Poster presented at the 26th annual meeting of the Society for Neurosciences, Washington, DC.
31. Cantor, J. M., Binik, Y., & Pfaus, J. G. (1996, June). *An animal model of fluoxetine-induced sexual dysfunction: Dose dependence and time course*. Poster presented at the 28th annual Conference on Reproductive Behavior, Montréal, Canada.
32. Cantor, J. M., O'Connor, M. G., Kaplan, B., & Cermak, L. S. (1993, June). *Transient events test of retrograde memory: Performance of amnestic and unimpaired populations*. Poster presented at the 2nd annual science symposium of the Massachusetts Neuropsychological Society, Cambridge, MA.

EDITORIAL AND PEER-REVIEWING ACTIVITIES

Editor-in-Chief

Sexual Abuse: A Journal of Research and Treatment Jan., 2010–Dec., 2014

Editorial Board Memberships

Journal of Sexual Aggression Jan., 2010–Dec., 2021
Journal of Sex Research, The Jan., 2008–Aug., 2020
Sexual Abuse: A Journal of Research and Treatment Jan., 2006–Dec., 2019
Archives of Sexual Behavior Jan., 2004–Present
The Clinical Psychologist Jan., 2004–Dec., 2005

Ad hoc Journal Reviewer Activity

American Journal of Psychiatry
Annual Review of Sex Research
Archives of General Psychiatry
Assessment
Biological Psychiatry
BMC Psychiatry
Brain Structure and Function
British Journal of Psychiatry
British Medical Journal
Canadian Journal of Behavioural Science
Canadian Journal of Psychiatry
Cerebral Cortex
Clinical Case Studies
Comprehensive Psychiatry
Developmental Psychology
European Psychologist
Frontiers in Human Neuroscience
Human Brain Mapping
International Journal of Epidemiology
International Journal of Impotence Research
International Journal of Sexual Health
International Journal of Transgenderism
Journal of Abnormal Psychology
Journal of Clinical Psychology
Journal of Consulting and Clinical Psychology
Journal of Forensic Psychology Practice
Journal for the Scientific Study of Religion
Journal of Sexual Aggression
Journal of Sexual Medicine
Journal of Psychiatric Research
Nature Neuroscience
Neurobiology Reviews
Neuroscience & Biobehavioral Reviews
Neuroscience Letters
Proceedings of the Royal Society B (Biological Sciences)
Psychological Assessment
Psychological Medicine
Psychological Science
Psychology of Men & Masculinity
Sex Roles
Sexual and Marital Therapy
Sexual and Relationship Therapy
Sexuality & Culture
Sexuality Research and Social Policy
The Clinical Psychologist
Traumatology
World Journal of Biological Psychiatry

GRANT REVIEW PANELS

2017–2021 Member, College of Reviewers, *Canadian Institutes of Health Research,* Canada.

2017 Committee Member, Peer Review Committee—Doctoral Research Awards A. *Canadian Institutes of Health Research*, Canada.

2017 Member, International Review Board, Research collaborations on behavioural disorders related to violence, neglect, maltreatment and abuse in childhood and adolescence. *Bundesministerium für Bildung und Forschung [Ministry of Education and Research],* Germany.

2016 Reviewer. National Science Center [*Narodowe Centrum Nauki*], Poland.

2016 Committee Member, Peer Review Committee—Doctoral Research Awards A. *Canadian Institutes of Health Research*, Canada.

2015 Assessor (Peer Reviewer). Discovery Grants Program. *Australian Research Council,* Australia.

2015 Reviewer. *Czech Science Foundation,* Czech Republic.

2015 Reviewer, "Off the beaten track" grant scheme. *Volkswagen Foundation,* Germany.

2015 External Reviewer, Discovery Grants program—Biological Systems and Functions. *National Sciences and Engineering Research Council of Canada*, Canada

2015 Committee Member, Peer Review Committee—Doctoral Research Awards A. *Canadian Institutes of Health Research*, Canada.

2014 Assessor (Peer Reviewer). Discovery Grants Program. *Australian Research Council,* Australia.

2014 External Reviewer, Discovery Grants program—Biological Systems and Functions. *National Sciences and Engineering Research Council of Canada*, Canada.

2014 Panel Member, Dean's Fund—Clinical Science Panel. *University of Toronto Faculty of Medicine*, Canada.

2014 Committee Member, Peer Review Committee—Doctoral Research Awards A. *Canadian Institutes of Health Research*, Canada.

2013 Panel Member, Grant Miller Cancer Research Grant Panel. *University of Toronto Faculty of Medicine*, Canada.

2013 Panel Member, Dean of Medicine Fund New Faculty Grant Clinical Science Panel. *University of Toronto Faculty of Medicine,* Canada.

2012 Board Member, International Review Board, Research collaborations on behavioural disorders related to violence, neglect, maltreatment and abuse in childhood and adolescence (2nd round). *Bundesministerium für Bildung und Forschung [Ministry of Education and Research],* Germany.

2012 External Reviewer, University of Ottawa Medical Research Fund. *University of Ottawa Department of Psychiatry*, Canada.

2012 External Reviewer, Behavioural Sciences—B. *Canadian Institutes of Health Research*, Canada.

2011 Board Member, International Review Board, Research collaborations on behavioural disorders related to violence, neglect, maltreatment and abuse in childhood and adolescence. *Bundesministerium für Bildung und Forschung [Ministry of Education and Research],* Germany.

TEACHING AND TRAINING

PostDoctoral Research Supervision
Law & Mental Health Program, Centre for Addiction and Mental Health, Toronto, Canada

Dr. Katherine S. Sutton	Sept., 2012–Dec., 2013
Dr. Rachel Fazio	Sept., 2012–Aug., 2013
Dr. Amy Lykins	Sept., 2008–Nov., 2009

Doctoral Research Supervision
Centre for Addiction and Mental Health, Toronto, Canada

Michael Walton • University of New England, Australia	Sept., 2017–Aug., 2018
Debra Soh • York University	May, 2013–Aug, 2017
Skye Stephens • Ryerson University	April, 2012–June, 2016

Masters Research Supervision
Centre for Addiction and Mental Health, Toronto, Canada

Nicole Cormier • Ryerson University	June, 2012–present
Debra Soh • Ryerson University	May, 2009–April, 2010

Undergraduate Research Supervision
Centre for Addiction and Mental Health, Toronto, Canada

Kylie Reale • Ryerson University	Spring, 2014
Jarrett Hannah • University of Rochester	Summer, 2013
Michael Humeniuk • University of Toronto	Summer, 2012

Clinical Supervision (Doctoral Internship)
Clinical Internship Program, Centre for Addiction and Mental Health, Toronto, Canada

Katherine S. Sutton • Queen's University	2011–2012
David Sylva • Northwestern University	2011–2012
Jordan Rullo • University of Utah	2010–2011
Lea Thaler • University of Nevada, Las Vegas	2010–2011
Carolin Klein • University of British Columbia	2009–2010
Bobby R. Walling • University of Manitoba	2009–2010

TEACHING AND TRAINING

Clinical Supervision (Doctoral- and Masters- level practica)
Centre for Addiction and Mental Health, Toronto, Canada

Tyler Tulloch • Ryerson University	2013–2014
Natalie Stratton • Ryerson University	Summer, 2013
Fiona Dyshniku • University of Windsor	Summer, 2013
Mackenzie Becker • McMaster University	Summer, 2013
Skye Stephens • Ryerson University	2012–2013
Vivian Nyantakyi • Capella University	2010–2011
Cailey Hartwick • University of Guelph	Fall, 2010
Tricia Teeft • Humber College	Summer, 2010
Allison Reeves • Ontario Institute for Studies in Education/Univ. of Toronto	2009–2010
Helen Bailey • Ryerson University	Summer, 2009
Edna Aryee • Ontario Institute for Studies in Education/Univ. of Toronto	2008–2009
Iryna Ivanova • Ontario Institute for Studies in Education/Univ. of Toronto	2008–2009
Jennifer Robinson • Ontario Institute for Studies in Education/Univ. of Toronto	2008–2009
Zoë Laksman • Adler School of Professional Psychology	2005–2006
Diana Mandelew • Adler School of Professional Psychology	2005–2006
Susan Wnuk • York University	2004–2005
Hiten Lad • Adler School of Professional Psychology	2004–2005
Natasha Williams • Adler School of Professional Psychology	2003–2004
Lisa Couperthwaite • Ontario Institute for Studies in Education/Univ. of Toronto	2003–2004
Lori Gray, née Robichaud • University of Windsor	Summer, 2003
Sandra Belfry • Ontario Institute for Studies in Education/Univ. of Toronto	2002–2003
Althea Monteiro • York University	Summer, 2002
Samantha Dworsky • York University	2001–2002
Kerry Collins • University of Windsor	Summer, 2001
Jennifer Fogarty • Waterloo University	2000–2001
Emily Cripps • Waterloo University	Summer, 2000
Lee Beckstead • University of Utah	2000

PROFESSIONAL SOCIETY ACTIVITIES

OFFICES HELD

2018–2019	Local Host. Society for Sex Therapy and Research.
2015	Member, International Scientific Committee, World Association for Sexual Health.
2015	Member, Program Planning and Conference Committee, Association for the Treatment of Sexual Abusers
2012–2013	Chair, Student Research Awards Committee, Society for Sex Therapy & Research
2012–2013	Member, Program Planning and Conference Committee, Association for the Treatment of Sexual Abusers
2011–2012	Chair, Student Research Awards Committee, Society for Sex Therapy & Research
2010–2011	Scientific Program Committee, International Academy of Sex Research
2002–2004	Membership Committee • APA Division 12 (Clinical Psychology)
2002–2003	Chair, Committee on Science Issues, APA Division 44
2002	Observer, Grant Review Committee • Canadian Institutes of Health Research Behavioural Sciences (B)
2001–2009	Reviewer • APA Division 44 Convention Program Committee
2001, 2002	Reviewer • APA Malyon-Smith Scholarship Committee
2000–2005	Task Force on Transgender Issues, APA Division 44
1998–1999	Consultant, APA Board of Directors Working Group on Psychology Marketplace
1997	Student Representative • APA Board of Professional Affairs' Institute on TeleHealth
1997–1998	Founder and Chair • APA/APAGS Task Force on New Psychologists' Concerns
1997–1999	Student Representative • APA/CAPP Sub-Committee for a National Strategy for Prescription Privileges
1997–1999	Liaison • APA Committee for the Advancement of Professional Practice
1997–1998	Liaison • APA Board of Professional Affairs
1993–1997	Founder and Chair • APA/APAGS Committee on LGB Concerns

PROFESSIONAL SOCIETY ACTIVITIES

MEMBERSHIPS

2017–2021 Member • *Canadian Sex Research Forum*

2009–Present Member • *Society for Sex Therapy and Research*

2007–Present Fellow • *Association for the Treatment and Prevention of Sexual Abuse*

2006–Present Full Member (elected) • *International Academy of Sex Research*

2006–Present Research and Clinical Member • *Association for the Treatment and Prevention of Sexual Abuse*

2003–2006 Associate Member (elected) • *International Academy of Sex Research*

2002 Founding Member • CPA Section on Sexual Orientation and Gender Identity

2001–2013 Member • *Canadian Psychological Association* (CPA)

2000–2015 Member • *American Association for the Advancement of Science*

2000–2015 Member • *American Psychological Association* (APA)

APA Division 12 (Clinical Psychology)

APA Division 44 (Society for the Psychological Study of LGB Issues)

2000–2020 Member • *Society for the Scientific Study of Sexuality*

1995–2000 Student Member • *Society for the Scientific Study of Sexuality*

1993–2000 Student Affiliate • *American Psychological Association*

1990–1999 Member, American Psychological Association of Graduate Students (APAGS)

CLINICAL LICENSURE/REGISTRATION

Certificate of Registration, Number 3793
College of Psychologists of Ontario, Ontario, Canada

AWARDS AND HONORS

2022 Distinguished Contribution Award
Association for the Treatment and Prevention of Sexual Abuse (ATSA)

2011 Howard E. Barbaree Award for Excellence in Research
Centre for Addiction and Mental Health, Law and Mental Health Program

2004 fMRI Visiting Fellowship Program at Massachusetts General Hospital
American Psychological Association Advanced Training Institute and NIH

1999–2001 CAMH Post-Doctoral Research Fellowship
Centre for Addiction and Mental Health Foundation and Ontario Ministry of Health

1998 Award for Distinguished Contribution by a Student
American Psychological Association, Division 44

1995 Dissertation Research Grant
Society for the Scientific Study of Sexuality

1994–1996 McGill University Doctoral Scholarship

1994 Award for Outstanding Contribution to Undergraduate Teaching
"TA of the Year Award," from the McGill Psychology Undergraduate Student Association

MAJOR MEDIA

(Complete list available upon request.)

Feature-length Documentaries

Vice Canada Reports. *Age of Consent.* 14 Jan 2017.
Canadian Broadcasting Company. *I, Pedophile.* Firsthand documentaries. 10 Mar 2016.

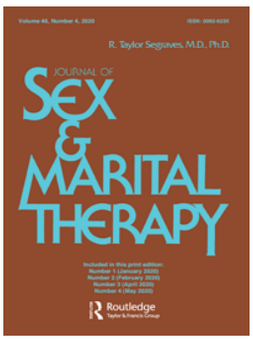
Appearances and Interviews

11 Mar 2020. Ibbitson, John. It is crucial that Parliament gets the conversion-therapy ban right. *The Globe & Mail.*
25 Jan 2020. Ook de hulpvaardige buurman kan verzamelaar van kinderporno zin. *De Morgen.*
3 Nov 2019. Village of the damned. *60 Minutes Australia.*
1 Nov 2019. HÅKON F. HØYDAL. Norsk nettovergriper: – Jeg hater meg selv: Nordmannen laster ned overgrepsmateriale fra nettet – og oppfordrer politiet til å gi amnesti for slike som ham.
10 Oct 2019. Smith, T. Growing efforts are looking at how—or if—#MeToo offenders can be reformed. *National Public Radio.*
29 Sep 2019. Carey, B. Preying on Children: The Emerging Psychology of Pedophiles. *New York Times.*
29 Apr 2019. Mathieu, Isabelle. La poupée qui a troublé les Terre-Neuviens. *La Tribune.*
21 Mar 2019. Pope Francis wants psychological testing to prevent problem priests. But can it really do that? *The Washington Post.*
12 Dec 2018. Child sex dolls: Illegal in Canada, and dozens seized at the border. Ontario Today with Rita Celli. *CBC.*
12 Dec 2018. Celli, R. & Harris, K. Dozens of child sex dolls seized by Canadian border agents. *CBC News.*
27 Apr 2018. Rogers, Brook A. The online 'incel' culture is real–and dangerous. *New York Post.*
25 Apr 2018. Yang, J. Number cited in cryptic Facebook post matches Alek Minassian's military ID: Source. *Toronto Star.*
24 Ap 2018 Understanding 'incel'. *CTV News.*
27 Nov 2017. Carey, B. Therapy for Sexual Misconduct? It's Mostly Unproven. *New York Times.*
14 Nov 2017. Tremonti, A. M. The Current. *CBC.*
9 Nov2017. Christensen, J. Why men use masturbation to harass women. *CNN.* http://www.cnn.com/2017/11/09/health/masturbation-sexual-harassment/index.html
7 Nov 2017. Nazaryan, A. Why is the alt-right obsessed with pedophilia? *Newsweek.*
15 Oct 2017. Ouatik, B. Déscouvre. Pédophilie et science. *CBC Radio Canada.*
12 Oct 2017. Ouatik, B. Peut-on guérir la pédophilie? *CBC Radio Canada.*
11 Sep 2017. Burns, C. The young paedophiles who say they don't abuse children. *BBC News.*
18 Aug 2017. Interview. *National Post Radio.* Sirius XM Canada.
16 Aug 2017. Blackwell, Tom. Man says he was cured of pedophilia at Ottawa clinic: 'It's like a weight that's been lifted': But skeptics worry about the impact of sending pedophiles into the world convinced their curse has been vanquished. *National Post.*
26 Apr 2017. Zalkind, S. Prep schools hid sex abuse just like the catholic church. *VICE.*
24 Apr 2017. Sastre, P. Pédophilie: une panique morale jamais n'abolira un crime. *Slate France.*
12 Feb 2017. Payette, G. Child sex doll trial opens Pandora's box of questions. *CBC News.*
26 Nov 2016. Det morke uvettet ["The unknown darkness]". *Fedrelandsvennen.*
13 July 2016. Paedophilia: Shedding light on the dark field. *The Economist.*

1 Jul 2016. Debusschere, B. Niet iedereen die kinderporno kijkt, is een pedofiel: De mythes rond pedofilie ontkracht. *De Morgen.*
12 Apr 2016. O'Connor, R. Terence Martin: The Tasmanian MP whose medication 'turned him into a paedophile'. *The Independent.*
8 Mar 2016. Bielski, Z. 'The most viscerally hated group on earth': Documentary explores how intervention can stop pedophiles. *The Globe and Mail.*
1 Mar 2016. Elmhirst, S. What should we do about paedophiles? *The Guardian.*
24 Feb 2016. The man whose brain tumour 'turned him into a paedophile'. *The Independent.*
24 Nov 2015. Byron, T. The truth about child sex abuse. *BBC Two.*
20 Aug 2015. The Jared Fogle case: Why we understand so little about abuse. *Washington Post.*
19 Aug 2015. Blackwell, T. Treat sex offenders for impotence—to keep them out of trouble, Canadian psychiatrist says. *National Post.*
2 Aug 2015. Menendez, J. BBC News Hour. *BBC World Service.*
13 Jul 2015. The nature of pedophilia. *BBC Radio 4.*
9 Jul 2015. The sex-offender test: How a computerized assessment can help determine the fate of men who've been accused of sexually abusing children. *The Atlantic.*
10 Apr 2015. NWT failed to prevent sex offender from abusing stepdaughter again. *CBC News.*
10 Feb 2015. Savage, D. "The ethical sadist." In Savage Love. *The Stranger.*
31 Jan 2015. Begrip voor/van pedofilie [Understanding pedophilia]. *de Volkskrant.*
9 Dec 2014. Carey, B. When a rapist's weapon is a pill. *New York Times*.
1 Dec 2014. Singal, J. Can virtual reality help pedophiles? *New York Magazine.*
17 Nov2014. Say pedófile, busco aydua. *El Pais.*
4 Sep 2014. Born that way? *Ideas, with Paul Kennedy.* CBC Radio One.
27 Aug 2014. Interrogating the statistics for the prevalence of paedophilia. BBC.
25 Jul 2014. Stephenson, W. The prevalence of paedophilia. *BBC World Service.*
21 Jul 2014. Hildebrandt, A. Virtuous Pedophiles group gives support therapy cannot. *CBC.*
26 Jan 2014. Paedophilia a result of faulty wiring, scientists suggest. *Daily Mail.*
22 Dec 2013. Kane, L. Is pedophilia a sexual orientation? *Toronto Star.*
21 Jul 2013. Miller, L. The turn-on switch: Fetish theory, post-Freud. *New York Magazine.*
1 Jul 2013. Morin, H. Pédophilie: la difficile quête d'une origine biologique. *Le Monde.*
2 Jun 2013. Malcolm, L. The psychology of paedophilia. *Australian National Radio.*
1 Mar 2013. Kay, J. The mobbing of Tom Flanagan is unwarranted and cruel. *National Post.*
6 Feb 2013. Boy Scouts board delays vote on lifting ban on gays. *L.A. Times.*
31 Aug 2012. CNN Newsroom interview with Ashleigh Banfield. *CNN.*
24 Jun 2012. CNN Newsroom interview with Don Lemon. *CNN.*

EXPERT WITNESS TESTIMONY

1.	2022	Bridge v Oklahoma State Dept of Education	Western District, OK
2.	2022	Dekker, et al. v Florida Agency for Health Care Admin	Tallahassee, FL
3.	2022	Roe v Utah High School Activities Assn.	Salt Lake County, UT
4.	2022	A.M. v Indiana Public Schools	Southern District, IN
5.	2022	Ricard v Kansas	Geery County, KS
6.	2022	Re Commitment of Baunee	Syracuse, NY
7.	2022	Hersom & Doe v WVa Health & Human Services	Southern District, WV
8.	2022	Eknes-Tucker v Alabama	Montgomery County, AL
9.	2022	PFLAG, et al. v Texas	Travis County, TX
10.	2022	Doe v Texas	Travis County, TX
11.	2022	BPJ v West Virginia Board of Education	Southern District, WV
12.	2021	Cross et al. v Loudoun School Board	Loudoun, VA
13.	2021	Cox v Indiana Child Services	Child Services, IN
14.	2021	Josephson v University of Kentucky	Western District, KY
15.	2021	Re Commitment of Michael Hughes (Frye Hearing)	Cook County, IL
16.	2021	Arizona v Arnett Clifton	Maricopa County, AZ
17.	2019	US v Peter Bright	Southern District, NY
18.	2019	Spiegel-Savoie v Savoie-Sexten (Custody Hearing)	Boston, MA
19.	2019	Re Commitment of Steven Casper (Frye Hearing)	Kendall County, IL
20.	2019	Re Commitment of Inger (Frye Hearing)	Poughkeepsie, NY
21.	2019	Canada vs John Fitzpatrick (Sentencing Hearing)	Toronto, ON, Canada
22.	2018	Re Commitment of Little (Frye Hearing)	Utica, NY
23.	2017	Re Commitment of Nicholas Bauer (Frye Hearing)	Lee County, IL
24.	2017	US vs William Leford (Presentencing Hearing)	Warnock, GA
25.	2015	Florida v Jon Herb	Naples, FL
26.	2010	Re Detention of William Dutcher	Seattle, WA



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Transgender and Gender Diverse Children and Adolescents: Fact-Checking of AAP Policy

James M. Cantor

Toronto Sexuality Centre, Toronto, Canada

ABSTRACT

The American Academy of Pediatrics (AAP) recently published a policy statement: *Ensuring comprehensive care and support for transgender and gender-diverse children and adolescents*. Although almost all clinics and professional associations in the world use what's called the *watchful waiting* approach to helping gender diverse (GD) children, the AAP statement instead rejected that consensus, endorsing *gender affirmation* as the only acceptable approach. Remarkably, not only did the AAP statement fail to include any of the actual outcomes literature on such cases, but it also misrepresented the contents of its citations, which repeatedly said the very opposite of what AAP attributed to them.

The American Academy of Pediatrics (AAP) recently published a policy statement entitled, *Ensuring comprehensive care and support for transgender and gender-diverse children and adolescents* (Rafferty, AAP Committee on Psychosocial Aspects of Child and Family Health, AAP Committee on Adolescence, AAP Section on Lesbian, Gay, Bisexual, and Transgender Health and Wellness, 2018). These are children who manifest discontent with the sex they were born as and desire to live as the other sex (or as some alternative gender role). The policy was quite a remarkable document: Although almost all clinics and professional associations in the world use what's called the *watchful waiting* approach to helping transgender and gender diverse (GD) children, the AAP statement rejected that consensus, endorsing only *gender affirmation.* That is, where the consensus is to delay any transitions after the onset of puberty, AAP instead rejected waiting before transition. With AAP taking such a dramatic departure from other professional associations, I was immediately curious about what evidence led them to that conclusion. As I read the works on which they based their policy, however, I was pretty surprised—rather alarmed, actually: These documents simply did not say what AAP claimed they did. In fact, the references that AAP cited as the basis of their policy instead outright contradicted that policy, repeatedly endorsing *watchful waiting*.

The AAP statement was also remarkable in what it left out—namely, the actual outcomes research on GD children. In total, there have been 11 follow-up studies of GD children, of which AAP cited one (Wallien & Cohen-Kettenis, 2008), doing so without actually mentioning the outcome data it contained. The literature on outcomes was neither reviewed, summarized, nor subjected to meta-analysis to be considered in the aggregate—It was merely disappeared. (The list of all existing studies appears in the appendix.) As they make clear, *every* follow-up study of GD children, without exception, found the same thing: Over puberty, the majority of GD children cease to want to transition. AAP is, of course, free to establish whatever policy it likes on

CONTACT James Cantor jamescantorphd@gmail.com Toronto Sexuality Centre, 2 Carlton Street, suite 1820, Toronto, Ontario M5B 1J3, Canada.

whatever basis it likes. But any assertion that their policy is based on evidence is demonstrably false, as detailed below.

AAP divided clinical approaches into three types—conversion therapy, watchful waiting, and gender affirmation. It rejected the first two and endorsed *gender affirmation* as the only acceptable alternative. Most readers will likely be familiar already with attempts to use conversion therapy to change sexual orientation. With regard to gender identity, AAP wrote:

> "[C]onversion" or "reparative" treatment models are used to prevent children and adolescents from identifying as transgender or to dissuade them from exhibiting gender-diverse expressions. … Reparative approaches have been proven to be not only unsuccessful[38] but also deleterious and are considered outside the mainstream of traditional medical practice.[29,39–42]

The citations were:

38. Haldeman DC. The practice and ethics of sexual orientation conversion therapy. *J Consult Clin Psychol.* 1994;62(2):221–227.

29. Adelson SL; American Academy of Child and Adolescent Psychiatry (AACAP) Committee on Quality Issues (CQI). Practice parameter on gay, lesbian, or bisexual sexual orientation, gender nonconformity, and gender discordance in children and adolescents. *J Am Acad Child Adolesc Psychiatry.* 2012;51(9):957–974.

39. Byne W. Regulations restrict practice of conversion therapy. *LGBT Health.* 2016;3(2):97–99.

40. Cohen-Kettenis PT, Delemarrevan de Waal HA, Gooren LJ. The treatment of adolescent transsexuals: changing insights. *J Sex Med.* 2008;5(8):1892–1897.

41. Bryant K. Making gender identity disorder of childhood: historical lessons for contemporary debates. *Sex Res Soc Policy.* 2006;3(3):23–39.

42. World Professional Association for Transgender Health. *WPATH De-Psychopathologisation Statement.* Minneapolis, MN: World Professional Association for Transgender Health; 2010.

AAP's claims struck me as odd because *there are no studies of conversion therapy for gender identity.* Studies of conversion therapy have been limited to *sexual orientation,* and, moreover, to the sexual orientation *of adults,* not to gender identity and not of children in any case. The article AAP cited to support their claim (reference number 38) is indeed a classic and well-known review, but it is a review of sexual orientation research *only.* Neither gender identity, nor even children, received a single mention in it. Indeed, the narrower scope of that article should be clear to anyone reading even just its title: "The practice and ethics of *sexual orientation* conversion therapy" [italics added].

AAP continued, saying that conversion approaches for GD children have already been rejected by medical consensus, citing five sources. This claim struck me as just as odd, however—I recalled associations banning conversion therapy for sexual orientation, but not for gender identity, exactly because there is no evidence for generalizing from adult sexual orientation to childhood gender identity. So, I started checking AAP's citations for that, and these sources too pertained only to sexual orientation, not gender identity (specifics below). What AAP's sources *did* repeatedly emphasize was that:

A. Sexual orientation of adults is unaffected by conversion therapy and any other [known] intervention;
B. Gender dysphoria in childhood before puberty desists in the majority of cases, becoming (cis-gendered) homosexuality in adulthood, again regardless of any [known] intervention; and
C. Gender dysphoria in childhood persisting after puberty tends to persist entirely.

That is, in the context of GD children, it simply makes no sense to refer to externally induced "conversion": The majority of children "convert" to cisgender or "desist" from transgender

regardless of any attempt to change them. "Conversion" only makes sense with regard to adult sexual orientation because (unlike childhood gender identity), adult homosexuality never or nearly never spontaneously changes to heterosexuality. Although gender identity and sexual orientation may often be analogous and discussed together with regard to social or political values and to civil rights, they are nonetheless distinct—with distinct origins, needs, and responses to medical and mental health care choices. Although AAP emphasized to the reader that "gender identity is not synonymous with 'sexual orientation'" (Rafferty et al., 2018, p. 3), they went ahead to treat them as such nonetheless.

To return to checking AAP's fidelity to its sources: Reference 29 was a practice guideline from the Committee on Quality Issues of the American Academy of Child and Adolescent Psychiatry (AACAP). Despite AAP applying this source to *gender identity,* AACAP was quite unambiguous regarding their intent to speak to sexual orientation and *only* to sexual orientation: "Principle 6. Clinicians should be aware that there is no evidence that *sexual orientation* can be altered through therapy, and that attempts to do so may be harmful. There is no established evidence that change in a predominant, enduring *homosexual* pattern of development is possible. Although sexual fantasies can, to some degree, be suppressed or repressed by those who are ashamed of or in conflict about them, sexual desire is not a choice. However, behavior, social role, and—to a degree—identity and self-acceptance are. Although operant conditioning modifies sexual fetishes, it does not alter *homosexuality*. Psychiatric efforts to alter *sexual orientation* through 'reparative therapy' *in adults* have found little or no change in *sexual orientation,* while causing significant risk of harm to self-esteem" (AACAP, 2012, p. 967, italics added).

Whereas AAP cites AACAP to support gender affirmation as the only alternative for treating GD children, AACAP's actual view was decidedly neutral, noting the lack of evidence: "Given the lack of empirical evidence from randomized, controlled trials of the efficacy of treatment aimed at eliminating gender discordance, the potential risks of treatment, and longitudinal evidence that gender discordance persists in only a small minority of untreated cases arising in childhood, further research is needed on predictors of persistence and desistence of childhood gender discordance as well as the long-term risks and benefits of intervention before any treatment to eliminate gender discordance can be endorsed" (AACAP, 2012, p. 969). Moreover, whereas AAP rejected watchful waiting, what AACAP recommended was: "In general, it is desirable to help adolescents who may be experiencing gender distress and dysphoria to defer sex reassignment until adulthood" (AACAP, 2012, p. 969). So, not only did AAP attribute to AACAP something AACAP never said, but also AAP withheld from readers AACAP's actual view.

Next, in reference 39, Byne (2016) also addressed only sexual orientation, doing so very clearly: "Reparative therapy is a subset of conversion therapies based on the premise that *same-sex attraction* are reparations for childhood trauma. Thus, practitioners of reparative therapy believe that exploring, isolating, and repairing these childhood emotional wounds will often result in reducing *same-sex attractions*" (Byne, 2016, p. 97). Byne does not say this of gender identity, as the AAP statement misrepresents.

In AAP reference 40, Cohen-Kettenis et al. (2008) did finally pertain to gender identity; however, this article never mentions conversion therapy. (!) Rather, in this study, the authors presented that clinic's lowering of their minimum age for cross-sex hormone treatment from age 18 to 16, which they did on the basis of a series of studies showing the high rates of success with this age group. Although it did strike me as odd that AAP picked as support against conversion therapy an article that did not mention conversion therapy, I could imagine AAP cited the article as an example of what the "mainstream of traditional medical practice" consists of (the logic being that conversion therapy falls outside what an 'ideal' clinic like this one provides). However, what this clinic provides is the very *watchful waiting* approach that AAP rejected. The approach

espoused by Cohen-Kettenis (and the other clinics mentioned in the source—Gent, Boston, Oslo, and now formerly, Toronto) is to make puberty-halting interventions available at age 12 because: "[P]ubertal suppression may give adolescents, together with the attending health professional, more time to explore their gender identity, without the distress of the developing secondary sex characteristics. The precision of the diagnosis may thus be improved" (Cohen-Kettenis et al., 2008, p. 1894).

Reference 41 presented a very interesting history spanning the 1960s–1990s about how feminine boys and tomboyish girls came to be recognized as mostly pre-homosexual, and how that status came to be entered into the DSM at the same time as homosexuality was being *removed* from the DSM. Conversion therapy is never mentioned. Indeed, to the extent that Bryant mentions treatment at all, it is to say that treatment is entirely irrelevant to his analysis: "An important omission from the *DSM* is a discussion of the kinds of treatment that GIDC children should receive. (This omission is a general orientation of the DSM and not unique to GIDC)" (Bryant, 2006, p. 35). How this article supports AAP's claim is a mystery. Moreover, how AAP could cite a 2006 history discussing events of the 1990s and earlier to support a claim about the *current* consensus in this quickly evolving discussion remains all the more unfathomable.

Cited last in this section was a one-paragraph press release from the World Professional Association for Transgender Health. Written during the early stages of the American Psychiatric Association's (APA's) update of the DSM, the statement asserted simply that "The WPATH Board of Directors strongly urges the de-psychopathologisation of gender variance worldwide." Very reasonable debate can (and should) be had regarding whether gender dysphoria should be removed from the DSM as homosexuality was, and WPATH was well within its purview to assert that it should. Now that the DSM revision process is years completed however, history has seen that APA ultimately retained the diagnostic categories, rejecting WPATH's urging. This makes AAP's logic entirely backwards: That WPATH's request to depathologize gender dysphoria was *rejected* suggests that it is *WPATH's* view—and therefore the AAP policy—which fall "outside the mainstream of traditional medical practice." (!)

AAP based this entire line of reasoning on their belief that conversion therapy is being used "to prevent children and adolescents from identifying as transgender" (Rafferty et al., 2018, p. 4). That claim is left without citation or support. In contrast, what is said by AAP's sources is "delaying affirmation should *not* be construed as conversion therapy or an attempt to change gender identity" in the first place (Byne, 2016, p. 2). Nonetheless, AAP seems to be doing exactly that: simply relabeling any alternative approach as equivalent to conversion therapy.

Although AAP (and anyone else) may reject (what they label to be) conversion therapy purely on the basis of political or personal values, there is no evidence to back the AAP's stated claim about the existing science on gender identity at all, never mind gender identity of children.

AAP also dismissed the watchful waiting approach out of hand, not citing any evidence, but repeatedly calling it "outdated." The criticisms AAP provided, however, again defied the existing evidence, with even its own sources repeatedly calling watchful waiting the current standard. According to AAP:

> [G]ender affirmation is in contrast to the outdated approach in which a child's gender-diverse assertions are held as "possibly true" until an arbitrary age (often after pubertal onset) when they can be considered valid, an approach that authors of the literature have termed "watchful waiting." This outdated approach does not serve the child because critical support is withheld. Watchful waiting is based on binary notions of gender in which gender diversity and fluidity is pathologized; in watchful waiting, it is also assumed that notions of gender identity become fixed at a certain age. The approach is also influenced by a group of early studies with validity concerns, methodologic flaws, and limited follow-up on children who identified as TGD and, by adolescence, did not seek further treatment ("desisters").[45,47]

The citations from AAP's reference list are:

45. Ehrensaft D, Giammattei SV, Storck K, Tishelman AC, Keo-Meier C. Prepubertal social gender transitions: what we know; what we can learn—a view from a gender affirmative lens. *Int J Transgend.* 2018;19(2):251–268

47. Olson KR. Prepubescent transgender children: what we do and do not know. *J Am Acad Child Adolesc Psychiatry.* 2016;55(3):155–156.e3

I was surprised first by the AAP's claim that watchful waiting's delay to puberty was somehow "arbitrary." The literature, including AAP's sources, repeatedly indicated the pivotal importance of puberty, noting that outcomes strongly diverge at that point. According to AAP reference 29, in "*prepubertal* boys with gender discordance—including many without any mental health treatment—the cross gender wishes usually fade over time and do not persist into adulthood, with only 2.2% to 11.9% continuing to experience gender discordance" (Adelson & AACAP, 2012, p. 963, italics added), whereas "when gender variance with the desire to be the other sex is present *in adolescence,* this desire usually does persist through adulthood" (Adelson & AACAP, 2012, p. 964, italics added). Similarly, according to AAP reference 40, "Symptoms of GID *at prepubertal ages* decrease or even disappear in a considerable percentage of children (estimates range from 80–95%). Therefore, any intervention in childhood would seem premature and inappropriate. However, GID persisting *into early puberty* appears to be highly persistent" (Cohen-Kettenis et al., 2008, p. 1895, italics added). That follow-up studies of prepubertal transition differ from postpubertal transition is the very meaning of non-arbitrary. AAP gave readers exactly the reverse of what was contained in its own sources. If AAP were correct in saying that puberty is an arbitrarily selected age, then AAP will be able to offer another point to wait for with as much empirical backing as puberty has.

Next, it was not clear on what basis AAP could say that watchful waiting withholds support—AAP cited no support for its claim. The people in such programs often receive substantial support during this period. Also unclear is on what basis AAP could already know exactly which treatments are "critical" and which are not—Answering that question is the very purpose of this entire endeavor. Indeed, the logic of AAP's claim appears entirely circular: It is only if one were already pre-convinced that gender affirmation is the only acceptable alternative that would make watchful waiting seem to withhold critical support—What it delays is gender affirmation, the method one has already decided to be critical.

Although AAP's next claim did not have a citation appearing at the end of its sentence, binary notions of gender were mentioned both in references 45 and 47. Specifically, both pointed out that existing outcome studies have been about people transitioning from one sex to the other, rather than from one sex to an in-between status or a combination of masculine/feminine features. Neither reference presented this as a reason to reject the results from the existing studies of complete transition however (which is how AAP cast it). Although it is indeed true that the outcome data have been about complete transition, some future study showing that partial transition shows a different outcome would not invalidate what is known about complete transition. Indeed, data showing that partial transition gives better outcomes than complete transition would, once again, support the watchful waiting approach which AAP rejected.

Next was a vague reference alleging concerns and criticisms about early studies. Had AAP indicated what those alleged concerns and flaws were (or which studies they were), then it would be possible to evaluate or address them. Nonetheless, the argument is a red herring: Because all of the later studies showed the same result as did the early studies, any such allegation is necessarily moot.

Reference 47 was a one-and-a-half page commentary in which the author off-handedly mentions criticisms previously made of three of the eleven outcome studies of GD children, but does not provide any analysis or discussion. The only specific claim was that studies (whether early or late) had limited follow-up periods—the logic being that had outcome researchers lengthened the follow-up period, then people who seemed to have desisted might have returned to the clinic as

cases of "persistence-after-interruption." Although one could debate the merits of that prediction, AAP instead simply withheld from the reader the result from the original researchers having tested that very prediction directly: Steensma and Cohen-Kettenis (2015) conducted another analysis of their cohort, by then ages 19–28 (mean age 25.9 years), and found that 3.3% (5 people of the sample of 150) later returned. That is, in long-term follow-up, the childhood sample showed 66.7% desistence instead of 70.0% desistance.

Reference 45 did not support the claim that watchful-waiting is "outdated" either. Indeed, that source said the very opposite, explicitly referring to watchful waiting as the *current* approach: "Put another way, if clinicians are straying from SOC 7 guidelines for social transitions, not abiding by the watchful waiting model *favored by the standards,* we will have adolescents who have been consistently living in their affirmed gender since age 3, 4, or 5" (Ehrensaft et al., 2018, p. 255). Moreover, Ehrensaft et al. said there are cases in which they too would still use watchful waiting: "When a child's gender identity is unclear, the watchful waiting approach can give the child and their family time to develop a clearer understanding and is not necessarily in contrast to the needs of the child" (p. 259). Ehrensaft et al. are indeed critical of the watchful waiting model (which they feel is applied too conservatively), but they do not come close to the position the AAP policy espouses. Where Ehrensaft summaries the potential benefits and potential risks both to transitioning and not transitioning, the AAP presents an ironically binary narrative.

In its policy statement, AAP told neither the truth nor the whole truth, committing sins both of commission and of omission, asserting claims easily falsified by anyone caring to do any fact-checking at all. AAP claimed, "This policy statement is focused specifically on children and youth that identify as TGD rather than the larger LGBTQ population"; however, much of that evidence was about sexual orientation, not gender identity. AAP claimed, "Current available research and expert opinion from clinical and research leaders … will serve as the basis for recommendations" (pp. 1–2); however, they provided recommendations entirely unsupported and even in direct opposition to that research and opinion.

AAP is advocating for something far in excess of mainstream practice and medical consensus. In the presence of compelling evidence, that is just what is called for. The problems with Rafferty, however, do not constitute merely a misquote, a misinterpretation of an ambiguous statement, or a missing reference or two. Rather, AAP's statement is a systematic exclusion and misrepresentation of entire literatures. Not only did AAP fail to provide compelling evidence, it failed to provide the evidence at all. Indeed, AAP's recommendations are *despite* the existing evidence.

Disclosure statement

No potential conflict of interest was reported by the author.

References

Rafferty, J., AAP Committee on Psychosocial Aspects of Child and Family Health, AAP Committee on Adolescence, AAP Section on Lesbian, Gay, Bisexual, and Transgender Health and Wellness. (2018). Ensuring comprehensive care and support for transgender and gender-diverse children and adolescents. *Pediatrics*, *142*(4), e20182162 doi:10.1542/peds.2018-2162

Steensma, T. D., & Cohen-Kettenis, P. T. (2015). More than two developmental pathways in children with gender dysphoria? *Journal of the American Academy of Child and Adolescent Psychiatry*, *52*, 147–148. doi:10.1016/j.jaac.2014.10.016

Wallien, M. S. C., & Cohen-Kettenis, P. T. (2008). Psychosexual outcome of gender-dysphoric children. *Journal of the American Academy of Child and Adolescent Psychiatry*, *47*, 1413–1423. doi:10.1097/CHI.0b013e31818956b9

Appendix

Count	Group	Study
2/16 4/16 10/16	gay* trans-/crossdress straight*/uncertain	Lebovitz, P. S. (1972). Feminine behavior in boys: Aspects of its outcome. *American Journal of Psychiatry, 128,* 1283–1289.
2/16 2/16 12/16	trans- uncertain gay	Zuger, B. (1978). Effeminate behavior present in boys from childhood: Ten additional years of follow-up. *Comprehensive Psychiatry, 19,* 363–369.
0/9 9/9	trans- gay	Money, J., & Russo, A. J. (1979). Homosexual outcome of discordant gender identity/role: Longitudinal follow-up. *Journal of Pediatric Psychology, 4,* 29–41.
2/45 10/45 33/45	trans-/crossdress uncertain gay	Zuger, B. (1984). Early effeminate behavior in boys: Outcome and significance for homosexuality. *Journal of Nervous and Mental Disease, 172,* 90–97.
1/10 2/10 3/10 4/10	trans- gay uncertain straight	Davenport, C. W. (1986). A follow-up study of 10 feminine boys. *Archives of Sexual Behavior, 15,* 511–517.
1/44 43/44	trans- cis-	Green, R. (1987). *The "sissy boy syndrome" and the development of homosexuality*. New Haven, CT: Yale University Press.
0/8 8/8	trans- cis-	Kosky, R. J. (1987). Gender-disordered children: Does inpatient treatment help? *Medical Journal of Australia, 146,* 565–569.
21/54 33/54	trans- cis-	Wallien, M. S. C., & Cohen-Kettenis, P. T. (2008). Psychosexual outcome of gender-dysphoric children. *Journal of the American Academy of Child and Adolescent Psychiatry, 47,* 1413–1423.
3/25 6/25 16/25	trans- lesbian/bi- straight	Drummond, K. D., Bradley, S. J., Badali-Peterson, M., & Zucker, K. J. (2008). A follow-up study of girls with gender identity disorder. *Developmental Psychology, 44*, 34–45.
17/139 122/139	trans- cis-	Singh, D. (2012). *A follow-up study of boys with gender identity disorder*. Unpublished doctoral dissertation, University of Toronto.
47/127 80/127	trans- cis-	Steensma, T. D., McGuire, J. K., Kreukels, B. P. C., Beekman, A. J., & Cohen-Kettenis, P. T. (2013). Factors associated with desistence and persistence of childhood gender dysphoria: A quantitative follow-up study. *Journal of the American Academy of Child and Adolescent Psychiatry, 52,* 582–590.

*For brevity, the list uses "gay" for "gay and cis-", "straight" for "straight and cis-", etc.

EXHIBIT 4

IN THE UNITED STATES DISTRICT COURT
FOR THE MIDDLE DISTRICT OF TENNESSEE
Nashville Division

L.W., by and through her parents and next friends, Samantha Williams and Brian Williams, et al.

Plaintiffs,

v.

JONATHAN SKRMETTI, in his official capacity as the Tennessee Attorney General and Reporter, et al.,

Defendants.

Civil No. 3:23-cv-00376

EXPERT DECLARATION OF PAUL W. HRUZ, M.D., PH.D

Pursuant to 28 U.S.C. § 1746, I declare:

1. I have been retained by counsel for Defendants as an expert witness in connection with the above-captioned litigation. I have actual knowledge of the matters stated in this report. My professional background, experience, and publications are detailed in my curriculum vitae. A true and accurate copy of my CV is attached as Exhibit A to this report.

2. I am an Associate Professor of Pediatrics in the Division of Pediatric Endocrinology and Diabetes at Washington University School of Medicine. I also have a secondary appointment as Associate Professor of Cellular Biology and Physiology in the Division of Biology and Biological Sciences at Washington University School of Medicine. I served as Chief of the Division of Pediatric Endocrinology and Diabetes at Washington University from 2012-2017. I served as the Director of the Pediatric Endocrinology Fellowship Program at Washington University from 2008-2016. I am currently serving as Associate Fellowship Program Director at Washington University in St. Louis.

3. Related to the litigation of issues of sex and gender, I have been designated as an expert witness in *Carcaño v. Cooper* (United States District Court for the Middle District of North Carolina, Case No. 1:16-cv-236); *Doe v. Board of Education of the Highland School District* (United States District Court for the Southern District of Ohio, Eastern Division, Case No. 2:16-CV-524); *Whitaker v. Kenosha Unified School District* (United States District Court for the Eastern District of Wisconsin, Case No. 2:16-cv-00943), *Bruce v. South Dakota* (United States District Court for the District of South Dakota, Western Division, Case No. 17-5080); *Kadel v. Falwell* (United States District Court for the Middle District of North Carolina, Case No. 1:19-cv-272-LCB-LPA); *Brandt v. Rutledge* (United States District Court for the Eastern District of Arkansas, Central Division, Case No. 4:21-CV-00450-JM); *D.H. v. Snyder* (United States District Court for

the District of Arizona, Case No. 4:20-cv-00335-SHR), Cause DF-15-09887-SD of the 255th Judicial Circuit of Dallas County, TX regarding the dispute between J.A. D.Y. and J.U. D.Y., Children; *Dekker v. Weida* (United States District Court for the Northern District of Florida, Tallahassee Division, Case No. 4:22-cv-00325-RH-MAF); *Boe v. Marshall* (United States District Court for the Middle District of Alabama Northern Division, Civil Action No. 2:22-cv-184-LCB); and *K.C. v. The Medical Licensing Board of* Indiana (United States District Court for the Southern District Of Indiana Indianapolis Division, No. 1:23-cv-00595-JPH-KMB). I have also served as a science consultant or submitted written testimony for court cases in Canada (B.C. Supreme Court File No. E190334) and Great Britain (*Bell v. Tavistock*).

4. I am being compensated at an hourly rate for actual time devoted, at the rate of $400 per hour including report drafting, travel, testimony, and consultation. My compensation does not depend on the outcome of this litigation, the opinions I express, or the testimony I provide. If called to testify in this matter, I would testify truthfully and based on my expert opinion.

5. My opinions as detailed in this report are based upon my:

a. knowledge, training, and clinical experience in caring for thousands of patients over many years;
b. detailed methodological reviews of hundreds of relevant peer-reviewed science publications;
c. consults, discussions, and team analyses with colleagues and other experts in the field, including attendance and participation in various professional conferences;
d. publications in peer-reviewed scientific journals;
e. editorial work for peer-reviewed scientific journals; and
f. peer-reviewed research grant receipt and review work.

The materials that I have relied upon are the same types of materials that other experts in my field of clinical practice rely upon when forming opinions on the subject, including hundreds of published, peer-reviewed scientific research (and professional) articles.

6. My opinions and hypotheses in this matter are — as all expert reports — subject to the limitations of documentary and related evidence, the impossibility of absolute predictions, and the limitations of social, biological, and medical science. I have not met with, or personally interviewed, anyone in this case. I have not yet reviewed all of the evidence in this case and my opinions are subject to change at any time as new information becomes available to me. Only the trier of fact can determine the credibility of witnesses and how scientific research may or may not be related to the specific facts of any particular case. In my opinion, a key role of an expert witness is to help the court, lawyers, parties, and the public understand and apply reliable scientific, technical, and investigative principles, hypotheses, methods, and information.

BACKGROUND

7. I received my Doctor of Philosophy degree from the Medical College of Wisconsin in 1993. I received my Medical Degree from the Medical College of Wisconsin in 1994.

8. I am board certified in Pediatrics and Pediatric Endocrinology. I have been licensed to practice medicine in Missouri since 2000. My professional memberships include the American Diabetes Association, the Pediatric Endocrine Society, and the Endocrine Society.

9. I have published 62 scholarly articles over my academic career spanning over two decades. This includes peer-reviewed publications in the leading journals in the fields of metabolism, cardiology, HIV, and ethics. Those journals include Gastroenterology, Circulation, Diabetes, Science Signaling, the Journal of Biological Chemistry, and FASEB Journal. See Exhibit A.

10. I have served as a Reviewer for a number of leading science journals in relevant fields including the Journal of Clinical Endocrinology and Metabolism, the Journal of Biological Chemistry, Diabetes, Scientific Reports, and PLOS ONE, assessing the quality of evidence that is put forward for publication. I have also been involved in the evaluation of clinical trials with

colleagues. I have received over $4.6 million in governmental and non-governmental funding for scientific research, including grants from the National Institutes of Health, the American Diabetes Association, The American Heart Association, the March of Dimes, and the Harrington Discovery Institute. I am a member of the Alpha Omega Alpha Medical Honor Society and have received the Armond J. Quick Award for Excellence in Biochemistry, the Eli Lilly Award for Outstanding Contribution to Drug Discovery, and the Julio V. Santiago Distinguished Scholar in Pediatrics Award.

11. During the more than 22 years that I have been in clinical practice, I have participated in the care of hundreds of infants and children, including adolescents, with disorders of sexual development. I was a founding member of the multidisciplinary Disorders of Sexual Development (DSD) program at Washington University. I continue to contribute to the discussion of complex cases and the advancement of research priorities in this field. In the care of these patients, I have acquired expertise in the understanding and management of associated difficulties in gender identification and gender transitioning treatment issues. I have trained and/or supervised hundreds of medical students, residents, and clinical fellows in the practice of medicine.

12. In my role as a scientist and as the Director of the Division of Pediatric Endocrinology at Washington University, I extensively studied the existing scientific research literature related to the incidence, potential etiology, and treatment of gender dysphoria as efforts were made to develop a Transgender Medicine Clinic at Saint Louis Children's Hospital. I have participated in local, national, and international meetings where the endocrine care of children with gender dysphoria has been discussed in detail and debated in depth. I have met individually and consulted with several pediatric endocrinologists (including Dr. Norman Spack) and other professionals spe-

cializing in sexual health (including Eli Coleman) who have developed and led transgender programs in the United States. I have also consulted with, met with, and had detailed discussions with dozens of parents of children with gender dysphoria to understand the unique difficulties experienced by this patient population. I continue to evaluate the ongoing experimental investigation of this condition. I am frequently consulted by other medical professionals to help them understand the complex medical and ethical issues related to this emerging field of medicine.

13. In my clinical practice, I have cared for children from birth to the completion of college in their early twenties who have a variety of hormone-related diseases. This includes disorders of growth, puberty (both precocious and delayed), glucose homeostasis (both hypoglycemia and diabetes mellitus), adrenal function (both adrenal insufficiency and steroid excess), thyroid function, skeletal abnormalities, gonadal dysfunction (including polycystic ovarian syndrome and ovarian failure), hypopituitarism, and disorders of sexual development. Pediatric patients referred to our practice for the evaluation and treatment of gender dysphoria are cared for by an interdisciplinary team of providers that includes a psychologist and pediatric endocrinologist who have been specifically chosen for this role based upon a special interest in this patient population.

BACKGROUND ON SEX AND GENDER

14. Sex is an objective biological trait intrinsically oriented toward specific roles in the conception and development of new members of a species. Both males and females contribute genetic information in distinct yet complementary ways. Males have the role of delivering sperm produced by testes and the unique paternal DNA contained therein to a female. Females have the role of receiving this male genetic information to join with the maternal genetic information contained in ova produced by ovaries. Sex is not "assigned at birth"; it is permanently determined by biology at conception. This remains the standard definition that has been accepted by the relevant

scientific community and used worldwide by scientists, medical personnel, and society in general for decades.[1]

15. The scientific and clinical measurement of sex is done with highly reliable and valid objective methodologies. Visual medical examination of the appearance of the external genitalia is the primary methodology used by clinicians to recognize sex. In cases where genital ambiguity is present, additional testing modalities including chromosomal analysis, measurement of hormone levels, radiographic imaging of internal sexual anatomy and biological response to provocative testing are utilized. The measurement and assessment of biological sex has been documented by valid and reliable research published in credible journals, and is accepted by the relevant scientific community. Medical recognition of an individual as male or female is correctly made at birth in nearly 99.98% of cases according to external phenotypic expression of primary sexual traits (i.e., the presence of a penis for males and presence of labia and vagina for females). [2]

16. For members of the human species (and virtually all mammals), sex is normatively aligned in a binary fashion (i.e., either male or female) in relation to biologic purpose. The presence of individuals with disorders of sexual development (along the range of the established Prader scale) does not alter this fundamental reality.

17. Due to genetic and hormonal variation in the developing fetus, normative development of the external genitalia in any individual differs with respect to size and appearance while maintaining an ability to function with respect to biologic purpose (i.e., reproduction). Internal

[1] See Miller LR, et al. Considering sex as a biological variable in preclinical research. FASEB J. 2017 Jan;31(1):29-34; Clayton JA. Studying both sexes: a guiding principle for biomedicine. FASEB J. 2016 Feb;30(2):519-24.
[2] See L. Sax, How common is Intersex? A response to Anne Fausto-Sterling, 39 J. Sex Rsch. 174 (2002).

structures (e.g., gonad, uterus, vas deferens) normatively align in more than 99.9%+ of mammals with external genitalia, including humans.

18. Due to the complexity of the biological processes that are involved in normal sexual development, it is not surprising that a very small number of individuals are born with defects in this process (1 in 5,000 births).[3] Defects can occur through either inherited or *de novo* mutations in genes that are involved in sexual determination or through environmental insults during critical states of sexual development. Persons who are born with such abnormalities are considered to have a disorder of sexual development (DSD). Most often, this is first detected as ambiguity in the appearance of the external genitalia. Such detection measurements are reliable and valid and accepted by the relevant scientific community.

19. The medical care of persons with DSDs is primarily directed toward identification of the etiology of the defect and treatment of any associated complications. Similar to the diagnosis of other diseases, objective diagnostic tools such as the Prader scale are used to assess, measure, and assign a "stage" to the severity of the deviation from normal. In children with DSDs, characterization based upon phenotype alone does not reliably predict the sex chromosomes present, nor does it necessarily correlate with potential for biological sexual function. The need for making a tentative sex assignment is unique to children with a DSD and does not apply to individuals with normally formed and functional genitalia at birth. Decisions on initial sex assignment in these very rare DSD cases require detailed assessment of objective, reliable medical evidence by a team of expert medical providers. In previous years, the general practice was to make a definitive sex assignment shortly after birth, the belief being that this would allow patients with a disorder of sexual development to best conform to the assigned sex and parents-caregivers to help socialize

[3] *Id*.

the child to the assigned sex. Current practice is to defer sex assignment until the etiology of the disorder is determined and, if possible, a reliable prediction can be made on likely biologic and psychologic outcomes. When this cannot be done with confidence, a presumptive sex assignment is made. Factors used in making such decisions include karyotype (46XX, 46XY, or other), phenotypic appearance of the external genitalia, and parental desires. The availability of new information can, in rare circumstances, lead to a change in sex determination. Decisions on whether to surgically alter the external genitalia to align with sex are generally deferred until the patient is able to provide consent.[4] The tentative assignment of sex is unique to individuals with a DSD.

20. "Gender," a term that had traditionally been reserved for grammatical purposes, is currently used to describe the psychological and cultural characteristics of a person in relation to biological sex. Gender in such new definitions therefore exists only in reference to subjective personal perceptions and feelings and societal expectations, not biology. The reliability and validity of various usages of the term "gender" is currently controversial. The dangers of incorrectly using the term "gender" in place of "sex" have been acknowledged by the Endocrine Society.[5]

21. "Gender identity" refers to a person's individual experience and perception and unverified verbal patient reports of how they experience being male or female or a combination of these or other categories. The term "gender identity" is controversial. There is no current worldwide definition of "gender identity" accepted by the relevant clinical communities. The measurement error rate for "gender identity" is unknown.

[4] See P. A. Lee et al., Global Disorders of Sex Development Update since 2006: Perceptions, Approach and Care, 85 Horm. Rsch. Paediatr. 158 (2016).
[5] See A. Bhargava et al., Considering Sex as a Biological Variable in Basic and Clinical Studies: An Endocrine Society Scientific Statement, 42 Endocrine Revs. 219 (2021).

22. People who identify as "transgender" transiently or persistently experience a sex-discordant gender identity.[6]

PUBERTY

23. Puberty is "the morphological and physiological changes that occur in the growing boy or girl as the gonads change from the infantile to the adult state. These changes involve nearly all the organs and structures of the body but they do not begin at the same age nor take the same length of time to reach completion in all individuals. Puberty is not complete until the individual has the physical capacity to conceive and successfully rear children."[7]

24. The principal manifestations of puberty are:

- The adolescent growth spurt; i.e., an acceleration followed by a deceleration of growth in most skeletal dimensions and in many internal organs.
- The development of the gonads.
- The development of the secondary reproductive organs and the secondary sex characters.
- Changes in body composition, i.e., in the quantity and distribution of fat in association with growth of the skeleton and musculature.
- Development of the circulatory and respiratory systems leading, particularly in boys, to an increase in strength and endurance.[8]

25. The ability to physically conceive children is made possible by the maturation of the primary sex characteristics, the organs and structures that are involved directly in reproduction.

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[6] American Psychological Association, The Diagnostic and Statistical Manual of Mental Disorders, (DSM-5), 451 (2013).
[7] W. A. Marshall et al., Puberty, in F. Falkner et al. eds., 2 Human Growth: A Comprehensive Treatise, 2nd ed., (New York: Springer, 1986), 171.
[8] *Id.* at 171-72.

In boys, these organs and structures include the scrotum, testes, and penis while in girls they include the ovaries, uterus, and vagina. In addition to these primary sex characteristics, secondary sex characteristics also develop during puberty — the distinctive physical features of the two sexes that are not directly involved in reproduction. Secondary sex characteristics that develop in girls include "the growth of breasts and the widening of the pelvis," while in boys they include "the appearance of facial hair and the broadening of shoulders." Other patterns of body hair and changes in voice and skin occur during puberty in both girls and boys.[9]

26. Physicians characterize the progress of puberty by marking the onset of different developmental milestones. The earliest visible event, the initial growth of pubic hair, is known as "pubarche;" it occurs between roughly ages 8 and 13 in girls, and between ages 9.5 and 13.5 in boys.[10] In girls, the onset of breast development, known as "thelarche," occurs around the same time as pubarche.[11] "Menarche" is another manifestation of sexual maturation in females, referring to the onset of menstruation, which typically occurs at around 13 years of age and is generally a sign of the ability to conceive.[12] Roughly corresponding to menarche in girls is "spermarche" in boys; this refers to the initial presence of viable sperm in semen, which also typically occurs around 13.[13] (The "-arche" in the terms for these milestones comes from the Greek for beginning or origin). Pubarche and thelarche correspond to the transition from Tanner Stage 1 to Tanner Stage 2 of sexual development. Spermarche and menarche generally occur at Tanner Stage 4 to Tanner Stage 5.

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[9] R. V. Kail et al., Human Development: A Life-Span View 276 (7th ed. 2016).
[10] J. Stang et al., Adolescent Growth and Development 1, 2-3 in J. Stang et al. eds., Guidelines for Adolescent Nutrition Services, (2005), available at http://demoiselle2femme.org/wp-content/uploads/Adolescent-Growth-and-Development.pdf (last visited Apr. 29, 2023).
[11] *Id.* at 2.
[12] Marshall et al., Puberty, at 191-92.
[13] *Id.* at 185.

27. Scientists distinguish three main biological processes involved in puberty: adrenal maturation, gonadal maturation, and somatic growth acceleration. "Adrenarche" — the beginning of adrenal maturation — begins between ages 6 and 9 in girls, and ages 7 and 10 in boys. The hormones produced by the adrenal glands during adrenarche are relatively weak forms of androgens (masculinizing hormones) known as dehydroepiandrosterone and dehydroepiandrosterone sulfate. These hormones are responsible for signs of puberty shared by both sexes: oily skin, acne, body odor, and the growth of axillary (underarm) and pubic hair.[14]

28. "Gonadarche" — the beginning of the process of gonadal maturation — normally occurs in girls between ages 8 and 13 and in boys between ages 9 and 14.[15] The process begins in the brain, where specialized neurons in the hypothalamus secrete gonadotropin-releasing hormone (GnRH).[16] This hormone is secreted in a cyclical or "pulsatile" manner — the hypothalamus releases bursts of GnRH, and when the pituitary gland is exposed to these bursts, it responds by secreting two other hormones.[17] These are luteinizing hormone (LH) and follicle-stimulating hormone (FSH), which stimulate the growth of the gonads (ovaries in females and testes in males).[18] (The "follicles" that the latter hormone stimulates are not hair follicles but ovarian follicles, the structures in the ovaries that contain immature egg cells.) In addition to regulating the maturation

[14] S. E. Oberfield et al., Approach to the Girl with Early Onset of Pubic Hair, 96 J. Clin. Endocrinol. & Metabol. 1610 (2011).
[15] S. F. Witchel et al., Puberty: Gonadarche and Adrenarche, in J. F. Strauss III et al. eds., Yen and Jaffe's Reproductive Endocrinology, 6th ed., 395, 395-446.e16 (2009).
[16] A. E. Herbison, Control of Puberty Onset and Fertility by Gonadotropin-Releasing Hormone Neurons, 12 Nature Revs. Endocrinol. 452 (2016).
[17] *Id.* at 453.
[18] *Id.* at 454.

of the gonads and the production of sex hormones, these two hormones also play an important role in regulating aspects of human fertility.[19]

29. As the gonadal cells mature under the influence of LH and FSH, they begin to secrete androgens (masculinizing sex hormones like testosterone) and estrogens (feminizing sex hormones).[20] These hormones contribute to the further development of the primary sex characteristics (the uterus in girls and the penis and scrotum in boys) and to the development of secondary sex characteristics (including breasts and wider hips in girls, and wider shoulders, breaking voices, and increased muscle mass in boys). The ovaries and testes both secrete androgens as well as estrogens, however the testes secrete more androgens and the ovaries more estrogens.[21]

30. The gonads and the adrenal glands are involved in two separate but interrelated pathways (or "axes") of hormone signaling. These are the hypothalamic-pituitary-gonadal (HPG) axis and the hypothalamic-pituitary-adrenal (HPA) axis.[22] Though both play essential roles in puberty, it is, as just noted, the HPG axis that results in the development of the basic reproductive capacity and the external sex characteristics that distinguish the sexes.[23]

31. The third significant process that occurs with puberty, the somatic growth spurt, is mediated by increased production and secretion of human growth hormone, which is influenced by sex hormones secreted by the gonads (both testosterone and estrogen). Similar to the way that

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[19] *Id.* at 452.
[20] M. A. Preece, Prepubertal and Pubertal Endocrinology, in F. Falkner et al. eds., 2 Human Growth: A Comprehensive Treatise, 211, 212 (1986).
[21] R. A. Hess, Estrogen in the adult male reproductive tract: A review, 1 Reproductive Biol. and Endocrinol. 1, (2003); H. G. Burger, Androgen Production in Women, 77 (Suppl.) Fertility and Sterility, S3-5 (2002).
[22] R. D. Romeo, Neuroendocrine and Behavioral Development during Puberty: A Tale of Two Axes, 71 Vitamins and Hormones 1, 1-25 (2005).
[23] M. E. Wierman et al., Neuroendocrine Control of the Onset of Puberty, 2 Human Growth 225 (1986).

the secretion of GnRH by the hypothalamus induces the pituitary gland to secrete FSH and LH, in this case short pulses of a hormone released by the hypothalamus cause the pituitary gland to release human growth hormone.[24] This process is augmented by testosterone and estrogen. Growth hormone acts directly to stimulate growth in certain tissues, and also stimulates the liver to produce a substance called "insulin-like growth factor 1," which has growth-stimulating effects on muscle.[25]

32. The neurological and psychological changes occurring in puberty are less well understood than are the physiological changes. Men and women have distinct neurological features that may account for some of the psychological differences between the sexes, though the extent to which neurological differences account for psychological differences, and the extent to which neurological differences are caused by biological factors like hormones and genes (as opposed to environmental factors like social conditioning), are all matters of debate.

33. Scientists distinguish between two types of effects hormones can have on the brain: organizational effects and activational effects. Organizational effects are the ways in which hormones cause highly stable changes in the basic architecture of different brain regions. Activational effects are the more immediate and temporary effects of hormones on the brain's activity. During puberty, androgens and estrogens primarily have activating effects, but long before then they have organizational effects in the brains of developing infants and fetuses.[26]

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[24] M. A. Preece, Prepubertal and Pubertal Endocrinology, at 218-19.
[25] U. J. Meinhardt et al., Modulation of growth hormone action by sex steroids, 65 Clin. Endocrinol. 413, 414 (2006).
[26] M. M. Herting et al., Puberty and structural brain development in humans, 44 Frontiers in Neuroendocrinol. 122 (2017); J. Hornung et al., Sex hormones and human brain function, 195 Handb. Clin. Neurol. 175 (2020).

34. In sum: Puberty involves a myriad of complex, related, and overlapping physical processes, occurring at various points and lasting for various durations. During this period of life, adrenarche and changes in the secretion of growth hormone contribute to the child's growth and development. With gonadarche, the maturation of sex organs begins and with normal maturation will lead to the emergence of reproductive capacity, as well as the development of the other biological characteristics that distinguish males and females.

PEDIATRIC ENDOCRINE DISORDERS AND TREATMENTS

35. The field of endocrinology is directed toward the care of hormone-related diseases. Pediatric endocrine diseases include disorders of glucose regulation (hypoglycemia and diabetes mellitus), disorders of thyroid function (hyper and hypothyroidism), disorders of growth (e.g., short stature, acromegaly, obesity, and poor weight gain), disorders of sexual development and function (e.g., genital ambiguity, precocious and delayed puberty, hypogonadism, polycystic ovarian syndrome), disorders of adrenal function (e.g., adrenal insufficiency and Cushing's syndrome), disorders of pituitary function, lipid disorders, and disorders of bone and mineral metabolism. For all of these conditions, there are objective physical and biochemical criteria for diagnosis and treatment with well-established normal reference ranges for hormones and metabolites.

I. Using GnRH Analogues — "Puberty Blockers" — to Treat Precocious Puberty and Other Conditions

36. Hormone interventions to suppress puberty were not developed for the purpose of treating children with gender dysphoria. Rather, they were first used as a way to normalize puberty for children who undergo puberty too early, a condition known as "precocious puberty."

37. For females, precocious puberty is defined by the onset of puberty before age 8, while for males it is defined as the onset of puberty before age 9.[27] Premature thelarche (the appearance of breast development) is usually the first clinical sign of precocious puberty in girls. For males, precocious puberty is marked by premature testicular enlargement.[28] In addition to the psychological and social consequences that a child might be expected to suffer, precocious puberty can also lead to reduced adult height, since the early onset of puberty interferes with later bone growth.[29]

38. Precocious puberty is divided into two types, central precocious puberty (sometimes labeled "true precocious puberty") and peripheral precocious puberty (sometimes labeled "precocious pseudopuberty").[30] Central precocious puberty is caused by the early activation of the gonadal hormone pathway by GnRH, and is amenable to treatment by physicians. Peripheral precocious puberty, which is caused by secretion of sex hormones by the gonads or adrenal glands independent of signals from the pituitary gland, is less amenable to treatment. Effects of androgen or estrogen hypersecretion can be reduced by administration of drugs that block the activity of the sex hormone receptors. If a tumor is causing the disorder, surgical removal may be necessary.

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[27] K. O. Klein, Precocious Puberty: Who Has It? Who Should Be Treated?, 84 J. Clin. Endocrinol. & Metabol. 411 (1999). See also F. M. Biro et al., Onset of Breast Development in a Longitudinal Cohort, 132 Pediatrics 1019 (2013); C.-J. Partsch et al., Pathogenesis and epidemiology of precocious puberty. Effects of exogenous oestrogens, 7 Human Reproduction Update 292, 293 (2001).
[28] A. Parent et al., The Timing of Normal Puberty and the Age Limits of Sexual Precocity: Variations around the World, Secular Trends, and Changes after Migration, 24 Endocrine Revs. 675 (2011).
[29] J.-C. Carel et al., Precocious puberty and statural growth, 10 Human Reproduction Update 135 (2004).
[30] C.-J. Partsch et al., Pathogenesis and epidemiology of precocious puberty. Effects of exogenous oestrogens, at 294-95.

39. Precocious puberty is rare, especially in boys. A recent Spanish study of central precocious puberty estimated the overall prevalence to be 19 in 100,000 (37 in 100,000 girls affected, and 0.46 in 100,000 boys).[31] A Danish study of precocious puberty (not limited to central precocious puberty) found the prevalence to be between 20 to 23 per 10,000 in girls and less than 5 in 10,000 in boys.[32]

40. To diagnose central precocious puberty, hormones from the pituitary gland, LH and FSH, are objectively measured. This can sometimes be done by measurement of baseline levels[33] but often requires assessment after transient stimulation with GnRH. As discussed, these are two hormones that are made in the pituitary gland that signal to the gonads. In males, they lead to production of testosterone. In females, they lead to the production of estrogen. LH and FSH signaling are essential for normal sperm production and ovarian maturation in males and females, respectively.

41. Also subject to objective measurement when diagnosing and treating central precocious puberty are sex steroid hormones, either testosterone or estrogen, and bone growth.

42. Treatment for precocious puberty is somewhat counterintuitive. Rather than stopping the production of GnRH, physicians actually provide patients more constant levels of synthetic GnRH (called GnRH analogues or GnRH agonists).[34] As discussed above, when produced

[31] L. Soriano-Guillén et al., Central Precocious Puberty in Children Living in Spain: Incidence, Prevalence, and Influence of Adoption and Immigration, 95 J. Clin. Endocrinol. & Metabol., 4305, 4307 (2011). In some cases, peripheral precocious puberty is caused by an underlying condition, such as a tumor, that can be treated.
[32] G. Teilmann et al., Prevalence and Incidence of Precocious Pubertal Development in Denmark: An Epidemiologic Study Based on National Registries, 116 Pedriatics 1323 (2005).
[33] S. Heo et al., Basal Serum Luteinizing Hormone Value as the Screening Biomarker in Female Central Precocious Puberty, 24 Annals of Pediatr. Endocrinol. & Metabol., 164, 164-71 (2019).
[34] W. F. Crowley, Jr. et al., Therapeutic use of pituitary desensitization with a long-acting LHRH agonist: a potential new treatment for idiopathic precocious puberty, 52 J. Clin. Endocrinol. &

endogenously (that is, by the body naturally), GnRH stimulates the pituitary gland to release gonad-stimulating hormones (gonadotropins, LH and FSH). When added exogenously, the additional GnRH "desensitizes" the pituitary, leading to a decrease in the secretion of gonadotropins, which in turn leads to the decreased maturation of and secretion of sex hormones by the gonads (ovaries and testes). The intent and effect of giving puberty blockers is identical when it is given to a male as when it is given to a female in this context: suppressing the secretion of gonadotropin hormones. Even the dosing is the same for males and females, and depends on the person's weight.

43. The first publication describing the use of GnRH analogues in children for precocious puberty appeared in 1981.[35] In the time since GnRH analogues were first proposed, they have become fairly well accepted as a treatment of precocious puberty, with one prominent GnRH analogue, Lupron, approved for that use by the FDA in 1993.[36] However, there remain some questions concerning the effectiveness of treatment with GnRH analogues. A 2009 consensus statement of pediatric endocrinologists concluded that GnRH analogues are an effective way to improve the height of girls with onset of puberty at less than 6 years of age, and also recommended the treatment be considered for boys with onset of precocious puberty who have compromised height potential.[37] Regarding the negative psychological and social outcomes associated with precocious puberty, the authors found that the available data were unconvincing, and that additional

Metabol., 370, 370-72 (1981) (LHRH refers to "luteinizing hormone releasing hormone," another term for GnRH.).

[35] *Id.*

[36] "Full Prescribing Information" for Lupron Depot-Ped, FDA.gov (undated), https://www.accessdata.fda.gov/drugsatfda_docs/label/2011/020263s036lbl.pdf (last visited April 6, 2023).

[37] J.-C. Carel et al., Consensus Statement on the Use of Gonadotropin-Releasing Hormone Analogs in Children, 123 Pediatrics e752, e753 (2009).

studies are needed.[38] Puberty blockers have recently been recognized to carry a risk of increased brain pressure that can adversely affect vision and cause severe headaches.[39]

44. When used to treat precocious puberty, the process of desensitization of the pituitary gland by synthetic GnRH is not permanent. After a patient stops taking the GnRH analogues, the pituitary will resume its normal response to the pulsatile secretion of GnRH by the hypothalamus, as evidenced by the fact that children treated for precocious puberty using GnRH analogues will resume normal pubertal development, usually about a year after they withdraw from treatment.[40]

45. The goal of treating precocious puberty is to allow the child to have pubertal development enter the normal quiescence that is present at that age. This treatment helps to preserve their final adult height, by slowing the rate of bone age advancement. The goal is *not* to delay puberty beyond other children, as delaying too long can lead to adverse effects, including reduced bone marrow density, as discussed below.

46. In addition to being prescribed for children with precocious puberty, GnRH analogues have also been used in adults for a variety of indications, including hormone-sensitive tumors.[41] GnRH analogues have also been given to post-pubertal adolescents undergoing chemotherapy with drugs that can have toxic effects on the gonads.[42]

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[38] *Id.*
[39] Risk of pseudotumor cerebri added to labeling for gonadotropin-releasing hormone agonists, AAP News, July 1, 2022, https://publications.aap.org/aapnews/news/20636/Risk-of-pseudotumor-cerebri-added-to-labeling-for?autologincheck=redirected (last visited April 7, 2023).
[40] M. M. Fisher et al., Resumption of Puberty in Girls and Boys Following Removal of the Histrelin Implant, 164 J. Pediatrics 912, 912-16 (2014).
[41] See P. Kumar et al., Gonadotropin-releasing hormone analogs: Understanding advantages and limitations, 7 J. Human Reproductive Scis. 170 (2014).
[42] M. Meli et al., Triptorelin for Fertility Preservation in Adolescents Treated With Chemotherapy for Cancer, 40 J. Pediatr. Hematol./Oncol. 269 (2018).

II. Using Sex Steroids Such as Testosterone and Estrogen to Treat Disorders of Normal Gonadal Function

47. Sex steroids such as testosterone and estrogen are frequently used in the treatment of disorders of normal gonadal function. This includes hypogonadotropic hypogonadism, primary gonadal failure, and delayed puberty.[43] In each of these conditions, there are objective laboratory tests that are used to diagnose these conditions and monitor response to treatment. Deficiency of sex steroids has bodily effects that extend beyond sexual function.[44] This includes significant effect on bone density, lean body mass, metabolism, immunity, and neural function.

48. There are major and highly significant differences between male and female responses to sex hormones.[45] Giving estrogen to a biological male is not equivalent to giving the same hormone to a biological female. Likewise, giving testosterone to a biological female is not equivalent to giving the same hormone to a biological male.[46] Differences are not limited to pharmacokinetic effect (i.e., how drugs are absorbed, distributed throughout the body, and metabolized) but are present even at the cellular level.[47] Sex steroids act by altering the expression of the genetic information present in all nucleated cells of the body. Epigenetic differences (i.e., chemical changes to DNA structure) result in sex-differential expression of over 6,500 genes in the

[43] P. Kumar et al., Male hypogonadism: Symptoms and treatment, 1 J. Advanced Pharmaceutical Technology & Research 297 (2010); K. Voutsadaki et al., Hypogonadism in adolescent girls: treatment and long-term effects, 93 Acta Biomedica Atenei Parmensis e2022317 *1 (2022).
[44] M. Alemany, The Roles of Androgens in Humans: Biology, Metabolic Regulation and Health. 23 Int'l. J. Molecular Scis. 11952 (2022); S. Patel et al., Estrogen: The necessary evil for human health, and ways to tame it, 102 Biomed. & Pharmacother. 403 (2018).
[45] See C. Madla et al., Let's talk about sex: Differences in drug therapy in males and females, 175 Advanced Drug Delivery Revs. 113804 (2021).
[46] See O. P. Soldin et al., Sex Differences in Pharmacokinetics and Pharmacodynamics, 48 Clin. Pharmacokinetics 143 (2009); S. Pogun et al., Sex Differences in Drug Effects, in Encyclopedia of Psychopharmacology, 1210, 1210-16 (I. P. Stolerman, ed., 2010).
[47] See, e.g., C. J. Walker et al., Matters of the heart: Cellular sex differences, 160 J. Molecular and Cellular Cardiol. 42 (2021).

body.[48] Consequences of a failure to recognize these differences can result in drug overdose, lack of treatment response, or serious side effects.

49. Several conditions in male minors may indicate a need for endocrinologic treatment with testosterone. For instance, primary hypogonadism from gonadal failure is caused by damage or impaired function of the male testes. Secondary hypogonadism is caused by abnormalities in pituitary structure or function. Hypogonadism can be objectively diagnosed by measurement of testosterone (or its derivatives) and gonadotropin (LH and FSH) levels. When used for the treatment of affected males with hypogonadism, testosterone is administered to achieve levels that are normal for males of the patient's age. For young adult Tanner Stage 5 males, normal testosterone levels range from 300-900 ng/dL.[49] Achievement of appropriate testosterone levels requires careful monitoring, as excess levels can have serious adverse effects, including elevations of red blood cell counts, changes in blood pressure, and brain changes.[50]

50. Testosterone may also be used in males to treat delayed puberty. To treat the condition of constitutional delay (where the person has means to progress through puberty, but onset was delayed), the male would normally be given low doses of testosterone for 3-4 months to "prime the pump" for normal puberty. Assessment of this condition includes measuring levels of LH, FSH, and testosterone, as well as observation of testicular size. Once puberty has been initi-

[48] M. Gershoni et al., The landscape of sex-differential transcriptome and its consequent selection in human adults, 15 BMC Biol. 7 (2017).
[49] T. G. Travison et al., Harmonized Reference Ranges for Circulating Testosterone Levels in Men of Four Cohort Studies in the United States and Europe, 102 J. Clin. Endocrinol. & Metabol., 1161 (2017).
[50] S. J. Ohlander et al., Erythrocytosis Following Testosterone Therapy, 6 Sexual Medicine Revs. 77 (2018); T. Kienitz et al., Testosterone and Blood Pressure Regulation, 31 Kidney and Blood Press. Rsch. 71 (2008); M. Scarth et al., Androgen abuse and the brain, 28 Curr. Op. in Endocrinol., Diabetes & Obes. 604 (2021).

ated and is progressing, there is no need to administer ongoing testosterone therapy. Normal gonadotropin (LH and FSH) signaling from the pituitary gland will allow continued maturation of the testes, leading to reproductive capacity.

51. Continuing to give external testosterone to a male in normal puberty would suppress the normal function of the testes and can lead to infertility — a result contrary to the goal of endocrinology, which is to restore health. Thus, for instance, a male adolescent undergoing normal puberty who simply desired increased lean body mass (i.e., higher muscle mass) should not normally be given testosterone for that purpose, both because it is considered medically unnecessary and because of the adverse effects of extra testosterone. Among other reasons, these effects explain why testosterone is a controlled substance.

52. Outside the context of gender dysphoria, testosterone is not an indicated treatment for a female child or adolescent. Testosterone, or any androgen, would lead to virilization, which can come with serious adverse effects. This includes impaired fertility, alopecia (hair loss), disfiguring acne, and metabolic changes that increase risk of heart disease and diabetes.[51]

53. Estrogen can be given to young females to treat the same conditions testosterone treats in young males: constitutional delay and hypogonadism, either primary or secondary. Primary hypogonadism is caused by a defect in the presence or function of the ovaries. Secondary hypogonadism is caused by a defect in the structure or function of the pituitary gland. A female can experience premature ovarian insufficiency where the ovaries become inactive over time, both genetically and through environmental incidents. To diagnose these conditions, hormone levels can be objectively measured. This includes LH, FSH, estradiol, and other levels. (Estradiol is a

[51] R. Yang et al., Effects of hyperandrogenism on metabolic abnormalities in patients with polycystic ovary syndrome: a meta-analysis, 14 Reproductive Biol. and Endocrinol. 67 (2016).

form of estrogen, and generally the main hormone followed and measured in female endocrinologic practice.) Female estrogen levels will vary throughout the menstrual cycle but are normally 30-400 pg/mL.[52] The physical response to the intervention can also be measured.

54. Estrogen treatments carry risks, including stroke, elevated blood pressure, and changes to bone development. Males are not generally prescribed estrogen (again, outside the context of gender dysphoria), and there is concern that the risks of estrogen are even higher in males.

GENDER DYSPHORIA AND TREATMENTS

I. Diagnosis

55. In contrast to the conditions discussed above, gender dysphoria is not an endocrine disorder. Instead, it is a diagnostic term for "the distress that may accompany the incongruence between one's experienced or expressed gender and one's" biological sex.[53] Gender dysphoria is associated with high rates of comorbidity, including suicidal ideation, depression, anxiety, poverty, homelessness, eating disorders, and HIV infection.[54] Gender dysphoria as a psychiatric disorder should be distinguished from identifying as transgender or transsexual. As noted, people who identify as transgender "transiently or persistently identify with a gender different from their natal gender." In this definition, "natal gender" refers to sex. Transsexual has an even more specific meaning; it "denotes an individual who seeks, or has undergone, a social transition from male to

[52] S. Verdonk et al., Estradiol reference intervals in women during the menstrual cycle, postmenopausal women and men using an LC-MS/MS method, 495 Clinica Chimica Acta 198, 198-204 (2019).
[53] DSM-5, at 451.
[54] M. D. Connolly et al., The Mental Health of Transgender Youth: Advances in Understanding, 59 J. Adolesc. Health 489 (2016); F. Pinna et al., Mental health in transgender individuals: a systematic review, 34 Int'l Rev. of Psychiatry 292 (2022).

female or female to male, which in many, but not all, cases also involves a somatic transition by cross-sex hormone treatment and genital surgery."[55]

56. The clinical assessment methodology in sex discordant gender medicine is currently limited to self-reported information from patients without objective scientific markers or medical tests. There are no reliable radiological, genetic, physical, hormonal, or biomarker tests that can establish gender identity or reliably predict treatment outcomes.

57. The diagnosis of "gender dysphoria" encompasses a diverse array of conditions. While the contributors to sex-discordant gender identity remain to be fully identified and characterized, differences both in kind and degree within individuals and across varied populations create challenges in establishing specific approaches to alleviate associated suffering. For example, data from adults cannot be assumed to apply equally to children. Nor can data from children who present with sex-discordant gender pre-pubertally be presumed to apply to the growing number of post-pubertal adolescent females presenting with this condition.

58. Although gender perceptions, feelings, and "identity" usually align with biological sex, some individuals report experiencing discordance in these distinct traits. Specifically, for example, biological females may report experiencing that they identify as men and biological males may report experiencing that they identify as women. As gender by definition is distinct from biological sex, one's gender identity does not change a person's biological sex. There is currently no known reliable and valid methodology for assessing the accuracy or nature of unverified, verbal reports of discordant "identity," nor whether that discordant identity will persist or resolve over time. There is thus no known "error rate" for relying upon such reports to engage in hormonal and surgical treatments.

[55] DSM-5, at 451.

II. Treatments

59. Moving from diagnosis to treatment, two broad approaches are generally used to treat children with gender dysphoria.[56]

A. Watchful Waiting and Exploratory Therapy

60. The first approach, sometimes called "watchful waiting," motivated by an understanding of the natural history of transgender identification in children, is to neither encourage nor discourage transgender identification, recognizing that existing evidence (discussed next) shows that the vast majority of affected children are likely to eventually realign their reports of gender identification with their sex. This realignment of expressed gender identity to be concordant with sex is sometimes called "desistance."

61. The "watchful waiting" approach does not advocate doing nothing. Rather, it focuses on affirming the inherent dignity of affected people and supporting them in other aspects of their lives, including the diagnosis and treatment of any comorbidities, as individuals proceed through the various stages of physical and psychological development. For instance, the approach may include the use of scientifically validated treatments (e.g., cognitive behavioral therapy) to treat the patient's anxiety, depression, social skills deficits, or other issues.[57] It may also use exploratory therapy to explore potential causes of the dysphoria, which may be linked to trauma, developmental issues, or psychological comorbidities.

62. Despite differences in country, culture, decade, follow-up length, and method, multiple studies have come to a remarkably similar conclusion: Very few gender dysphoric children

[56] See K. J. Zucker, On the "Natural History" of Gender Identity Disorder in Children, 47 J. Am. Acad. Child & Adolesc. Psychiatry 1361 (2008).
[57] See J. S. van Bentum et al., Cognitive therapy and interpersonal psychotherapy reduce suicidal ideation independent from their effect on depression, 38 Depression and Anxiety 940 (2021).

still want to transition by the time they reach adulthood. Many turn out to have been struggling with sexual orientation issues rather than gender discordant "transgender" identity. The exact number of children who experience realignment of gender identity with biological sex by early adult life varies by study. Estimates within the peer-reviewed published literature range from 50-98%, with most reporting desistance in approximately 85% of children before the widespread adoption of the "affirming" model discussed below.[58] In 2018, for instance, studies found that 67% of children meeting the diagnostic criteria for gender dysphoria no longer had the diagnosis as adults, with an even higher rate (93%) of natural resolution of gender-related distress for the less significantly impacted cases.[59] A March 2021 study, with one of the largest samples in the relevant literature, suggests that most young gender dysphoric children grow out of the condition without medical interventions.[60] Thus, desistance (i.e., the child accepting their natal, biological sex identity and declining "transitioning" treatments) is the outcome for the vast majority of affected children who are not actively encouraged to proceed with sex-discordant gender affirmation.

[58] T. D. Steensma et al., Factors Associated With Desistence and Persistence of Childhood Gender Dysphoria: A Quantitative Follow-Up Study, 52 J. Am. Acad. of Child & Adolesc. Psychiatry 582 (2013); K. D. Drummond et al., A Follow-up Study of Girls with Gender Identity Disorder, 44 Dev. Psychol. 34 (2008); M. S. Wallien et al., Psychosexual Outcome of Gender-Dysphoric Children, 47 J. Am. Acad. Child & Adolesc. Psychiatry 1413 (2008); Bradley SJ, Zucker KJ. Gender Identity Disorder and Psychosexual Problems in Children and Adolescents. The Canadian Journal of Psychiatry. 1990;35(6):477-486

[59] See, e.g., K. J. Zucker, The myth of persistence: Response to "A critical commentary on follow-up studies and 'desistance' theories about transgender and gender non-conforming children" by T. Newhook et al. (2018), 19 Int'l. J. Transgenderism 231 (2018).

[60] See D. Singh et al., A Follow-Up Study of Boys With Gender Identity Disorder, 12 Frontiers in Psychiatry 632784 (2021).

63. Decades of peer-reviewed, published scientific research have supported the efficacy of the psychological approaches for the majority of patients experiencing gender dysphoria.[61] Cognitive therapy and interpersonal psychotherapy have been found to reduce suicidal ideation independent of their effect on depression.[62] Within the "watchful waiting" model, these data support the investigative use of modern psychotherapeutic approaches to address suicidal ideation in children with gender dysphoria (as well as to treat other psychological ailments).

B. Gender Affirming

64. The second, so-called "gender affirming," approach is to affirm the child's present gender identity. This affirmation may have social, medical, legal, and behavioral dimensions. Typically, the "affirming" approach encourages children to embrace transgender identity with social transitioning followed by puberty blockade and hormonal therapy (cross-sex hormones), and potential surgical interventions.[63] This approach is considered below.

65. The first stage of this approach is social affirmation. Included interventions include allowance of name change, use of preferred pronouns, wearing of sex-stereotyped clothing, and access to sex-segregated facilities (bathrooms and locker rooms) corresponding to the child's gender identification. While often presented as a neutral intervention, there is concern that social affirmation will alter the rate of spontaneous desistance. As noted by Steensma et al., "one may

[61] See K. J. Zucker (2008), On the "Natural History," 47 J. Am. Acad. Child & Adolesc. Psychiatry, at 1361, 1361-63; S. J. Bradley et al., Gender Identity Disorder: A Review of the Past 10 Years, 36 J. Am. Acad. Child & Adolesc. Psychiatry 872-80 (1997).
[62] J. S. van Bentum et al. (2021), Cognitive therapy and interpersonal psychotherapy, 38 Depression and Anxiety at 940 (2021); M. W. Gallagher et al., Trajectories of change in well-being during cognitive behavioral therapies for anxiety disorders: Quantifying the impact and covariation with improvements in anxiety, 57 Psychotherapy 379 (2020).
[63] See A. Walch et al., Proper Care of Transgender and Gender Diverse Persons in the Setting of Proposed Discrimination: A Policy Perspective, 106 J. Clin. Endocrinol. & Metabol. 305 (2021).

wonder whether a childhood transition has an effect by itself and influences the cognitive gender identity representation of the child and/or their future development"; this "hypothesized link between social transitioning and the cognitive representation of the self [may] influence the future rates of persistence."[64] For this reason, in the original Dutch protocol social transition of prepubertal children was discouraged. The Dutch protocol authors reference the prior work of Wallien and Cohen-Kettenis[65] in asserting that "because most gender dysphoric children will not remain gender dysphoric through adolescence, we recommend that young children not yet make a complete social transition (different clothing, a different given name, referring to a boy as 'her' instead of 'him') before the very early stages of puberty."[66] In the initial 2009 Endocrine Society guidelines, it was stated that "given the high rate of remission of GID [gender identity disorder] after the onset of puberty, we recommend against a complete social role change and hormone treatment in prepubertal children with GID."[67] Current data validate this concern. In the 2022 study by Olson et al., 94% of children who were socially affirmed persisted with sex-discordant

[64] T. D. Steensma et al., Factors Associated with Desistence and Persistence of Childhood Gender Dysphoria: A Quantitative Follow-up Study, Chapter 6 in T. D. Steensma, From Gender Variance to Gender Dysphoria: Psychosexual development of gender atypical children and adolescents, 97, 115 (Ph.D. thesis, Vrije Universiteit Amsterdam, 2013), available at https://research.vu.nl/ws/files/42117780/hoofdstuk%2006.pdf (last visited May 1, 2023).
[65] M. S. C. Wallien et al. (2008), Psychosexual Outcome of Gender-Dysphoric Children, 47 J. Am. Acad. Child & Adolesc. Psychiatry, at 1413 (2008).
[66] A. L. C. de Vries et al., Clinical management of gender dysphoria in children and adolescents: the Dutch approach, 59 J. Homosex. 301 (2012).
[67] W. C. Hembree et al., Endocrine Treatment of Transsexual Persons: An Endocrine Society Clinical Practice Guideline, 94 J. Clin. Endocrinol. & Metabol. 3132, 3132-33 (2009).

gender identity.[68] This is in sharp contrast to the low rates of persistence prior to adoption of social affirmation in pre-pubertal children with sex-discordant gender identity.[69]

66. Before analyzing gender affirmative medical interventions, it is important to understand that underlying biology is not changed by altering bodily features to appear as the opposite sex, and such alterations do not change disease vulnerabilities and drug responses associated with genetically defined sex.[70] Despite the increasing ability of hormones and various surgical procedures to reconfigure some male bodies to visually pass as female, or vice versa, the biology of the person remains as defined by genetic makeup, normatively by his (XY) or her (XX) chromosomes, including cellular, anatomic, and physiologic characteristics and the particular disease vulnerabilities associated with that chromosomally-defined sex.[71] For instance, the XX (genetically female) individual who takes testosterone to stimulate certain male secondary sex characteristics will nevertheless remain unable to produce sperm and father children. It is possible for some adolescents

[68] K. R. Olson et al., Gender Identity 5 Years After Social Transition, 150 Pediatrics e2021056082. (2022).
[69] M. S. C. Wallien et al. (2008), Psychosexual Outcome of Gender-Dysphoric Children, 47 J. Am. Acad. Child & Adolesc. Psychiatry, at 1413-23. The rate of persistence in this study was 27%. *Id.* at 1413, 1416, 1420.
[70] See Klein SL, Flanagan KL. Sex differences in immune responses. Nat Rev Immunol. 2016 Oct;16(10):626-38 and Karlsson Lind L, et al. Sex differences in drugs: the development of a comprehensive knowledge base to improve gender awareness prescribing. Biol Sex Differ. 2017 Oct 24;8(1):32.
[71] See Exploring the biological contributions to human health: does sex matter?, (Institute of Medicine (U.S.), T. M. Wizemann, & M. L. Pardue eds., 2001) (hardcover edition); Exploring the Biological Contributions to Human Health: Does Sex Matter?, (2001), http://www.nap.edu/catalog/10028 (last visited Apr 8, 2023) (electronic editions).

and adults to pass unnoticed as the opposite gender that they aspire to be — but with limitations, costs, and risks.[72] And their underlying biology does not change.

1. Puberty Blockers

67. Only in the 1990s did GnRH analogues begin being used to suppress puberty in children who identify as the opposite sex. In 1998, Peggy Cohen-Kettenis and Stephanie van Goozen, psychologists at a Dutch gender clinic, described the case of a 13-year-old female gender-dysphoria patient, on whom a GnRH analogue was used to suppress puberty before the patient received a definitive diagnosis of gender identity disorder at age 16. At age 18, the patient underwent sex-reassignment surgery.[73]

68. The clinic's scientists developed an influential protocol, often referred to as the "Dutch protocol," which involved puberty suppression followed by cross-sex hormones and potential surgical interventions.[74] In many clinics that adhere to the gender affirmation model, the ages for initiating sex-discordant, gender-affirming, sex-steroid hormones has deviated substantially from the original Dutch protocol. In current protocols puberty blockers (GnRH analogs) are initiated as soon as puberty begins (Tanner Stage 2), which can occur as early as 8 years in females and 9 years in males. While in the Dutch protocol, cross-sex hormones started at 16 years, the Standards of Care for the Health of Transgender and Gender Diverse People, Version

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[72] See S. B. Levine, Informed Consent for Transgendered Patients, 45 J. Sex & Marital Therapy, 218 at *6 (2018) ("Informed Consent"); S. B. Levine, Reflections on the Legal Battles Over Prisoners with Gender Dysphoria, 44 J. Am. Acad. Psychiatry & L. 236, 238 (2016) ("Reflections on Legal Battles").

[73] P. T. Cohen-Kettenis et al., Pubertal delay as an aid in diagnosis and treatment of a transsexual adolescent, 7 Eur. Child & Adolesc. Psychiatry 246 (1998). See also P, T. Cohen-Kettenis et al., Treatment of Adolescents With Gender Dysphoria in the Netherlands, 20 Child and Adolesc. Psychiatric Clinics of N. Am. 689 (2011).

[74] M. Biggs, The Dutch Protocol for Juvenile Transsexuals: Origins and Evidence, J. Sex & Marital Therapy, 1 (Sept.19, 2022).

8 (SOC-8), the latest guidelines published by the World Professional Association for Transgender Health (WPATH), made no recommendations on specific ages for initiation of gender-affirming medical interventions, stating that decisions need to be made on an individual basis with the possibility of there being compelling reasons to start interventions earlier.[75] Gender-affirming surgery in the Dutch model was reserved to patients 18 years or older. Again, WPATH discusses surgery for minors, noting that "[c]hest masculinization surgery can be considered in minors when clinically and developmentally appropriate," and suggesting that "there may be a benefit for some adolescents to having [vaginoplasties] performed before the age of 18."[76] GnRH analogs are discontinued after gonadectomy is performed as this medication is no longer needed to suppress gonads that are no longer present. Due to the suppressive effect of exogenous sex-steroids on gonadal function, GnRH analogs are often stopped after gender-affirming hormone administration has been titrated to maximal doses required to achieve the desired change in secondary sex characteristics.

69. This gender "affirming" model, with its reliance on hormones and surgical interventions, would make gender dysphoria unique among psychiatric conditions: sex reassignment surgery "for Gender Dysphoria is symptom based. It does not correct a biological abnormality.[77] The same is true for hormone-based interventions.

[75] E. Coleman et al., Standards of Care for the Health of Transgender and Gender Diverse People, Version 8, 23 Int'l. J. Transgender Health, 51-5258, 556-66, S1, S65-66 (Sept. 6, 2022) ("SOC-8").
[76] *Id.* at 566.
[77] S. B. Levine (2016), Reflections on Legal Battles, 44 J. Am. Acad. Psychiatry & L., at 240.

70. These scientists, along with others, have claimed that puberty suppression is "fully reversible."[78] On this view, puberty suppression "give[s] adolescents, together with the attending health professional, more time to explore their gender identity, without the distress of the developing secondary sex characteristics. The precision of the diagnosis, it is claimed, may thus be improved."[79]

71. This assertion appears to presume that natural sex characteristics interfere with the "exploration" of gender identity, when one would expect that the development of natural sex characteristics might contribute to the natural consolidation of one's gender identity. It is based upon an untested scientific premise that interfering with the development of natural sex characteristics can allow for a more accurate diagnosis of the gender identity of the child. Given that nearly all gender dysphoric adolescents who begin puberty blockers proceed to cross-sex hormones,[80] it seems more plausible that the interference with normal pubertal development will influence the gender identity of the child by reducing the prospects for developing a gender identity corresponding to his or her biological sex.

72. Given their potential importance in the lives of the affected children, claims about reversibility require careful examination. In developmental biology, it makes little sense to describe anything as "reversible." If a child does not develop certain characteristics at age 12 because

[78] H. A. Delemarre-van de Waal et al., Clinical management of gender identity disorder in adolescents: a protocol on psychological and paediatric endocrinology aspects, 155 Eur. J. of Endocrinol., S131, S133 (Nov. 1, 2006).
[79] P. T. Cohen-Kettenis et al., The Treatment of Adolescent Transsexuals: Changing Insights, 5 J. Sexual Med. 1892, 1894 (2008).
[80] M. A. T. C. van der Loos et al., Continuation of gender-affirming hormones in transgender people starting puberty suppression in adolescence: a cohort study in the Netherlands, 6 Lancet Child & Adolesc. Health 869 (2022).

of a medical intervention, then his or her developing those characteristics at age 18 is not a "reversal," since the sequence of development has already been disrupted. This is especially important since there is a complex relationship between physiological and psychosocial development during adolescence. Gender identity is shaped during puberty and adolescence as young people's bodies become more sexually differentiated and mature. Given how little we understand about gender identity and how it is formed and consolidated, we should be cautious about interfering with the normal process of sexual maturation.

73. A more relevant question is whether the physiological and psychosocial development that occurs during puberty can resume in something resembling a normal way after puberty-suppressing treatments are withdrawn. In children with precocious puberty, this does appear to be the case. Puberty-suppressing hormones are typically withdrawn around the average age for the normal onset of gonadarche, at about age 12, and normal hormone levels and pubertal development gradually resume. For one common method of treating precocious puberty, girls reached menarche approximately a year after their hormone treatments ended, at an average age of approximately 13, essentially the same average age as the general population.[81] The evidence for the safety and efficacy of puberty suppression in boys is less robust, chiefly since precocious puberty is much rarer in boys. Although the risks are speculative and based on limited evidence, boys who undergo puberty suppression may be at greater risk for the development of testicular microcalcifications, which may be associated with an increased risk of testicular cancer, and puberty suppression in boys may also be associated with obesity.[82]

[81] M. M. Fisher et al., Resumption of Puberty in Girls and Boys Following Removal of the Histrelin Implant, 164 J. Pediatrics 912, 912-16 (2014).
[82] S. Bertelloni, Treatment of central precocious puberty by GnRH analogs: long-term outcome in men, 10 Asian J. Androl. 525, 531 (2008).

74. Unlike children affected by precocious puberty, adolescents with gender dysphoria do not have any physiological disorders of puberty that are being corrected by the puberty-suppressing drugs. The fact that children with suppressed precocious puberty between ages 8 and 12 resume puberty at age 13 does not mean that adolescents suffering from gender dysphoria whose puberty is suppressed beginning at age 12 will simply resume normal pubertal development later if they choose to withdraw from the puberty-suppressing treatment and choose not to undergo other sex-reassignment procedures. Interrupting puberty in this manner may have significant effects on final stature and bone density.[83]

75. After an extended period of pubertal suppression one cannot "turn back the clock" and reverse changes in the normal coordinated pattern of adolescent psychological development and puberty.[84] Once puberty is blocked, even if eventually unblocked (and assuming signaling from the pituitary gland resumes), the person cannot "buy back" the time when the physical process of puberty has been disrupted at the time when it would normally occur with complementary psychological processes in that stage in the person's life.

76. A possible effect of blocking normally timed puberty is alteration of normal adolescent brain maturation.[85]

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[83] T. Joseph et al., The effect of GnRH analogue treatment on bone mineral density in young adolescents with gender dysphoria: findings from a large national cohort, 32 J. Pediatric Endocrinol. and Metabol. 1077, 1077-81 (2019); D, Klink et al., Bone Mass in Young Adulthood Following Gonadotropin-Releasing Hormone Analog Treatment and Cross-Sex Hormone Treatment in Adolescents With Gender Dysphoria, 100 J. Clin. Endocrinol. & Metabol., E270-E275 (2015).

[84] See P. W. Hruz et al., Growing Pains, 52 The New Atlantis: A Journal of Technology and Society, 3 (Spring 2017). See also N. Vijayakumar et al., Puberty and the human brain: Insights into adolescent development, 92 Neurosci. & Biobehav. Revs 417 (2018); S. Choudhury, Culturing the adolescent brain: what can neuroscience learn from anthropology?, 5 Social Cognitive and Affective Neurosci. 159 (2010).

[85] See M. Arain et al., Maturation of the adolescent brain, 9 Neuropsychiatric Disease and Treatment, 449 (2013).

77. Another troubling question that has been largely uninvestigated is what psychological consequences there might be for children with gender dysphoria whose puberty has been suppressed and who later come to identify as their biological sex.

78. In addition to the reasons to suspect that puberty suppression may have side effects on physiological, psychological, and brain development, the evidence that something like normal puberty will resume for these patients after puberty-suppressing drugs are removed is very weak. Data obtained from the treatment of precocious puberty cannot be assumed to apply equally to the disruption of puberty that begins after 8 years of age in females and after 9 years of age in males.

79. In addressing the concern of puberty blockers on bone density, it is important to recognize that bone density is normally increasing during the teenage years. Observing an increase in bone density measurement does not indicate lack of adverse effect.[86] The relevant parameter is the bone density in relation to mean bone density in age and size matched controls. This is generally assessed as a "z-score." In the study by Klink,[87] it was observed that with blockade of normally timed puberty, there was a failure to regain pre-treatment z-scores for bone density even after introduction of cross-sex hormones. This supports the concern that interruption of normally timed puberty adversely affects bone density.

2. Cross-Sex Hormones

80. Rather than resuming biologically normal puberty, adolescents treated on the "affirming" model overwhelmingly go from suppressed puberty to medically conditioned cross-sex

[86] L. K. Bachrach, Acquisition of optimal bone mass in childhood and adolescence, 12 Trends in Endocrinol. & Metabol. 22 (2001).
[87] Klink et al., Bone Mass in Young Adulthood Following Gonadotropin-Releasing Hormone Analog Treatment and Cross-Sex Hormone Treatment in Adolescents With Gender Dysphoria, 100 J. Clin. Endocrinol. & Metabol., E270-E275 (2015)

puberty, when they are administered cross-sex hormones.[88] Specifically, exogenous estrogen is administered to biological men to induce gynecomastia (i.e., the enlargement of breast tissues), and testosterone is administered to biological women to induce virilization (i.e., the development of facial hair and other desired male features) and to interfere with normal ovarian function.

81. Along with (and often before) estrogen is administered to biological males in this treatment, spironolactone may be used as an androgen blocker. Spironolactone is primarily used for the treatment of blood pressure and heart failure. It is a mineralocorticoid antagonist, meaning that it blocks the function of proteins in the kidney that regulate salt retention. But it also has effects in blocking the action of androgens. As discussed, androgens are masculinizing hormones that lead to virilization. Testosterone is a prime androgen, but other androgens are also made in the gonads and adrenal gland. Spironolactone is sometimes used in the treatment of polycystic ovarian syndrome, in which females will undergo virilization due to excess androgen production in the ovaries. This syndrome can have adverse effects on fertility, metabolic health, and cardio-vascular health.[89] The diagnosis of polycystic ovarian syndrome is a clinical diagnosis based upon the physical evidence of virilization or androgen effects, insulin resistance, and irregular periods. There are objective biological measures to assess those androgen levels, most notably elevated free testosterone levels. And there are objective measures of dysregulation of relevant signals from the pituitary gland, the LH and the FSH, to complement the clinical diagnosis by looking at the degree of virilization that is present in the patient.

[88] M. A. T. C. van der Loos et al. (2022), Continuation of gender-affirming hormones in transgender people starting puberty suppression in adolescence, 6 Lancet Child & Adolesc. Health, at 869-75.
[89] M. H. Hunter et al., Polycystic Ovary Syndrome: It's Not Just Infertility, 62 Am. Fam. Physician 1079, 1079-88 (2000).

82. Spironolactone would not be prescribed to male patients for an endocrinologic purpose related to androgen production. Once again, this reflects a fundamental biological difference between males and females. Though spironolactone can be used to regulate the levels of potassium and sodium in the body, such treatment would be based on objective markers of those levels.

83. Likewise, the administration of the sex steroid hormones differ by the sex of the individual. It is not identical to give testosterone to a male as it is to give it to a female, nor is it the same treatment to give estrogen to a male versus female. This difference has an established scientific basis. The differences between males and females occurs in every nucleated cell of the body, for males and females have different genetic programming. This is a process known as epigenetics, meaning that there are modifications of the DNA itself that alter the expression of genes when exposed to the same stimulus. As noted above, there are over 6,000 sex-differentially expressed genes. So, if one gives testosterone to a male, the physiologic effects of that treatment, even in the measurement at which genes are turned on and turned off, will be different than if one gives testosterone to a female.[90]

84. In congenital or acquired conditions where there is a defect in the ability to produce endogenous sex-steroid hormones, the goal of administering testosterone or estrogen is to restore the body to its natural state had the defect not been present. For example, females with Turner syndrome have premature ovarian failure and are therefore given estrogen to preserve bone health and allow normal pubertal maturation. Males with Klinefelter syndrome have primary hypogonad-

[90] M. Gershoni et al., The landscape of sex-differential transcriptome and its consequent selection in human adults, 15 BMC Biol. 7 (2017)

ism and are therefore given testosterone to achieve normal lean body mass, bone density, hematocrit, and other androgen mediated bodily changes. Importantly, sex-steroid hormone doses are adjusted to maintain levels within the normal range for the sex of that individual.

85. While the normal range for testosterone levels in a male adolescent who has completed puberty is 300-900 ng/dL, testosterone levels for a female adolescent are 15-70 ng/dL. Testosterone levels can be elevated in females with pathologic conditions such as polycystic ovarian syndrome, but levels generally are less than 150 ng/dL. Levels above 200 ng/dL would generally necessitate evaluation for an adrenal or ovarian tumor.

86. When a patient with gender dysphoria is placed on cross-sex hormones, per the Dutch protocol, puberty-suppressing GnRH analogues continue to be administered until exogenous administration of cross-sex hormones (i.e., sex hormones normally produced by the gonads of the opposite sex) leads to sufficient suppression of endogenous sex hormone production, or the gonads are surgically removed. With pubertal blockade, sex hormones that are normally secreted by the maturing gonads are not produced. This means that adolescents undergoing cross-sex hormone treatment circumvent the most fundamental form of sexual maturation — the maturation of their reproductive organs.

87. For males who are being medically transitioned, exogenously administered estrogen will suppress testosterone production through feedback inhibition of pituitary LH and FSH secretion. Without pubertal blockade, this reduction of endogenous testosterone production is usually not sufficient to fully prevent virilization, and it is therefore necessary to add anti-androgenic medications such as spironolactone. For females being medically transitioned, exogenously administered testosterone will usually result in the cessation of menses and lead to the expected effect of virilization.

88. Patients undergoing gender affirming surgery discontinue GnRH treatment after having their gonads removed, since the secretion of sex hormones that the treatment is ultimately intended to prevent will no longer be possible. These patients are then sterile, as loss or alteration of primary sexual organs leads directly to impairment of reproductive potential.

89. Although the long-term effect of exposing immature gonads to cross-sex hormones is currently unknown, it is generally accepted, even by advocates of transgender hormone therapy, that hormonal treatment impairs fertility, which may be irreversible.[91] Specifically, estrogen administration to males who identify as women results in impaired spermatogenesis and an absence of Leydig cells in the testis.[92] Exogenous testosterone administration to females who identify as men causes ovarian stromal hyperplasia and follicular atresia.[93] Recognition of these consequences is the basis for the development of new areas of medical practice where there is an attempt to restore fertility that has been intentionally destroyed.[94]

90. Gametes (sperm and ova) require natural puberty to mature to the point that they are viable for reproduction.[95] While it is expected that the exposure of immature gonads to cross-sex hormones will lead to infertility, whether affected individuals have permanent sterility has not

[91] See L. Nahata et al., Low Fertility Preservation Utilization Among Transgender Youth, 61 J. Adolesc. Health 40 (2017).
[92] C. Schulze, Response of the human testis to long-term estrogen treatment: Morphology of Sertoli cells, Leydig cells and spermatogonial stem cells, 251 Cell and Tissue Rsch. 31 (1988).
[93] T. D. Pache et al., Ovarian morphology in long-term androgen-treated female to male transsexuals. A human model for the study of polycystic ovarian syndrome?, 19 Histopathol. 445 (1991); K. Ikeda et al., Excessive androgen exposure in female-to-male transsexual persons of reproductive age induces hyperplasia of the ovarian cortex and stroma but not polycystic ovary morphology 28 Human Reproduction 453 (2013).
[94] See, e.g., A. J. Ainsworth et al., Fertility Preservation for Transgender Individuals: A Review, 95 Mayo Clinic Proceedings 784, 784-92 (2020).
[95] H. E. Kuhn et al., The Onset of Sperm Production in Pubertal Boys: Relationship to Gonadotropin Excretion, 143 Am. J. Diseases in Children 190 (1989).

been established. Much of the uncertainty arises from the novelty of this intervention and the lack of long term follow up. There are limited reports of successful pregnancies after cross-sex hormones, but all of the subjects started gender-affirming hormones as adults after completing puberty.[96] I am not aware of any reports that show this for children who were exposed to puberty blockers before completing puberty followed by cross-sex hormones.

91. There are many other known risks to puberty suppression followed by cross-sex hormones beyond fertility concerns. As noted, emerging data show that treated patients have lower bone density, which may lead to increased fracture risk later in life.[97] Other potential adverse effects include disfiguring acne, high blood pressure, weight gain, abnormal glucose tolerance, breast cancer, liver disease, thrombosis, and cardiovascular disease.[98] In addition, non-physiological levels of estrogen in males has been shown to increase the risk of thromboembolic stroke above the incidence observed in females.[99]

92. Advocates of the gender affirmation approach to gender dysphoria often make misleading or erroneous statements about the potential or known adverse effects of interrupting normally timed puberty with GnRH analogues and the administration of "gender-affirming" sex-

[96] I. de Nie et al., Successful restoration of spermatogenesis following gender-affirming hormone therapy in transgender women, 4 Cell Reports Med. 100858 (2023).
[97] See D. Klink et al. (2015), Bone Mass in Young Adulthood, 100 J. Clin. Endocrinol. & Metabol., at E270-E275.
[98] See L. J. Seal, A review of the physical and metabolic effects of cross-sex hormonal therapy in the treatment of gender dysphoria, 53 Annals Clin. Biochem. 10 (2016); K. Banks et al., Blood Pressure Effects of Gender-Affirming Hormone Therapy in Transgender and Gender-Diverse Adults, 77 Hypertension 2066, 2066-74 (2021); D. Getahun et al., Cross-sex Hormones and Acute Cardiovascular Events in Transgender Persons: A Cohort Study, 169 Annals of Internal Med. 205 (2018); S. Maraka et al., Sex Steroids and Cardiovascular Outcomes in Transgender Individuals: A Systematic Review and Meta-Analysis, 102 J. Clin. Endocrinol. & Metabol., 3914, 3914-23 (2017).
[99] See, e.g. D. Getahun et al. (2018), Cross-sex Hormones and Acute Cardiovascular Events in Transgender Persons, 169 Annals of Internal Med., at 205, *6-*8.

steroid hormones. This includes appeal to data on the safety of using these drugs in treating precocious puberty, where the effect of the intervention is to restore the patient to the normal phase of quiescence of the pituitary-gonadal axis. Further assertions that such treatments are the same as those used to treat conditions that are associated with infertility, such as Turner syndrome and Klinefelter syndrome, ignore the striking differences in both physiological attributes and goal of intervention. Some potential adverse effects can only be ascertained with directed testing that goes beyond what is normally performed as screening tests done in medical clinics. Cancer and cardiovascular and metabolic risks often take decades to manifest. The failure to observe patients with myocardial infarction (heart attack), thromboembolic events (stroke), or cancer in adolescent patients exposed to testosterone or estrogen at levels at or exceeding those observed in known disease states (e.g., polycystic ovarian syndrome or hormone-secreting tumors) does not mitigate concerns with these interventions in youth who experience sex-discordant gender identity.

ENDOCRINE SOCIETY AND WPATH GUIDELINES

93. A reasonable understanding of relative risk versus benefit for medical products or procedures is a fundamental obligation in providing appropriate clinical care. This is the bedrock standard of "evidence-based medical practice." When considering clinical practice guidelines, it is essential that physicians recognize the relative risks and benefits of such documents. If done properly, they can distill large data sets into actionable clinical recommendations. However, there is a long history of clinical practice guidelines that have later been found to be deficient, resulting in wasted medical resources, failure to achieve desired benefits, and, at times, substantial harm to patients.[100]

[100] See S. H. Woolf et al., Clinical guidelines: potential benefits, limitations, and harms of clinical guidelines, 318 BMJ 527 (1999).

94. As detailed throughout this report, this foundational standard of "evidence-based medical practice" has never been met as to so-called gender affirming care. The field of "affirming care" is characterized by a poor quality of evidence regarding safety and efficacy, as well as attempts to silence standard scientific discussion and consideration of alternative hypotheses; failures to acknowledge existing data showing persistence of suicidality after intervening; the intentional impairment and destruction of normally formed and functioning male and female sexual organs to address psychological-psychiatric distress; the manipulation of language from standard medical definitions; and widespread failures to properly report research data related to gender transitioning.

95. Despite the dangers of confirmation bias, existing guidelines base recommendations for "affirming" medical interventions on uncorroborated patient self-reports, assessed by mental health professionals with no methodology for discerning accurate patient reports, no alternative treatments offered, and no alternative explanations (e.g., social contagion) explored. There is no biological test to verify the diagnosis.

I. Endocrine Society

96. In 2009, the Endocrine Society published clinical guidelines for the treatment of patients with persistent gender dysphoria.[101] The recommendations include temporary suppression of pubertal development of children with GnRH agonists followed by hormonal treatments to induce the development of secondary sexual traits consistent with one's gender identity. In developing these guidelines, the authors assessed the quality of evidence supporting the recommendations made with use of the GRADE (Grading of Recommendations, Assessment, Development,

[101] See W. C. Hembree et al. (2009), Endocrine Treatment of Transsexual Persons, 94 J. Clin. Endocrinol. & Metabol. at 3132, 3132-54.

and Evaluation) system for rating clinical guidelines. As stated in the Endocrine Society publication, "the strength of recommendations and the quality of evidence was low or very low."[102] According to the GRADE system, low recommendations indicate that "[f]urther research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate."[103] Very low recommendations mean that "any estimate of effect is very uncertain."[104]

97. The Endocrine Society published an updated set of guidelines in September 2017.[105] Those guidelines show that all recommendations as to "affirming" treatment of adolescents are supported by low or very low-quality evidence.[106] Despite this low-quality evidence in this document, strong recommendations are frequently made on the basis of the "values and preferences" of either the Endocrine Society or the patient.[107] For instance, the Endocrine Society's recommendations expressly place "a lower value on avoiding potential harm from early pubertal suppression."[108]

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[102] *Id.* at 3132.
[103] G. H. Guyatt et al., GRADE: an emerging consensus on rating quality of evidence and strength of recommendations, 336 BMJ 924, 926 (2008).
[104] *Id.*
[105] See W. C. Hembree et al., Endocrine Treatment of Gender-Dysphoric/Gender-Incongruent Persons: An Endocrine Society Clinical Practice Guideline, 102 J. Clin. Endocrinol. & Metabol., 3869, 3869-3903 (2017). See also Corrigendum for "Endocrine Treatment of Gender-Dysphoric/Gender-Incongruent Persons: An Endocrine Society Clinical Practice Guideline," 103 J. Clin. Endocrinol. & Metabol. 2758 (July 2018) ("Endocrine Society Clinical Practice Guideline"); Corrigendum for "Endocrine Treatment of Gender-Dysphoric/Gender-Incongruent Persons: An Endocrine Society Clinical Practice Guideline," 103 J. Clin. Endocrinol. & Metabol. 699 (Feb. 2018).
[106] J. Block, Gender dysphoria in young people is rising — and so is professional disagreement, 380 BMJ 382, at *2 (2023). See also W. C. Hembree et al. (2017), Endocrine Society Clinical Practice Guideline, 102 J. Clin. Endocrinol. & Metab. at 3869-3903.
[107] See, e.g., W. C. Hembree et al. (2017), Endocrine Society Clinical Practice Guideline, 102 J. Clin. Endocrinol. & Metab., at 3872-73, 3881, 3894.
[108] *Id.* at 3881.

98. Dr. Guyatt, a co-developer of the GRADE system, "found 'serious problems' with the Endocrine Society guidelines, noting that the systematic reviews didn't look at the effect of the interventions on gender dysphoria itself, arguably 'the most important outcome.'"[109] He also criticized the Endocrine Society guidelines for pairing strong recommendations with weak evidence, explaining that such practice is discouraged "except under very specific circumstances."[110] He states that except under very specific circumstances, such practice is discouraged.[111]

99. The Endocrine Society guidelines state that "[w]eak recommendations require more careful consideration of the person's circumstances, values, and preferences to determine the best course of action."[112] These values and preferences include the desire of the individual seeking gender-affirming medical interventions, who may be operating under an *a priori* presumption (encouraged by the Endocrine Society's "strong recommendations") that these will lead to improved mental health. As detailed throughout this declaration, the existing data do not support this presumption. Instead, the existing data substantiate Dr. Guyatt's concerns as summarized by J. Block:

> For Guyatt, claims of certainty represent both the success and failure of the evidence-based medicine movement. "Everybody now has to claim to be evidence based" in order to be taken seriously, he says—that's the success. But people "don't particularly adhere to the standard of what is evidence based medicine—that's the failure." When there's been a rigorous systematic review of the evidence and the bottom line is that "we don't know,'" he says, then "anybody who then claims they do know is not being evidence based."[113]

[109] J. Block (2023), Gender dysphoria in young people is rising, 380 BMJ 382, at *2-*3.
[110] *Id.* at *3.
[111] *Id.*
[112] W. C. Hembree et al. (2017), Endocrine Society Clinical Practice Guideline, 102 J. Clin. Endocrinol. & Metab., at 3872-73, 3885.
[113] J. Block (2023), Gender dysphoria in young people is rising, 380 BMJ 382, at *4.

100. It is highly misleading to imply that the current Endocrine Society guidelines[114] represent the opinions of the Society's 18,000 members. The committee that drafted these guidelines was composed of *less than a dozen* members. The guidelines were never submitted to the entire Endocrine Society membership for comment and approval prior to publication. They also did not undergo external review. Such methodologies are common in association "statements" and "endorsement;" they are not scientific or generally reliable.

101. The panel that drafted the Endocrine Society guidelines was heavily composed of individuals who have significant associations with WPATH. Specifically, all but one of the committee members were leaders in WPATH. Two of the authors served as WPATH's president (Walter J. Meyer and Vin Tangpricha);[115] at least five have served, or are serving, on WPATH's Board of Directors (Peggy Cohen-Kettenis, Louis Gooren, Stephen Rosenthal, Joshua Safer, Guy T'Sjoen);[116] and at least four (Stephen Rosenthal, Joshua Safer, Vin Tangpricha, and Guy T'Sjoen)

[114] W. C. Hembree et al. (2017), Endocrine Society Clinical Practice Guideline, 102 J. Clin. Endocrinol. & Metab., at 3872.

[115] A. Devor, History, WPATH World Professional Association for Transgender Health, https://www.wpath.org/about/history (last visited Apr 12, 2023) (Walter Meyer III, M.D. (President, 2003-2005)); Profile, Vin Tangpricha MD/PHD, Emory School of Medicine, https://med.emory.edu/departments/medicine/divisions/endocrinology/profile/?u=VTANGPR (last visited Apr 12, 2023).

[116] A. Devor, History, WPATH (Peggy Cohen-Kettenis (Board of Directors, 2003-2005), Louis J. G. Gooren, MD (Board of Directors, 1999-2003)); WPATH, Executive Committee and Board of Director, WPATH World Professional Association for Transgender Health, https://www.wpath.org/about/EC-BOD (last visited Apr 12, 2023) (Stephen Rosenthal, MD (Board of Directors, Member-at-Large, 2020-2024), Joshua Safer, MD (Board of Directors, Member-at-Large, 2022-2026), Guy G. R. T'Sjoen, MD, PhD (EPATH Representative — Term Determined by Board of Directors)).

were authors of WPATH SOC-8[117]. Three (Peggy Cohen-Kettenis, Walter Meyer, and Vin Tangpricha) were authors of WPATH SOC-7.[118]

II. WPATH

102. The World Professional Association for Transgender Health (WPATH) has also issued several iterations of guidelines. The first set of clinical practice guidelines was published in 1979. WPATH published its latest version of their "Standards of Care for the Health of Transgender and Gender Diverse People" (SOC-8) in September 2022.[119] While this document has been presented as "authoritative" and "evidence-based," numerous concerns have been raised about the updated recommendations. Changes in SOC-8 include removal of age limits for initiation of cross-sex hormones and gender-affirming surgery,[120] recommendations with language sufficiently flexible to encourage the exclusion of parents from the decision-making process if they

[117] E. Coleman et al. (2022), SOC-8, 23 Int'l. J. Transgender Health, at 51-5258.
[118] E. Coleman et al., Standards of Care for the Health of Transsexual, Transgender, and Gender-Nonconforming People, Version 7, 13 Int'l. J. Transgenderism 165 (2012) ("SOC-7").
[119] E. Coleman et al. (2022), SOC-8, 23 Int'l. J. Transgender Health, at 51-5258, S1-259.
[120] See, e.g., J. Block (2023), Gender dysphoria in young people is rising, 380 BMJ 382, at *1.

question or challenge medical interventions,[121] elimination of safeguards for addressing underlying mental health illness before the start of gender-affirming medical interventions,[122] and the addition of a section on "eunuch-identified" people.[123] Many of the recommendations made reflect WPATH's acknowledged agenda as an advocacy group. In SOC-8, WPATH specifically states, "Health is promoted through public policies and legal reforms that advance tolerance and equity for gender diversity and that eliminate prejudice, discrimination, and stigma. WPATH is committed to advocacy for these policy and legal changes."[124] Despite the claim that the SOC-8 guidelines are based upon solid scientific evidence, such recommendations represent ideological positions devoid of rigorous scientific evidence.[125] Scientific data on long-term outcomes in adolescents who are exposed to the U.S. affirmation model simply do not exist.

103. In sum, clinical guidelines or standards of care should provide practitioners with evidence-based standards by which they may reliably inform the patient of projected outcomes, and do so with a known error rate. Such data is the starting point for obtaining informed consent. This information is not provided by either WPATH or Endocrine Society's guidelines.

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[121] See, e.g., E. Coleman et al. (2022), SOC-8, 23 Int'l. J. Transgender Health, at 5548 and Recommendation 6.11 ("We recommend when gender-affirming medical or surgical treatments are indicated for adolescents, health care professionals working with transgender and gender diverse adolescents involve parent(s)/guardian(s) in the assessment and treatment process, unless their involvement is determined to be harmful to the adolescent *or not feasible*." (emphasis added)).

[122] P. Toro, 7 takeaways for HR from the new transgender guidelines, HR Executive (2022), https://hrexecutive.com/7-takeaways-for-hr-from-the-new-transgender-guidelines/ (last visited Apr 29, 2023) ("Operationally, this means that TGD individuals do not require a mental health evaluation in order to obtain medical or surgical services. This is quite different from the prior guideline, which required mental health sign-off from one or two mental health providers in order to obtain gender-affirming surgery.").

[123] E. Coleman et al. (2022), SOC-8, 23 Int'l. J. Transgender Health, at 51-5258, S1-259.

[124] *Id.* at 55.

[125] See, e.g., J. Block (2023), Gender dysphoria in young people is rising, 380 BMJ 382, at *1-*3.

INFORMED CONSENT

104. The fundamental purpose of the practice of medicine is to treat disease and alleviate suffering. An essential tenet of medical practice is to avoid doing harm in the process. As discussed above, relying on clear, valid, reliable, and definitive evidence on how to best accomplish treatment goals is the essential ethical, professional, scientific, and clinical goals of physicians. Using "affirming" treatments on minors violates this essential principle by using experimental treatments on vulnerable populations without properly informing them of the actual risks and limitations of the treatments.[126]

105. It is now universally agreed that medical and psychotherapy patients have a right to proper informed consent. Professional ethics codes, licensing rules and regulations, hospital rules and regulations, state and federal laws, and biomedical conventions and declarations all protect patients' right to informed consent discussions of the risks and benefits of proposed treatments and alternative treatments including no treatment.[127]

106. Essential requirements for informed consent include the ability of the patient or study subject to understand the proposed procedure, full disclosure of known and potential risks and benefits, discussion of alternative treatments, and freedom to act voluntarily. This information is presented verbally and in written form with allowance of sufficient time for the patient to ask

[126] See A. R. Jonsen et al., Clinical Ethics: A Practical Approach to Ethical Decisions in Clinical Medicine (4th ed. 1998).

[127] See *id.* ("Informed consent is defined as the willing acceptance of a medical intervention by a patient after adequate disclosure by the physician of the nature of the intervention, its risks, and benefits, as well as of alternatives with their risks and benefits."). See also A. L. Katz et al., Informed Consent in Decision-Making in Pediatric Practice, 138 Pediatrics e20161485 (2016) (reaffirmed in AAP Publications Reaffirmed, 151 Pediatrics e2023061452 (2023)).

questions and for the provider to assess adequate comprehension by the patient. It is well recognized that the signing of a formal consent form does not guarantee that informed consent has been obtained.

107. Several aspects of the care of individuals with gender dysphoria may substantially interfere with proper application of these foundational principles.[128] For adolescent children seeking medical gender affirmation, well-established limitations in decision-making ability raise serious concerns about their ability to consent to hormonal and surgical interventions. Adolescents have a known tendency to engage in risky behaviors, exercise poor impulse control, and show frequent failure to appreciate long-term consequences of current choices.[129]

108. For example, the ability of a child to understand implications for future fertility while still developmentally immature can pose a significant barrier to meeting the criterion of appreciating decision consequence. Children are often unlikely to be capable of giving truly informed consent, particularly when it comes to hormonal or surgical treatments that can result in lifelong sterility.[130] Adolescents' inability to adequately weigh potential short-term benefits against long-term risks seems supported by the observation that few adolescents express concern over loss of fertility even when directly told of the potential sterilizing effect of medical intervention.[131]

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[128] P. S. Appelbaum et al., Assessing Patients' Capacities to Consent to Treatment, 319 N. Engl. J. Med. 1635 (1988) (correction issued in Correction, 320 N. Engl. J. Med. 748 (1989)).
[129] Neuroscientists have found that the adolescent brain is too immature to make reliably rational decisions. S-J. Blakemore et al., Decision-Making in the Adolescent Brain, 15 Nature Neurosci. 1184 (2012); B. J. Casey et al., The Adolescent Brain 1124 Annals N.Y. Acad. Scis. 111 (2008).
[130] See C. F. Geier, Adolescent cognitive control and reward processing: Implications for risk taking and substance use, 64 Hormones and Behavior 333 (2013).
[131] L. Nahata et al. (2017), Low Fertility Preservation Utilization, 61 J. Adolesc. Health, at 40.

109. Similarly, individuals with transgender identity who also have clinical depression or other serious psychiatric comorbidity may have limited capacity to objectively weigh proposed clinical interventions with potentially irreversible consequences and would therefore fail to meet psychological abilities criteria.[132]

110. In addition, a study subject's underlying belief that he or she was born in the wrong body is the primary reason for seeking medical intervention. Thus, any challenge to this underlying premise is seen as a threat to the affected individual. Under such conditions, an individual will find it difficult, if not impossible, to give truly informed consent.

111. A model relying on parental consent with child assenting to affirmative medical interventions does not remove concerns about the difficulty in obtaining truly informed consent. Since many of the long-term outcomes of gender-affirming interventions are unknown, prospective patients are being asked to consent without sufficient knowledge of inherent risk versus benefit. Without understanding that nearly all adolescents who are put on puberty blockers will proceed to cross-sex hormones, with many subsequently opting for gender-affirming surgeries, focus on gaining consent for this first stage of the affirmative model is difficult if not impossible.

112. Parents are often told by gender affirmation activists or providers that the failure to allow a gender dysphoric child to medically transition will result in suicide. These "threats" ignore data that challenge this biased assumption.[133]

113. While any cases of suicide are of utmost concern, suicide rates in children with sex-discordant gender identity must be put in context of overall suicidality in the pediatric population

[132] H. Helmchen, Ethics of Clinical Research with Mentally Ill Persons, 262 Eur. Archs. Psychiatry and Clin. Neurosci. 441 (2012).
[133] See D'Angelo et al., One Size Does Not Fit All: In Support of Psychotherapy for Gender Dysphoria, 50 Archs. Sex. Behav. 7 (2021).

independent of gender dysphoria. When considered in this context, the rates of suicidal ideation and attempt in transgender adolescents are similar to those found in adolescents without gender dysphoria who present for psychological care.[134] Furthermore, it is necessary to critically assess, with rigorous scientific data, whether gender affirming medical interventions succeed in preventing suicides. While long-term data are not available for pediatric patients, the adult literature consistently reports continued elevated suicidality after undergoing gender affirming medical interventions.[135] In considering the population-based study in Sweden by Dhejne and colleagues,[136] it is not possible to draw conclusions on the effect of gender affirming interventions on suicide outcome since it was not a controlled study. Nevertheless, the observation that completed suicide rates following such interventions were 19-fold above the background population clearly demonstrates that gender affirming medical care did not fix the problem of suicide.

114. Researchers have noted that in the "affirming" context, "the informed consent process rarely adequately discloses" either "the uncertain permanence of a child's or an adolescent's gender identity" or "the uncertain long-term physical and psychological health outcomes of gender transition."[137] Levine et al. recently noted the following major deficiencies in the informed consent process under existing "affirming" guidelines and approaches:

- "High rate of desistance/natural resolution of gender dysphoria in children is not disclosed";
- "Implications of very low-quality evidence that underlies the practice of pediatric gender transition are not explained"; and

[134] M. Aitken et al., Self-Harm and Suicidality in Children Referred for Gender Dysphoria, 55 J. Am. Acad. Child & Adolesc. Psychiatry, 513 (2016).
[135] N. Adams et al., Varied Reports of Adult Transgender Suicidality: Synthesizing and Describing the Peer-Reviewed and Gray Literature, 2 Transgender Health 60 (2017).
[136] C. Dhejne et al., Long-Term Follow-Up of Transsexual Persons Undergoing Sex Reassignment Surgery: Cohort Study in Sweden, 6 PLOS ONE e16885 (2011).
[137] S. B. Levine et al., Reconsidering Informed Consent for Trans-Identified Children, Adolescents, and Young Adults, 48 J. Sex & Marital Therapy 706 (2022).

- "The question of suicide is inappropriately handled."[138]

As discussed above, the informed consent process for "affirming" treatments is further "limited by" "erroneous professional assumptions" and "poor quality of the initial evaluations."[139]

115. Given the low quality of scientific evidence available regarding the effects of puberty blockers and cross-sex hormones on children with sex-discordant gender identity as discussed below in this report, the relevant scientific community recognizes that medical gender affirmation of adolescent children remains experimental.[140] Using experimental procedures on uninformed, vulnerable patients is unethical and improper. Some of the most tragic chapters in the history of medicine include violations of informed consent and improper experimentation on patients using methods and procedures that have not been tested and validated by methodologically sound science — such is the case with the gender transition industry. The infamous Tuskegee studies, Nazi and Imperial Japanese wartime experiments, lobotomies (e.g., Dr. Egas Moniz received the 1949 Nobel Prize in Medicine for inventing lobotomies as a "treatment" for schizophrenia[141]), recovered memory therapy, multiple personality disorders, rebirthing therapy,[142] coercive

[138] *Id.* at 711, 712, 713.
[139] *Id.* at 706 (Abstract).
[140] Ludvigsson JF et al. A systematic review of hormone treatment for children with gender dysphoria and recommendations for research. Acta Paediatr. 2023 Apr 17. Epub ahead of print; "Recommendation of the Council for Choices in Health Care in Finland (PALKO/COHERE Finland): Medical Treatment Methods for Dysphoria Related to Gender Variance In Minors," PALVELUVALIKOIMA, p. 8.
[141] See Bengt Jansson, Egas Moniz: Controversial Psychosurgery Resulted in a Nobel Prize, NobelPrize.org (Oct. 29, 1998), https://www.nobelprize.org/prizes/medicine/1949/moniz/article/ (last visited Apr 11, 2023).
[142] See, e.g., M. Janofsky, Girl's Death Brings Ban on a Kind of Therapy, The New York Times, Apr. 18, 2001, https://www.nytimes.com/2001/04/18/us/girl-s-death-brings-ban-on-a-kind-of-therapy.html (last visited Apr 11, 2023); see also P. Lowe, Rebirthing team convicted: Two therapists face mandatory terms of 16 to 48 years in jail, Rocky Mountain News, Apr. 21, 2001.

holding therapy,[143] and other tragic examples should serve as a stark warning to medical providers to properly protect the rights of patients and their families to a proper informed consent process and to not be subjected to experimental, unproven interventions.

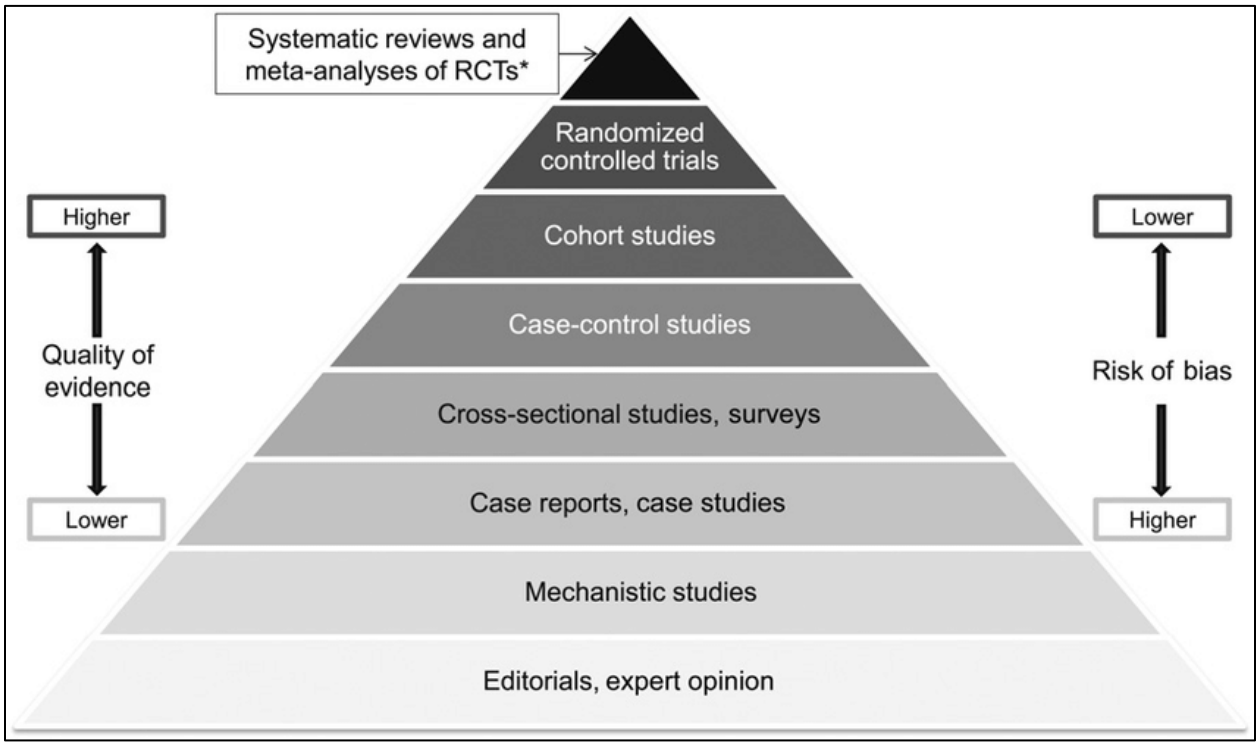
EXISTING LITERATURE AND ITS LIMITATIONS

116. Before turning to the existing literature on gender dysphoria and its treatments, it is important to understand the varying types of studies conducted in this and other medical fields, as well as the general approach to scientific testing. Appropriate testing of medical and other scientific hypothesis requires proper study design. First, the researcher formulates a hypothesis as to whether there is a difference — a cause and effect relationship — from the studied intervention. The study starts by assuming the "null hypothesis" — there is no difference — and then one looks for evidence sufficient to disprove the null hypothesis. When conducting the study, statistical significance is of central importance, for it states the likelihood that the observation would exist if the null hypothesis were true. Only if there is a very small likelihood that the null hypothesis is true is it generally appropriate to treat a study as providing evidence that the null hypothesis is, in fact, false. Accordingly, if a study finding does not reach statistical significance, it would be improper to use the finding as a rejection of the null hypothesis.

117. Case reports or experts' opinions are recognized as the lowest level of evidence. Those are based upon general experiences, not scientific testing. They can be useful for generating novel hypotheses, which can then be tested through experimental testing to establish if there are cause/effect relationships. Next up on the pyramid of quality of evidence would be, for example, cross-sectional studies that are done where one looks at a condition at one point in time. One can

[143] See J. Hyde, Holding therapy appears finished, Deseret News (Feb. 23, 2005), https://www.deseret.com/2005/2/13/19877054/holding-therapy-appears-finished (last visited Apr 11, 2023).

merely infer associations from these types of studies. Randomized longitudinal studies can permit, to some extent, the elimination of unrecognized variables that may distort the results. The highest part of the evidence-based pyramid (for individual studies) is randomized controlled trials, in which the investigator attempts to control all aspects of the study with the exception of the independent variable that is being tested. When done properly, this type of study can provide strong evidence of causation. The following illustrates this pyramid:[144]



118. Since the "affirming" model of treating transgender children — as summarized by the WPATH and Endocrine Society guidelines discussed above — are relatively new, long-term outcomes are unknown. Evidence presented as support for short-term reductions in psychological

[144] Image available at https://www.researchgate.net/figure/Hierarchy-of-evidence-pyramid-The-pyramidal-shape-qualitatively-integrates-the-amount-of_fig1_311504831. For original source, see E. A Yetley et al., Options for basing Dietary Reference Intakes (DRIs) on chronic disease endpoints: report from a joint US-/Canadian-sponsored working group, 105 Am. J. Clin. Nutrition 249S, 259S (2017).

distress following social transition in a "gender-affirming" environment remains inconclusive. Multiple potential confounders are evident. The most notable deficiencies of existing research are the absence of proper control subjects and lack of randomization in study design.[145] No randomized control trials have been performed, and the existing longitudinal studies have serious limitations — most significantly, that they follow cohorts of patients in a non-controlled, unrandomized manner. This design severely limits any conclusions that can be drawn.

119. Moreover, many studies find no improvement — or negative effects — from "affirming" care. For instance, a 2020 British study (Carmichael et al.[146]) found "no evidence of change in psychological function with GnRHa treatment as indicated by parent report (CBCL) or self-report (YSR) of overall problems, internalising or externalising problems or self-harm."[147] Puberty blockers used to treat children aged 12 to 15 who had severe and persistent gender dysphoria had no significant effect on their psychological function, thoughts of self-harm, or body image.[148] However, as expected, the children experienced reduced growth in height and bone strength by the time they finished their treatment at age 16.[149]

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[145] See P. W. Hruz, Deficiencies in Scientific Evidence for Medical Management of Gender Dysphoria, 87 Linacre Quarterly 34 (2020).

[146] P. Carmichael et al., Short-term outcomes of pubertal suppression in a selected cohort of 12 to 15 year old young people with persistent gender dysphoria in the UK, 16 PLOS ONE e0243894, *1, *19 (2021). The acronyms CBCL and YSR refer to Child Behavior CheckList and Youth Self-Report, respectively. *Id.* at Abstract. See also H. Cass, The Cass Review, Independent review of gender identity services for children and young people: Interim report, Feb. 2022, at 31 and n.27, https://cass.independent-review.uk/wp-content/uploads/2022/03/Cass-Review-Interim-Report-Final-Web-Accessible.pdf.

[147] P. Carmichael et al. (2020), Short-term outcomes of pubertal suppression, 16 PLOS ONE e0243894, at *19.

[148] *Id.* at *18, *19.

[149] *Id.*

120. The widely respected Cochrane Review examined hormonal treatment outcomes for male-to-female transitioners over 16 years.[150] They found "insufficient evidence to determine the efficacy or safety of hormonal treatment approaches for transgender women in transition."[151] Thus, decades after the first transitioned male-to-female patient, quality evidence for the benefit of transitioning remains lacking.

121. Although appropriate caution is warranted in extrapolating the outcomes observed from prior studies with current treatments, adults who have undergone social transition with or without surgical modification of external genitalia continue to have rates of depression, anxiety, substance abuse, and suicide far above the background population.[152]

122. Given the low quality of scientific evidence currently available regarding the relative risk versus benefit of gender-affirming medical interventions, existing evidence that suicidality remains markedly elevated after engaging in this therapeutic approach, and a general failure to directly test the benefits of psychological intervention to alleviate suffering in people who experience sex-discordant gender identity, before offering gender affirming care as a standard treatment there is an ethical imperative to conduct clinical trials to assess the validity of alternate hypotheses for effective treatment. Dismissal of randomized controlled trials rests upon an erroneous portrayal of clinical trial design. While it may be true that prospective research subjects would reject enrollment in a trial comparing affirmative care with no care, proper discussion of the inherent risk

[150] See C. Haupt et al., Antiandrogen or estradiol treatment or both during hormone therapy in transitioning transgender women, 2020 Cochrane Database of Systematic Revs., Issue 11, Art. No. CD013138 (2020).
[151] *Id.* at 2.
[152] See N. Adams et al., Varied Reports of Adult Transgender Suicidality: Synthesizing and Describing the Peer-Reviewed and Gray Literature, 2 Transgender Health 60, 60-75 (2017). See also C. Dhejne et al. (2011), Long-Term Follow-Up of Transsexual Persons, 6 PLOS ONE e16885.

of gender affirming interventions, the lack of data showing long term resolution of suicidal ideation, and the goal of alleviating dysphoria through alternate means can provide reasonable expectation of enrolling a sufficient number of study subjects.

123. The 2015 study by Costa et al.[153] provides preliminary evidence that psychotherapy alone is associated with improved mental health. It is important to note that in this study comparing subjects that received psychological support alone versus those who received psychological support together with pubertal blockade, both study groups had significantly improved psychosocial function (CGAS) from baseline. Importantly, there was no statistical difference in CGAS scores between the two study groups throughout the study.[154] A lack of significant difference means that one cannot reject the null hypothesis because any observed differences could be due to random chance. Both groups had final CGAS scores in the 61-70 range, which reflects "some difficulty in a single area but generally functioning well."[155] The magnitude of difference between the CGAS scores at the end of the study was 5 points on a 100-point scale.[156] Of high interest would be an attempt to replicate this study in a randomized manner to better ascertain a causal relationship between psychotherapy and mental health.

I. Change in Patient Population

124. One important (and contentious) issue requiring more study is the recent trend of adolescent female to male gender discordant patients. In the United Kingdom, where centralized

[153] R. Costa et al., Psychological Support, Puberty Suppression, and Psychosocial Functioning in Adolescents with Gender Dysphoria, 12 J. Sexual Med. 2206 (2015) (using the Utrecht Gender Dysphoria Scale (UGDS) and the Children's Global Assessment Scale (CGAS) as main outcome measures).
[154] *Id.* at 2206.
[155] D. Shaffer, A Children's Global Assessment Scale (CGAS), 40 Archs. Gen. Psychiatry 1228 (1983).
[156] R. Costa et al. (2015), Psychological Support, Puberty Suppression, and Psychological Functioning, 12 J. Sexual Med. at 2212 (Table 2).

medical care provides data to track health care phenomenon, the number of adolescent girls seeking sex transitioning exploded over 4,000% in the last decade. Similarly, in the United States, where we lack the same kinds of centralized health care data, it has been reported that, in 2018, 2% of high school students identified on surveys as "transgender" — this is 200 times greater response, a 20,000% increase — over reports during past decades which showed a rate of only .01%.[157]

125. Along with this increase in transgender patients and identifiers has come a radical and recent transformation of the patient population from early onset males to rapid onset adolescent girls. Currently the majority of new patients with sex-gender discordance are not males with a long, stable history of gender dysphoria since early childhood — as they were for decades, and under the Dutch protocols — but instead adolescent females with no documented long-term history of gender dysphoria. One might say, as Dr. Lisa Littman has theorized,[158] that these females experienced "rapid onset" transgender identification.

126. This recent change in the typical patient raises questions about our understanding of the origins of transgender identity. For instance, a genetics or "immutable" theory of transgender identity cannot explain the rapid expansion of new gender dysphoria cases (a 4,000% to 20,000% increase), given that our genome is simply not changing that fast. Nor can that theory explain the explosion of adolescent females presenting with gender dysphoria. A "brain structures" theory has only weak medical evidence, and it also cannot explain the rapid expansion of

[157] See M. M. Johns et al., Transgender Identity and Experiences of Violence Victimization, Substance Use, Suicide Risk, and Sexual Risk Behaviors Among High School Students — 19 States and Large Urban School Districts, 2017, 68 MMWR Morb. Mortal. Wkly. Rep. 67 (2019).
[158] See L. Littman, Parent reports of adolescents and young adults perceived to show signs of a rapid onset of gender dysphoria, 13 PLOS ONE e0202330 (2018); Erratum in L. Littman, Correction: Parent reports of adolescents and young adults perceived to show signs of a rapid onset of gender dysphoria, 14 PLOS ONE e0214157 (2019).

new gender dysphoria cases. As for the theory that increased social acceptance is leading many people who were transgender all along to identify as such to their medical providers, this theory fails to explain why the rate of increase in males and older women transitioning has not kept pace with that for adolescent females. It also does not explain why many adolescent females are found transitioning along with their "social peer group clusters."

II. Methodological Problems with "Affirming" Literature

127. The published literature relied on to advocate for the use of puberty blockers, cross-sex hormones, and gender-affirming surgeries in minors consists almost entirely of studies with major methodological limitations.[159] As detailed next, these include:

- Significant recruitment biases, including internet-based convenience sampling;
- Relatively small sample sizes for addressing a condition that is likely to be multi-factorial;
- Short-term follow-up;
- Lack of randomization to different treatment arms;
- Failure to consider alternate hypotheses;
- Failure to include proper control groups;
- Reliance on cross sectional sampling that may identify associations, but cannot establish causal relationships between intervention and outcome;
- A high rate of patients lost to follow up in longitudinal analyses, which is relevant to questions of regret, desistance, and completed suicide;
- Biased interpretation of study findings with a goal of validating *a priori* conclusions rather than seeking evidence to disprove the null hypothesis; and
- Ignoring starkly contradictory research documenting the lack of effectiveness of "transitioning" procedures, the low quality of research in this area, and the ongoing contentions and disagreements over this highly controversial, experimental medical field.

128. Some or all of these methodological and statistical flaws are present in the following studies, which are commonly relied on by advocates of "affirming" treatments. This list is not

[159] See generally P. W. Hruz (2020), Deficiencies in Scientific Evidence for Medical Management of Gender Dysphoria, 87 Linacre Quarterly, at 34.

exhaustive but is rather presented to demonstrate the serious scientific deficiencies in the published literature related to the care of individuals who experience sex-discordant gender identity.

The Bränström Long-Term Treatment Outcome Study: The historic Bränström study[160] is a long-term treatment outcome research investigation testing the effects of hormonal and surgical "transitioning" treatments on patients. Ultimately, but only after the authors' initial findings had come under public scrutiny,[161] this study found no reliable benefits from these treatments.[162] In addition, the study suggested *increased* suicide attempts and anxiety disorders following the "gender transitioning" treatments.[163]

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[160] R. Bränström et al., Reduction in Mental Health Treatment Utilization Among Transgender Individuals After Gender-Affirming Surgeries: A Total Population Study, 177 Am. J. Psychiatry 727 (2020). See also Correction to Bränström and Pachankis, 177 Am. J. Psychiatry 734 (2020).

[161] N. H. Kalin, Reassessing Mental Health Treatment Utilization Reduction in Transgender Individuals After Gender-Affirming Surgeries: A Comment by the Editor on the Process, 177 Am. J. Psychiatry 764 (2020) (writing on behalf of the Journal to announce a correction and an addendum published as a result of additional research requested and undertaken in response to the criticism of the Bränström study). See, e.g., A. Van Mol et al., Gender-Affirmation Surgery Conclusion Lacks Evidence, 177 Am. J. Psychiatry 765 (2020) (Letter to the Editor); A. Van Mol et al., Correction: Transgender Surgery Provides No Mental Health Benefit, Public Discourse, Sept. 13, 2020, https://www.thepublicdiscourse.com/2020/09/71296/ (last visited Apr 11, 2023). See also S. B. Levine, Reflections on the Clinician's Role with Individuals Who Self-identify as Transgender, 50 Archs. Sex Behav. 3527, 3530 (2021).

[162] See A. van Mol et al. (2020), Gender-Affirmation Surgery Conclusion Lacks Evidence, 177 Am. J. Psychiatry at 765 (Letter to the Editor). See also N. H. Kalin (2020), Reassessing: A Comment by the Editor on the Process, 177 Am. J. Psychiatry at 764; SEGM, Correction of a Key Study: No Evidence of "Gender-Affirming" Surgeries Improving Mental Health, https://segm.org/ajp_correction_2020 (Aug. 30, 2020).

[163] See, e.g., H. Anckarsäter et al., Methodological Shortcomings Undercut Statement in Support of Gender-Affirming Surgery, 177 Am. J. Psychiatry 764 (2020) (Letter to the Editor); A. van Mol et al., Gender-Affirmation Surgery Conclusion Lacks Evidence, 177 Am. J. Psychiatry 765 (2020) (Letter to the Editor); W. J. Malone et al., Calling Into Question Whether Gender-Affirming Surgery Relieves Psychological Distress, 177 Am. J. Psychiatry 766 (2020) (Letter to the Editor); M. Landén, The Effect of Gender-Affirming Treatment on Psychiatric Morbidity Is Still Undecided, 177 Am. J. Psychiatry 767, 767-68 (2020) (Letter to the Editor); A. Wold, Gender-Corrective Surgery Promoting Mental Health in Persons With Gender Dysphoria Not Supported by Data Presented in Article, 177 Am. J. Psychiatry 768 (2020) (Letter to the Editor) (noting that "among the

Of note, significant research errors suggested that the authors had initially attempted to manipulate and misreport the findings of the study.[164] After publication of the original article in October 2019, "letters containing questions on the statistical methodology employed in the study led the [American Journal of Psychiatry] to seek statistical consultations."[165] According to the Journal, "[t]he results of these consultations were presented to the study authors," who on request "reanalyzed the data."[166] That reanalysis led the authors to recant their initial misreporting, as "the results demonstrated no advantage of surgery in relation to subsequent mood or anxiety disorder-related health care visits or prescriptions or hospitalizations following suicide attempts."[167] And the Bränström study at no point showed any advantages from hormonal treatments in improving mental health outcomes.[168]

Thus, the Bränström study is devoid of any solid indication that medical interventions would objectively improve medical or mental health outcomes for transgender persons. Furthermore, because neither the original study nor the subsequent correction provide any statistically

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individuals examined in the study, the risk of being hospitalized for a suicide attempt was 2.4 times higher if they had undergone gender-corrective surgery than if they had not.").

[164] See, e.g., H. Anckarsäter et al. (2020) Methodological Shortcomings, 177 Am. J. Psychiatry at 764-65); D. Curtis, Study of Transgender Patients: Conclusions Are Not Supported by Findings, 177 Am. J. Psychiatry 766 (2020); A. van Mol et al. (2020), Gender-Affirmation Surgery Conclusion Lacks Evidence, 177 Am. J. Psychiatry at 765-66. See also A. Ring et al., Confounding Effects on Mental Health Observations After Sex Reassignment Surgery, 177 Am. J. Psychiatry 768, 768-69 (2020) (Letter to the Editor) (noting that "the same data [used in the Bränström study] may be modeled in a way that leads to the opposite conclusion" of that reached by Bränström study.).

[165] Correction to Bränström and Pachankis, 177 Am. J. Psychiatry 734 (2020).

[166] *Id.*

[167] *Id.*

[168] R. Bränström et al. (2020), Reduction in Mental Health Treatment Utilization, 177 Am. J. Psychiatry at 727. See also D. Curtis, Study of Transgender Patients: Conclusions Are Not Supported by Findings, 177 Am. J. Psychiatry 766 (2020) (Letter to the Editor) (stating that the Bränström study "does not demonstrate that either hormonal treatment or surgery has any effect on this morbidity.").

significant support for hormone treatment, the Bränström study has done nothing to close any of what the Cass Review, a formal independent review of gender identity services in the United Kingdom, has described as existing "gaps in the evidence base for hormone treatment" of minors.[169] Meanwhile, as discussed later in this report, several factors, including increased caution among some care providers, are resulting in a profound collapse of support for these experimental procedures across Europe, most notably in clinics providing treatment for minors.[170]

A 2011 Dutch study by De Vries et al.[171] is often cited to support longitudinal evidence of benefit from pubertal blockade. Although the study found slight improvements in mood and the risk of behavioral disorders with pubertal blockade over baseline, the study included no control group, and all 70 participants received ongoing psychological support. Thus, the authors were unable to determine the basis of the limited observed improvement. The authors acknowledge that psychological support or other reasons may have contributed to (or wholly caused) this observation. By the very nature of the trial, at best the study can provide a rationale for doing further studies that could show whether "affirming" interventions provide a benefit. The study does not (and cannot) answer the central question: whether the administration of puberty blockers is the solution to the problem and whether alternative approaches that do not carry the same risks relative to purported benefits (e.g., psychological interventions) may have the same or superior benefits.

Moreover, there remain questions about the extent to which the protocol used in these early Dutch studies may be relevant to the patient population presenting today. For decades transgender patients were mostly older adults or very young boys. As noted, over the last few years, a tsunami

[169] H. Cass (2022), The Cass Review — Interim Report, at 23.
[170] See, e.g., infra International Responses, ¶¶ 134 et seq.
[171] A. L. C. de Vries et al., Puberty Suppression in Adolescents With Gender Identity Disorder: A Prospective Follow-Up Study, 8 J. Sexual Med. 2276 (2011).

of teenaged girls has flipped the demographic ratio of transgender patients — now up to 7:1 for teen girls relative to teen boys. The newly presenting cases are vastly overrepresented by adolescent females, the majority of whom also have significant mental health problems and neurocognitive comorbidities such as autism-spectrum disorder or ADHD.[172] Furthermore, estimates of gender-dysphoria transgenderism are rocketing upwards from 1 in 10,000 to, in youth, "as high as 9%."[173] This unexplained, radical transformation of patient demographics raises questions about the applicability even of the limited existing literature on this issue, particularly as to the Dutch protocol. Dr. Thomas Steensma, a prominent investigator of the Dutch protocol — the original model for transitioning treatments — has recently noted that "[w]e don't know whether studies we have done in the past can still be applied to this time,"[174] specifically because of the unexplained surge in female adolescents reporting gender dysphoria. "Many more children are registering, but also of a different type . . . Suddenly there are many more girls applying who feel like a boy."[175] He concluded with the warning that "[w]e conduct structural research in the Netherlands. But the rest of the world is blindly adopting our research."[176]

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[172] See N. M. de Graaf et al., Reflections on emerging trends in clinical work with gender diverse children and adolescents, 24 Clin. Child Psychol. and Psychiatry 353 (2019).
[173] See K. M. Kidd et al., Prevalence of Gender-Diverse Youth in an Urban School District, 147 Pediatrics e2020049823 (2021).
[174] See B. Tetelepta, More research is urgently needed into transgender care for young people: "Where does the large increase of children come from?," Voorzij, Feb. 26, 2021, available at https://www.voorzij.nl/more-research-is-urgently-needed-into-transgender-care-for-young-people-where-does-the-large-increase-of-children-come-from/ (last visited Apr 11, 2023) (translation from B. Tetelepta, Dringend meer onderzoek nodig naar transgenderzorg aan jongeren: 'Waar komt de grote stroom kinderen vandaan?,' Algemeen Dagblad, Feb. 27, 2021, available at https://www.ad.nl/nijmegen/dringend-meer-onderzoek-nodig-naar-transgenderzorg-aan-jongeren-waar-komt-de-grote-stroom-kinderen-vandaan~aec79d00/ (last visited Apr 11, 2023)).
[175] *Id.*
[176] *Id.*

A 2014 follow-up study by De Vries et al.[177] encompassed 55 of the original 70 patients; 15 were lost to follow-up or not included. It has the same limitations that were present in assessing the original 2011 study, including a carefully selected patient population that is not representative of the broader population, especially now. Having a longer study does not obviate the limitations of the study design in making a conclusion that can be applied to the gender clinics that are operating in the United States.

In addition to the concerns of the Dutch studies already exposed, "[t]he linchpin result of the Dutch studies is the reported *resolution of gender dysphoria*, as measured by the Utrecht Gender Dysphoria Scale (UGDS)."[178] The UGDS is a tool developed in the mid-1990s to assess the degree of gender dysphoria experienced by research subjects with separate surveys for male and female subjects.[179] Yet, as several researchers (E. Abbruzzese et al.) recently explained, the observed "drop was an artifact of switching the scale from 'female' to 'male' versions (and vice versa) before and after treatment, prompting a problematic reversal in the scoring."[180] "The *same* gender dysphoric individual, effectively answering the *same* question (albeit linguistically inverted)" — e.g., "Every time someone treats me like a girl [or boy] I feel hurt" — "results in either the maximum or the minimum 'gender dysphoria' score — depending on which sexed version of the scale was used."[181] Thus, because researchers used different scales of the UGDS before and

[177] A. L. C. de Vries et al., Young Adult Psychological Outcome After Puberty Suppression and Gender Reassignment, 134 Pediatrics 696 (2014).
[178] E. Abbruzzese et al., The Myth of "Reliable Research" in Pediatric Gender Medicine: A critical evaluation of the Dutch Studies—and research that has followed, J. Sex & Marital Therapy, Jan. 2, 2023, at 1, 7-8.
[179] Cohen-Kettenis PT, van Goozen SH. Sex reassignment of adolescent transsexuals: a follow-up study. J Am Acad Child Adolesc Psychiatry. 36(2):263-71 (1997); .
[180] *Id.* at 1, 8.
[181] *Id.* at 8.

after treatment, "it is impossible to determine if [the result shows] a real difference in gender dysphoria between groups or if this is an artifact of measurement error."[182] Indeed, if anything, "[t]he fact that after gender reassignment, the UGDS scores were low on the opposite-sex scale indicates that the subjects would have scored high on the natal sex scale, which corresponds to a *persistence in transgender identity*."[183] This, of course, is the opposite result purportedly reached by the 2014 De Vries study.

The 2018 paper by Wiepjes et al.[184] is a retrospective review of records from all patients of the Center of Expertise on Gender Dysphoria gender clinic in Amsterdam from 1972-2015. While the study appears to report on the regret rates among a large cohort of adolescents (812) and children (548),[185] regret is only reported for children and adolescents who had undergone gonadectomy once over 18 years of age.[186] Of the adolescents, 41% started puberty suppression. Of those who started GnRH agonists, only 2% stopped this intervention (meaning that 98% of those who started puberty suppression progressed to cross-sex hormone therapy).[187] An additional 32%, having already completed puberty, started cross-sex hormone therapy without use of a GnRH agonist.[188] Classification of regret was very stringent, requiring physician documentation of patient verbalized regret after gonadectomy and start of sex-concordant hormones to treat the

[182] *Id.* at 9 (internal quotation and citation omitted).
[183] *Id.* at 10 (emphasis in original).
[184] C. M. Wiepjes et al., The Amsterdam Cohort of Gender Dysphoria Study (1972-2015): Trends in Prevalence, Treatment, and Regrets, 15 J. Sexual Med. 582 (2018).
[185] *Id.* at 584 (Table 1).
[186] *Id.* at 585, 587. See also *id.* at 582 (Abstract).
[187] *Id.* at 585 ("Of adolescents, 41.0% started PS, whereas only 1.9% of these adolescents stopped PS and did not start HT (Table 1).").
[188] *Id.*

iatrogenic hypogonadism.[189] This means there are significant limitations to the conclusions that can be drawn from this paper. There is no discussion in the paper regarding adolescent regret of use of puberty blockers, cross-sex hormones, or mastectomies. Importantly, 36% of patients were lost to follow up.[190] This is notable given that gonadectomy iatrogenically induces the pathologic state of primary hypogonadism. Affected patients have a lifelong dependency for exogenously administered sex-steroid hormones, and thus an acute need for ongoing follow-up. Their failure to return to the physicians who provided gender-affirming interventions raises serious questions about their outcome. It is reasonable to hypothesize that some may have experienced regret or completed suicide. Yet due to missing data, their fate remains unknown. It is also significant that the average time to regret was 130 months.[191] The authors themselves acknowledge that it may be too early to predict regret in patients who started hormone therapy in the past 10 years.[192]

The 2022 Tang et al. paper[193] is a retrospective chart review that aims to assess surgical outcomes in adolescents aged 12-17 years who underwent bilateral mastectomy for gender dysphoria from 2013-2020 within the Kaiser Permanente Health Care System in Northern California. The authors identified 209 subjects who had undergone this procedure. Of this group, only 137 had follow-up data more than 1 year after surgery. Complications were found in 7.3% with two of the subjects expressing regret within this interval. Despite claims to the contrary, this study documents that surgeries are being performed on adolescents with gender dysphoria as early

[189] *Id.* at 583-84, 587 (with columns in Table 4 indicating the type of detransitions for each patient listed and the specific reversal treatments undertaken for each patient listed).
[190] *Id.* at 589.
[191] *Id.* at 589.
[192] *Id.* at 589.
[193] Tang A, Hojilla JC, Jackson JE, Rothenberg KA, Gologorsky RC, Stram DA, Mooney CM, Hernandez SL, Yokoo KM. Gender-Affirming Mastectomy Trends and Surgical Outcomes in Adolescents. Ann Plast Surg. 2022 May;88(4 Suppl):S325-S331.

as 12 years of age. There are several serious limitations of this study. This includes a retrospective study design, which as noted above cannot establish a causal relationship between intervention and outcome. There is also lack of outcome data on 82 of the 209 subjects (39%) with potential for bias in the outcome of missing subjects. Furthermore, the follow-up was very short (mean of 2.1 years). As noted above for the Wiepjes study,[194] this timeframe is insufficient to ascertain regret.

The 2018 Olson-Kennedy et al. paper[195] presents the results of a survey of biologically female patients with male gender identity at the lead author's institution using a novel rating system for "chest dysphoria" created by the study authors.[196] There were an equal number (68) of nonsurgical and post-surgical subjects surveyed.[197] Those who had undergone bilateral mastectomies were reported to have less chest dysphoria than those who did not receive this intervention.[198] Limitations of this study include convenience sampling of nonsurgical study subjects with high potential for selection bias. As in the above studies, cross-sectional design precludes establishment of a causal relationship between intervention and outcome measures. The primary outcome measure was not assessed by a validated assessment tool. Test validation is particularly relevant in assessing adolescent questionnaires due to a variety of cognitive and situational factors in this population.[199] Rigorous validation methods have been previously used in several other established

[194] Wiepjes et al., at 589.
[195] J. Olson-Kennedy et al., Chest Reconstruction and Chest Dysphoria in Transmasculine Minors and Young Adults: Comparisons of Nonsurgical and Postsurgical Cohorts, 172 JAMA Pediatrics 431 (2018).
[196] *Id.* at 432.
[197] *Id.* at 431.
[198] *Id.* at 431 (Abstract).
[199] See N. D. Brener et al., Assessment of factors affecting the validity of self-reported health-risk behavior among adolescents: evidence from the scientific literature, 33 J. Adolesc. Health 436 (2003).

questionnaires addressing adolescent self-perception.[200] Furthermore, as noted in the above studies, the short follow-up time (about 2 years) is insufficient to assess an outcome (regret) that has been shown to occur a decade after the intervention.[201]

A 2019 study by Allen et al.[202] considered suicidality after cross-sex hormones. It was limited by a very small patient population (47), had no control group, had a short follow-up period (mean < 1 year), and again ignored that patients receiving the interventions also received psychological support.

A 2019-2020 study by Turban et al. in JAMA Psychiatry[203] aimed to consider "recalled exposure to gender identity conversion efforts [GICE] (ie, psychological interventions that attempt to change one's gender identity from transgender to cisgender) associated with adverse mental

[200] See N. Palenzuela-Luis et al., Questionnaires Assessing Adolescents' Self-Concept, Self-Perception, Physical Activity and Lifestyle: A Systematic Review, 9 Children 91 (2022).
[201] Wiepjes et al., at 589
[202] L. R. Allen et al., Well-being and suicidality among transgender youth after gender-affirming hormones, 7 Clin. Practice in Pediatric Psychol. 302 (2019).
[203] J. L. Turban et al., Association Between Recalled Exposure to Gender Identity Conversion Efforts and Psychological Distress and Suicide Attempts Among Transgender Adults, 77 JAMA Psychiatry 68 (2020) (originally posted online on September 11, 2019).

health outcomes in adulthood."[204] However, this paper has been repeatedly and pointedly criticized for a number of improper extrapolations and serious methodological defects,[205] several of which stem from its reliance on flawed data from the 2015 U.S. Transgender Survey (USTS).[206]

The USTS was an anonymous online survey conducted in the summer of 2015[207] and "is the largest survey examining the experiences of transgender people in the United States, with 27,715 respondents."[208] Anonymous surveys are not rigorous sources of evidence, and the data from this survey are compromised by numerous biases and irregularities. The 2015 USTS Report and Executive Summary were published by the National Coalition for Transgender Equality

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[204] *Id.* at 68.

[205] See, e.g., D'Angelo et al. (2021), One Size Does Not Fit All, 50 Archs. Sex. Behav., at 7; R. Byng et al., Misinterpretation of the findings of this study may limit safe, ethical treatment options for gender-questioning and gender-diverse people, Comment on J. L. Turban et al., Association Between Recalled Exposure to Gender Identity Conversion Efforts and Psychological Distress and Suicide Attempts Among Transgender Adults, 77 JAMA Psychiatry 68 (2020), Comment posted on Oct. 8, 2019, available at https://jamanetwork.com/journals/jamapsychiatry/fullarticle/2749479; H. Horvath, A deeply flawed analysis, Comment on J. L. Turban et al., Association Between Recalled Exposure to Gender Identity Conversion Efforts and Psychological Distress and Suicide Attempts Among Transgender Adults, 77 JAMA Psychiatry 68 (2020), Comment posted on Oct. 6, 2019, available at https://jamanetwork.com/journals/jamapsychiatry/fullarticle/2749479; J. Mason, Not all therapy is conversion therapy, Comment on J. L. Turban et al., Association Between Recalled Exposure to Gender Identity Conversion Efforts and Psychological Distress and Suicide Attempts Among Transgender Adults, 77 JAMA Psychiatry 68 (2020), Comment posted on Sept. 27, 2019, available at https://jamanetwork.com/journals/jamapsychiatry/fullarticle/2749479. These three Comments on Turban's article at JAMA Psychiatry, the comments by Byng et al., H. Horvath, and J. Mason, shall collectively be referred to as "Three Comments on J. L. Turban, Associations (2019-2020), at 77 JAMA Psychiatry 68."

[206] 2015 U.S. Transgender Survey Report, 2022 U.S. Trans Survey, https://www.ustranssurvey.org/reports (last visited Apr 25, 2023).

[207] S. E. James et al., The Report of the 2015 U.S. Transgender Survey, 4, Washington, DC: National Center for Transgender Equality (2016), available at https://transequality.org/sites/default/files/docs/usts/USTS-Full-Report-Dec17.pdf (last visited Apr. 25, 2023) ("USTS 2015 Report").

[208] *Id.*

(NCTE).[209] Several authors of the USTS Report have been actively involved in policy work and legal advocacy at both the state and federal level, and in legislatures and courts.[210] More broadly, the USTS is currently supported by a coalition including several trans advocacy groups that, like the NCTE, are active in the realm of public policy.[211] In 2022, the USTS conducted another survey in partnership with several other trans advocacy organizations, and results are expected to be released later in 2023.[212] The current homepage for the USTS describes the 2022 survey as "the largest survey of trans people, by trans people, in the United States."[213]

The Turban et al. 2019-2020 JAMA Psychiatry study relying on the USTS survey tool has been criticized on account of several limitations and weaknesses of that survey tool — and resulting data — such as convenience sampling[214] and recruitment of patients through transgender advocacy organizations.[215] Furthermore, the USTS "sampling method's inadequacy"[216] renders it highly unlikely that the survey tool (and thus the Turban 2019-2020 study data) captures or adequately accounts for populations integral to this study and its conclusions, such as "the population

[209] S. E. James et al., USTS 2015 Report; S. E. James et al., Executive Summary of the Report of the 2015 U.S. Transgender Survey, 16, Washington, DC: National Center for Transgender Equality (2016), available at https://transequality.org/sites/default/files/docs/usts/USTS-Executive-Summary-Dec17.pdf (last visited Apr. 25, 2023).
[210] S.E. James et al. (2015), USTS 2015 Report, at 241-42.
[211] See 2022 U.S. Trans Survey, USTS Homepage (featuring logos from and hyperlinks to BTAC, the Black Trans Advocacy Coalition; the TransLatin@ Coalition; and NQAPIA, the National Queer Asian Pacific Islander Alliance).
[212] 2022 U.S. Trans Survey, 2022 U.S. Trans Survey, https://www.ustranssurvey.org (last visited Apr 25, 2023) (USTS Homepage); FAQ's, 2022 U.S. Trans Survey, https://www.ustranssurvey.org/faq (last visited Apr 28, 2023) (Who Conducts the USTS?).
[213] *Id.*
[214] See, e.g., Three Comments on J. L. Turban, Associations (2019-2020), at 77 JAMA Psychiatry 68.
[215] Three Comments on J. L. Turban, Associations (2019-2020), at 77 JAMA Psychiatry 68.
[216] H. Horvath, A deeply flawed analysis, Comment on J. L. Turban et al. (2019-2020), 77 JAMA Psychiatry 68.

whose earlier gender dysphoria was alleviated through cognitive behavioral therapy or other standard approaches,"[217] or "individuals exposed to GICE who subsequently adopted a gender identity concordant with their biological sex."[218] Another crucial defect is the failure of Turban et al. to "control for comorbid psychiatric illness, the greatest single predictor of suicidality."[219]

In their comment, Byng et al. concluded:

> [T]he authors underplay the serious methodological weaknesses, particularly the likely confounding effects of co-existing mental health problems. They then take this association and in the abstract and conclusion seek to imply causation. Hence, the findings could mislead frontline clinicians and public policymakers alike. [220]

D'Angelo et al.,[221] in their response to the Turban et al. 2019-2020 JAMA Psychiatry study, highlighted further limitations of the USTS survey tool.[222] These include demand bias (i.e., the good subject effect[223]), a high number of respondents who reported having not transitioned medically or socially (and reported no desire to do so in the future), and several data irregularities.[224]

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[217] *Id.*
[218] R. Byng et al., Misinterpretation of the findings, Comment on J.T. Turban et al. (2019-2020), 77 JAMA Psychiatry at 68.
[219] R. Byng et al., Misinterpretation of the findings, Comment on J.T. Turban et al. (2019-2020), 77 JAMA Psychiatry at 68. See also J. Mason, Not all therapy is conversion therapy, Comment on J. L. Turban et al. (2019-2020), 77 JAMA Psychiatry 68 ("Turban et al allowed a number of study limitations — including convenience sampling and failure to control for mental illness, a key predictor of suicidality — which should make any savvy reader wary of accepting the study conclusions about the harms of therapy aimed at alleviating GD.").
[220] R. Byng et al., Misinterpretation of the findings, Comment on J.T. Turban et al. (2019-2020), 77 JAMA Psychiatry at 68. See also H. Horvath, A deeply flawed analysis, Comment on J.T. Turban et al. (2019-2020), 77 JAMA Psychiatry at 68 ("It is surprising that so eminent a scholar as Dr. Turban did not perceive the methodological errors to which he was evidently susceptible in preparing his recent analysis of suicidality in transgender persons.").
[221] *Id.*
[222] *Id.* at 7. See J. L. Turban et al., Association Between Recalled Exposure to Gender Identity Conversion Efforts and Psychological Distress and Suicide Attempts Among Transgender Adults, 77 JAMA Psychiatry 68 (2020).
[223] A. L. Nichols et al., The Good-Subject Effect: Investigating Participant Demand Characteristics, 135 J. Gen. Psychol. 151 (2008).
[224] D'Angelo et al. (2021), One Size Does Not Fit All, 50 Archs. Sex. Behav., at 8.

One notable data irregularity was that a high number of USTS respondents reported that their age was exactly 18 years.[225] Another was that "information about treatments received does not appear to be accurate, as a number of [USTS] respondents reported the initiation of puberty blockers after the age of 18 years, which is highly improbable."[226] These irregularities raise serious questions about the reliability of the USTS data and therefore the reliability of conclusions based on that data.[227] Because the 2019-2020 Turban study in JAMA Psychiatry is founded on a data set from an anonymous survey replete with flaws such as bias and convenience sampling, and because the study fails to control for multiple population gaps in the survey data and multiple key variables (such as co-morbid psychological illness), its conclusions are unreliable and potentially misleading.

Additional flaws and limitations of the USTS 2015 Survey data are set forth below in this report's summaries of the Turban et al. 2020 Pediatrics study, the Almazan et al. 2021 study, and the 2022 Turban et al. study, all papers which relied substantially on the USTS data.[228]

Another 2020 study by Turban et al. in Pediatrics[229] is often cited as proof that pubertal blockade prevents suicide in transgender youth. But this study also used the same unreliable,

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[225] *Id.*
[226] *Id.* at 8 (internal citation omitted).
[227] See generally *id.* at 7-16.
[228] See infra discussion of the 2022 Turban et al. study. Also, further caution is warranted in evaluating the literature as the flawed data from the 2015 USTS may appear in other studies, including studies that have yet to be published. Upon request, the USTS makes the raw data from the 2015 survey available to researchers through the Inter-University Consortium for Political and Social Research (ICPSR). See Data Requests, 2022 U.S. Trans Survey, https://www.ustranssurvey.org/data-requests (last visited Apr 25, 2023). See also ICPSR, 2015 U.S. Transgender Survey (USTS) (ICPSR 37229), Version Date: May 22, 2019, https://www.icpsr.umich.edu/web/RCMD/studies/37229 (last visited Apr. 29, 2023).
[229] J. L. Turban et al., Pubertal Suppression for Transgender Youth and Risk of Suicidal Ideation, 145 Pediatrics e20191725 (2020). See also Erratum for TURBAN 2019-1725, 147 Pediatrics e2020049767 (2021).

biased sampling methodology, the 2015 USTS.[230] As stated in the paper, the authors considered "a cross-sectional online survey of 20,619 transgender adults aged 18 to 36 years" from the 2015 U.S. Transgender Survey.[231] In addition to the defects in the 2015 USTS anonymous online survey discussed above, there is no evidence of study subject identities, no way to assess for potential false subjects, and no medical diagnosis for entry into the survey. Also, the patient sample was compromised by ascertainment bias.[232] It is impossible for deceased persons, including those who have succumbed to suicide, to respond to an online survey necessary for their inclusion into the data set. No causation can be determined from this retrospective, cross-sectional design. Furthermore, the study apparently failed to even assess individuals who may have desisted or regretted transitions.[233] Thus, the study "does not include outcomes for people who may have initiated pubertal suppression and subsequently no longer identify as transgender."[234]

Turban's misleading claim of lower suicidal ideation for treated patients is based upon "lifetime suicidality."[235] It fails to recognize or acknowledge that the decision to provide puberty blockers was likely influenced by the mental health of the subjects at the time of presentation.[236]

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[230] *Id.* at *2-*3 and n.6.
[231] *Id.* at *1, *2-*3.
[232] P. W. Hruz, Suicidality in Gender Dysphoric Youth Offered Pubertal Blockade Remains Alarmingly High, Comment on Comment on J. L. Turban, Pubertal Suppression for Transgender Youth and Risk of Suicidal Ideation, 145 Pediatrics e20191725, Comment published on Jan. 26, 2020, available at https://publications.aap.org/pediatrics/article/145/2/e20191725/68259/Pubertal-Suppression-for-Transgender-Youth-and?autologincheck=redirected (last visited April 24, 2023).
[233] J. L. Turban et al. (2020), Pubertal Suppression, 145 Pediatrics e20191725, at *1-*8.
[234] *Id.* at *7.
[235] *Id.* at *4.
[236] M. Biggs, Comment on J. L. Turban, Pubertal Suppression for Transgender Youth and Risk of Suicidal Ideation, 145 Pediatrics e20191725, Comment published on Jan. 30, 2020, available at https://publications.aap.org/pediatrics/article/145/2/e20191725/68259/Pubertal-Suppression-for-Transgender-Youth-and?autologincheck=redirected (last visited April 24, 2023).

Specifically, the most seriously mentally ill patients would have been denied puberty blockers.[237] The study can only be understood in light of these limitations and confounding issues.

According to the study, those who received treatment with pubertal suppression, when compared with those who wanted pubertal suppression but did not receive it, had lower odds of lifetime suicidal ideation (adjusted odds ratio = 0.3; 95% confidence interval = 0.2-0.6).[238] In Table 3 of the paper, under "Suicidality (past 12 months)" reductions for suppressed group versus non-suppressed were seen for ideation (50.6% v 64.8%) and "ideation with plan" (55.6% v 58.2%).[239] However, it is important to note that differences in suicidal "ideation with plan and suicide attempt" and "attempt resulting for inpatient care" did not reach statistical significance.[240] When discussing the results of their study, the authors fail to mention this lack of statistical significance in two of the most serious measures and, instead, reference only suicidal ideation. It would be reasonable to be concerned from an observation of over 40% attempted suicide in the treated group that the intervention was unsuccessful in improving health.[241]

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[237] *Id.*
[238] J. L. Turban et al. (2020), Pubertal Suppression, 145 Pediatrics e20191725, at *1.
[239] *Id.* at *5.
[240] *Id.* at *5 and Table 2 (indicated by lack of an asterisks next to the P column for the Univariate Analyses). See also use of the asterisks in Table 1, at *4.
[241] See generally M. Biggs, Comment on J. L. Turban, Pubertal Suppression for Transgender Youth and Risk of Suicidal Ideation, 145 Pediatrics e20191725, Comment published on Jan. 30, 2020, available at https://publications.aap.org/pediatrics/article/145/2/e20191725/68259/Pubertal-Suppression-for-Transgender-Youth-and?autologincheck=redirected (last visited April 24, 2023), and the multiple Letters to the Editor that criticized the multiple methodological errors in this study, https://pediatrics.aappublications.org/content/145/2/e20191725/tab-e-letters#re-pubertal-suppression-for-transgender-youth-and-risk-of-suicidal-ideation. See also M. Biggs, Puberty Blockers and Suicidality in Adolescents Suffering from Gender Dysphoria, 49 Archs. Sex. Behav. 2227 (2020).

Thus, much like the previously discussed Turban et al. 2019-2020 JAMA Psychiatry study, this Turban et al. 2020 Pediatrics study is severely compromised by unsound methodology, flawed and biased data from the 2015 USTS, and improper or weak extrapolations.

A 2020 study by Van der Miesen et al.[242] was a cross-sectional Dutch study that measured some patients who received puberty blockers and some who did not. The study had three populations of subjects: One was patients presenting to the gender clinic who had not received any intervention, the second was patients who had received puberty blocker, and the third was adolescents from the general population.[243] Because of this study's cross-sectional nature, it cannot establish a causal relationship between intervention and effect. It also represents a non-probability sample with potential for significant biases in subject recruitment. In addition, the subjects assessed before and after treatment are different populations. Among the differences between these groups is patient age (mean of 14.5 and 16.8 years before and after treatment, respectively).[244] This two-year age difference is important as developmental progress during adolescence is known to influence psychological well-being.[245] There was also the same limitation noted in the 2011 de Vries study, that the treated population also received psychological support.[246]

A 2021 study by Bustos et al.[247] attempts to provide a systematic review of 27 observational or interventional studies that report on regret or detransition following gender-transition

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[242] A. I. R. van der Miesen et al., Psychological Functioning in Transgender Adolescents Before and After Gender-Affirmative Care Compared With Cisgender General Population Peers, 66 J. Adolesc. Health 699 (2020).
[243] *Id.* at 700.
[244] *Id.*
[245] J. He et al., Meta-analysis of gender differences in body appreciation, 33 Body Image 90 (2020).
[246] A. I. R. van der Miesen et al. (2020), Psychological Functioning, 66 J. Adolesc. Health, at 703.
[247] V. P. Bustos et al., Regret after Gender-affirmation Surgery: A Systematic Review and Meta-analysis of Prevalence, 9 Plastic and Reconstructive Surg. - Global Open e3477 (2021); Regret

surgeries. A total of 7,928 subjects were included in their meta-analysis.[248] The authors concluded that only 1% or less of those who had gender-transition surgeries expressed regret.[249] It is important to understand the serious methodological limitations and high risk of bias contained within this study's analysis.[250] This includes failure to include major relevant studies addressing this question,[251] inaccurate analysis within one of the studies considered,[252] and the general lack of controlled studies, incomplete and generally short-term follow-up, large numbers of lost subjects, and lack of valid assessment measures in the published literature addressing this question.[253] As noted by Expósito-Campos and D'Angelo (2021), moderate to high risk of bias was present in 23 of the 27 studies included in the analysis.[254] Furthermore, 97% of subjects analyzed were found within studies deemed to be of fair to poor scientific quality.[255] Thus, this study cannot be used as strong support for the contention that regret is rare.

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after Gender-affirmation Surgery: A Systematic Review and Meta-analysis of Prevalence—Erratum, 10 Plastic and Reconstructive Surg. – Global Open e4340 (2022) ("The systematic review was re-conducted, and the meta-analysis was re-run with the updated numbers with no significant or major changes. The updated tables and figures are included below.").0

[248] V. P. Bustos et al. (2021), Regret after Gender-affirmation Surgery, 9 Plastic and Reconstructive Surg. – Global Open e3477, at *1.

[249] *Id.*

[250] See P. Expósito-Campos et al., Letter to the Editor: Regret after Gender-affirmation Surgery: A Systematic Review and Meta-analysis of Prevalence, 9 Plastic and Reconstructive Surg. - Global Open e3951 (2021).

[251] *Id.* See, e.g., C. Dhejne et al., An Analysis of All Applications for Sex Reassignment Surgery in Sweden, 1960-2010: Prevalence, Incidence, and Regrets, 43 Archs. Sex. Behav. 1535 (2014).

[252] C. M. Wiepjes et al., The Amsterdam Cohort of Gender Dysphoria Study (1972-2015): Trends in Prevalence, Treatment, and Regrets, 15 J. Sexual Med. 582 (2018).

[253] P. Expósito-Campos et al. (2021), Letter to the Editor regarding Bustos et al., Regret after Gender-affirmation Surgery, (2021), 9 Plastic and Reconstructive Surg., at *1.

[254] *Id.*

[255] *Id.*

The 2021 study by Narayan et al.[256] examines anonymous survey results from 154 surgeons affiliated with WPATH. The response rate for this survey was 30%.[257] Of the respondents, 57% had encountered patients with surgical regret.[258] It is important to recognize that this study was specifically directed toward patients who had undergone surgical transition. Acknowledged biases of this study include selection bias, recall bias, and response bias.[259] This type of study cannot accurately identify the prevalence in the transgender population as a whole, and is particularly limited in the ability to assess potential for regret in the pediatric population.

The 2021 Almazan et al. study is "a secondary analysis of data from the 2015 US Transgender Survey" (USTS).[260] As a secondary analysis that is entirely reliant on the highly flawed and bias 2015 USTS data set, this study is subject to the resulting deficiencies already discussed above in the summaries of the 2019-2020 Turban et al. JAMA Psychiatry study and the 2020 Turban et al. Pediatrics study.

In addition, the Almazan study itself has come under even more direct critique. In a Comment in response to the study, D. Curtis noted that the two groups the study compared are too dissimilar to one another to draw meaningful conclusions and that the authors failed to adequately highlight the magnitude of several differences.[261] Curtis lists a number of these differences —

[256] S. K. Narayan et al., Guiding the conversation—types of regret after gender-affirming surgery and their associated etiologies, 9 Annals of Translational Med. 605 (2021).
[257] *Id.*
[258] *Id.*
[259] *Id.* at 9.
[260] A. N. Almazan et al., Association Between Gender-Affirming Surgeries and Mental Health Outcomes, 156 JAMA Surg. 611 (2021).
[261] D. Curtis, Unrecognized confounding may explain differences in mental health outcomes, Comment on A. N. Almazan et al., Association Between Gender-Affirming Surgeries and Mental Health Outcomes, 156 JAMA Surg. 611 (2021), available at https://jamanetwork.com/journals/jamasurgery/fullarticle/2779429.

including significant differences in age, education (degree-status), employment status, gender identification, household income, and sexual orientation. — and then concludes:

> The two groups are so radically different that we really cannot assume that the multivariate analyses carried out allow us to conclude that differences in psychopathology are likely the result of surgical intervention. . . . We cannot agree that the results provide strong evidence that gender-affirming surgery is causally associated with improved mental health outcomes.[262]

In short, the Almazan study is discredited by both unreliable data and improper comparisons.

The 2022 Van der Loos study[263] is a Dutch cohort study that investigates the continuation rate of gender affirming interventions in people who began puberty blockers and gender affirming hormones during adolescence. The authors claim that the study provides evidence against desistance after receiving gender-affirming hormones. While the paper gives the impression that subjects represent a period of study extending from 1972 to 2018, the majority of subjects recently started hormone interventions. The length of time for follow-up (mean of 3.5 years for males and 2.3 years for females) and the average age at follow-up (20.2 years for males and 19.3 years for females) are inadequate to support the authors' claim. Notably, research from these same investigators has suggested that the average time to detransition is over 10 years.[264] Thus, it would be necessary for the study to assess patients at least a decade after starting gender-affirming hormones to make any meaningful conclusions on desistance. Furthermore, as a retrospective cohort study without a control group, the study design cannot determine the effect of gender affirming therapy

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[262] *Id.*

[263] M. A. T. C. van der Loos et al. (2022), Continuation of gender-affirming hormones in transgender people starting puberty suppression in adolescence, 6 Lancet Child & Adolesc. Health at 869-75.

[264] C. M. Wiepjes et al. (2018), The Amsterdam Cohort of Gender Dysphoria Study (1972-2015), 15 J. Sexual Med., at 582-90.

on whether the intervention influences the rate of desistance that would have occurred without the provision of gender-affirming hormones.

The 2022 Nos et al. study[265] is a retrospective cohort study that reports on the likelihood of starting on gender-affirming hormones (GAH) based upon whether or not subjects were treated with puberty blockers. While the title and abstract give the impression that puberty blocker use is not linked to subsequent GAH, the data fail to support this conclusion. Since nearly all of the patients in this study who did not receive GnRHa were given GAH, it is not possible to determine whether GnRHa could increase this outcome. The comparison groups differed by age at time of initial presentation (age 10-13 years versus 14-17 years). GnRHa use was higher among the younger patients owing to the fact that they had not completed puberty at the time of first visit. A lag in progression to GAH use in this group is heavily influenced by the difference in age at time of initial presentation. The older group was eligible to start GAH at the time of study entry while those in the younger group were not. When adjusted for age, the rates of progression to GAH use is nearly identical. Importantly, among the patients who received GnRHa, 94% (64 out of 70) went on to take gender affirming hormones. Thus, the study further confirms that, rather than serving as a "pause button" for gender dysphoric adolescents, GnRHa use is an intervention that will lead to progression to gender affirming hormones.

[265] A. L. Nos et al., Association of Gonadotropin-Releasing Hormone Analogue Use With Subsequent Use of Gender-Affirming Hormones Among Transgender Adolescents, 5 JAMA Netw. Open e2239758 (2022).

The 2022 Green at al. study[266] purported to measure suicide attempts and access to cross-sex hormones. Though this study had a large cohort of patients,[267] it suffered many biases in patient recruitment — which was done over the Internet[268] and provided a cross-sectional analysis[269] which can, at best, demonstrate correlation but not causation. Similar to other studies, it did not assess the effect of psychiatric medications or psychotherapy on outcomes. It also failed to include variables to assess at what age youth began puberty blockers or the duration which they had received gender-affirming hormones.

The 2022 Turban et al. study[270] is a retrospective cross-sectional investigation to assess whether there is an association between adolescent access to gender-affirming hormones and mental health. By nature of its retrospective cross-sectional design, the study is not able to make any conclusions regarding a causal relationship between GAH access and mental health. Like the Almazan et al. study and the two prior studies from Turban discussed above, this 2022 Turban study rests entirely on data from the USTS[271] and therefore suffers from similar defects.[272] Caution is warranted in evaluating any and all studies that either use or conduct further analysis of the USTS data because those studies would naturally be subject to any limitations, flaws, biases, irregularities, or anomalies in this source data.

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[266] A. E. Green et al., Association of Gender-Affirming Hormone Therapy With Depression, Thoughts of Suicide, and Attempted Suicide Among Transgender and Nonbinary Youth, 70 J. Adolesc. Health 643 (2022).
[267] *Id.* at 644.
[268] *Id.*
[269] *Id.* at 647.
[270] J. L. Turban et al., Access to gender-affirming hormones during adolescence and mental health outcomes among transgender adults, 17 PLOS ONE e0261039 (2022).
[271] *Id.* at *3.
[272] See supra discussion of Alamazan et al., USTS, D'Angelo et al, and D. Curtis comment on Almazan et al.

The authors of the Turban 2022 study claim that there is an association between getting gender-affirming hormones and favorable mental health outcomes compared to those who desired but did not receive this intervention.[273] However, since the methodology used is similar to the author's 2020 study on the effects of access to puberty blockers on lifetime suicidality, already discussed above, and used the same 2015 U.S. Transgender Survey (USTS), it is subject to all of the associated limitations and biases.[274] Participants in the USTS were recruited through transgender advocacy organizations and subjects were asked to "pledge" to promote the survey among friends and family.[275] Thus, there are serious concerns of selection bias.[276] It also suffers from recall bias[277] and an inability to verify the veracity of the claims of treatments given to the study respondents.

Review of the data contained within the paper leads to conclusions that are far different than those stated by the study authors regarding mental health of the study participants. While the odds ratio for past-year suicidal ideation was statistically different between those who did and those who did not get GAH, there was no difference in those who had a suicide plan, actually attempted suicide, or were hospitalized for a suicide attempt.[278] This is important since the rationale for accepting the attendant risks of gender-affirming hormones is to prevent suicide. As

[273] J. L. Turban et al. (2022), Access to gender-affirming hormones, 17 PLOS ONE e0261039, at *1, *1.
[274] D'Angelo et al. (2021), One Size Does Not Fit All, 50 Archs. Sex. Behav. at 7-16.
[275] *Id.* at 8.
[276] S. Tyrer et al., Sampling in epidemiological research: issues, hazards and pitfalls, 40 BJPsych Bull. 57 (2016).
[277] See generally S. S. Coughlin, Recall bias in epidemiologic studies, 43 J. Clin. Epidemiol. 87 (1990).
[278] J. L. Turban et al. (2022), Access to gender-affirming hormones, 17 PLOS ONE e0261039, at *5-*8 ("We detected no difference for other mental health variables measured.").

pointed out by Michael Biggs in a commentary on this article,[279] the data presented in this study negate the purported significance of effects of puberty blocker access on mental health as reported in Turban's 2020 Pediatrics article. As with many of the other studies considered in this report, the Turban et al. 2022 study is also discredited both by deficient data-sampling techniques and by flawed reasoning and unsound methodology overall.

The 2022 Tordoff study[280] is a prospective observational cohort study that assessed the mental health of patients presenting to the Seattle Children's gender clinic over a one-year period of follow-up. The authors claimed that access to gender-affirming care had significantly improved mental health with lower odds ratios of depression and suicidality. This purported finding was widely publicized by the University of Washington and was featured on several news media sites.[281] A detailed critique of the paper's data and flawed conclusions has been posted online.[282]

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[279] M. Biggs, Estrogen is associated with greater suicidality among transgender males, and puberty suppression is not associated with better mental health outcomes for either sex, Comment on J. L. Turban et al., Access to gender-affirming hormones during adolescence and mental health outcomes among transgender adults, 17 PLOS ONE e0261039 (2022), Comment posted on Jan. 19, 2022, available at https://journals.plos.org/plosone/article/comment?id=10.1371/annotation/dcc6a58e-592a-49d4-9b65-ff65df2aa8f6 ("Conversely, a previous article by Turban et al. claimed to find a positive association between puberty suppression (using a Gonadotropin-Releasing Hormone agonist) and mental health--but this did not control for cross-sex hormones." (citing J. L. Turban et al. 2020, Pubertal suppression, 145 Pediatrics e20191725)).

[280] D. M. Tordoff et al., Mental Health Outcomes in Transgender and Nonbinary Youths Receiving Gender-Affirming Care, 5 JAMA Netw. Open e220978 (2022). For errata, see Data Errors in eTables 2 and 3, 5 JAMA Netw. Open e2229031 (2022).

[281] See, e.g., Teens who received gender-affirming care had 60% lower odds of depression, UW study finds, king5.com, Published Mar. 12, 2022, Updated Sept. 7, 2022, https://www.king5.com/article/news/health/gender-affirming-care-reduces-depression-university-of-washington-study-transgender-nonbinary/281-bcfece1b-a7cb-4c95-80d0-3f02c597d783 (last visited Apr 30, 2023); Medical treatments cut risks for depression, suicide among transgender youth, UPI, https://www.upi.com/Health_News/2022/03/01/medical-treatments-transgender-youth/3211646078081/ (last visited Apr 30, 2023).

[282] See J. Singal, Researchers Found Puberty Blockers And Hormones Didn't Improve Trans Kids' Mental Health At Their Clinic. Then They Published A Study Claiming The Opposite. (Up-

Contrary to the authors' claims, data contained in the paper did not show improvement in mental health over the one-year study period. At entry into the study, 57% of the subjects who reported receiving treatment with puberty blockers or gender-affirming hormones (PB/GAH) had moderate to severe depression.[283] At the end of the study, 56% of the subjects who reported receiving PB/GAH had moderate to severe depression.[284] Rates for moderate to severe anxiety were 57% and 51% at baseline and 12 months, respectively, for subjects who reported receiving PB/GAH.[285] Self-harm or suicidal thoughts were 43% and 37% at baseline and 12 months, respectively for subjects who reported receiving PB/GAH.[286] These are alarmingly high numbers for an intervention that is touted to be lifesaving. J. Singal notes that "[a]mong the kids who went on hormones, there isn't genuine statistical improvement here from baseline to the final wave of data collection.[287] Singal contacted one of the authors to ask about the data in eTable 3 and to confirm that there was, in fact, no improvement within the group of participants that had received puberty-blocking or hormonal interventions. Singal writes:

> [The authors] reference "improvements" twice . . . but offer no statistical demonstration anywhere in the paper or the supplemental material. I wanted to double-check this to be sure, so I reached out to one of the study authors. They wanted to stay on background, but they confirmed to me that there was no improvement over time among the kids who went on hormones or blockers.[288]

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dated), Singal-Minded (Apr. 6, 2022), https://jessesingal.substack.com/p/researchers-found-puberty-blockers (last visited Apr 13, 2023). See also Jesse Singal, Authors, Macmillan, https://us.macmillan.com/author/jessesingal (last visited Apr 30, 2023).

[283] D. M. Tordoff et al. (2022), Mental Health Outcomes, 5 JAMA Netw. Open e220978, at Online Supplementary Materials (Tordoff Supplement) and eTable 3 (at *4).

[284] *Id.*

[285] *Id.*

[286] *Id.*

[287] J. Singal (2022), Research Found Puberty Blockers And Hormones Didn't Improve Trans Kids' Mental Health, https://jessesingal.substack.com/p/researchers-found-puberty-blockers (last visited Apr 30, 2023).

[288] J. Singal (2022), Research Found Puberty Blockers And Hormones Didn't Improve Trans Kids' Mental Health, https://jessesingal.substack.com/p/researchers-found-puberty-blockers (last visited

The reported statistical difference in odds ratios were comparisons between those who started on puberty blockers and cross-sex hormones and those who did not receive hormones. Importantly, there was a marked difference in the number of dropout subjects in the treated and non-treated groups (17.4% versus 80%, respectively).[289] It is reasonable to speculate that the small number of subjects who remained in the study but did not receive hormones had significant co-morbidities that prevented them from accessing this intervention. In any event, the actual data from this study demonstrates that access to puberty blockers and gender affirming hormones did not improve mental health over the first year of treatment. This is drastically different from what the authors and the media claimed.

The 2023 Chen et al. study[290] is a longitudinal observational study of patients receiving care at four gender centers in the United States. The primary conclusion made by the authors is that "GAH improved appearance congruence and psychosocial functioning."[291] However, there are major limitations and weaknesses in the data that limit the conclusions that can be made. The most glaring problem is that the study was observational and did not include a control group. Thus, there is no ability to draw causal conclusions. At best, the authors can find associations. A revealing critique of the paper by De Vries and Hannema that was published alongside this article

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Apr 30, 2023) (linking at the phrase "on background" to J. Bender et al., Levels of Attribution, in J. Bender et al., Writing & Reporting for the Media, 11th ed., Oxford University Press (2016), available at https://global.oup.com/us/companion.websites/9780190200886/student/chapter10/gline/level/#:~:text=%E2%80%9COn%20background%2C%E2%80%9D%20which%20is,the%20source%20by%20her%20position. (last visited May 1, 2023)).

[289] D. M. Tordoff et al. (2022), Mental Health Outcomes, 5 JAMA Netw. Open e220978, at 1, and Tordoff Supplement at eTable2 (*4), eTable3 (*4). See also J. Singal (2022), Research Found Puberty Blockers And Hormones Didn't Improve Trans Kids' Mental Health, at nn.3-4.

[290] D. Chen et al., Psychosocial Functioning in Transgender Youth after 2 Years of Hormones, 388 N. Engl. J. Med. 240 (2023).

[291] *Id.* at 240.

exposes some of these concerns.[292] Akin to many of the other papers in this field, there is no way to determine whether any of the changes were contributed by or due solely to psychiatric interventions.[293] It is also notable that even though the study was designed to recruit only subjects with good mental health at baseline, 48 of the 307[294] study subjects (15.6%) were described as having severe or moderate depression at this time point.[295] At the end of the two-year follow-up, 30 of the 219 remaining subjects (13.7%) were reported to have major depression. Furthermore, two patients committed suicide during the two-year observation period, "one after 6 months of follow-up and the other after 12 months of follow-up."[296] This is an outcome that in most other situations would lead to a halt in study and detailed inquiry by an institutional review board.[297] The paper claims to present two-year follow-up data in this cohort. However, only about half of the study participants were assessed at all five of the study time points,[298] and 30% did not have 24-month data collected.[299] Even if one accepted the follow-up period, this is likely not long enough to make

[292] A. L. C. De Vries et al., Growing Evidence and Remaining Questions in Adolescent Transgender Care, 388 N. Engl. J. Med. 275, (2023).
[293] *Id.* at 276.
[294] While 315 participants enrolled in the Chen study, only 307 participants remained at the conclusion of the study. D. Chen et al. (2023), Psychosocial Functioning, 388 N. Engl. J. Med. at 243.
[295] *Id.* at 243.
[296] *Id.* at 243.
[297] NIH Guide: Guidance on Reporting Adverse Events to Institutional Review Boards for NIH-Supported Multicenter Clinical Trials, NOT-99-107, June 11, 1999, available at https://grants.nih.gov/grants/guide/notice-files/NOT99-107.html (last visited Apr 13, 2023) (also accessible through NIH Funding Opportunities and Notices for The Week Ending 06-11-99, available at https://grants.nih.gov/grants/guide/WeeklyIndex.cfm?WeekEnding=06-11-99 (last visited Apr 13, 2023)). See also NIH Grant Policy Statement, § 4.1.15.6 Data and Safety Monitoring (U.S. Department of Health and Human Services, National Institutes of Health, December 2022) available at https://grants.nih.gov/grants/policy/nihgps/nihgps.pdf (last visited April 13, 2022) (setting planning standards for reporting of adverse events to institutional review boards in NIH grant-funded clinical trials).
[298] D. Chen et al. (2023), Psychosocial Functioning, 388 N. Engl. J. Med. at 240.
[299] D. Chen et al. (2023), Psychosocial Functioning, 388 N. Engl. J. Med. at 240, Supplementary Appendix at 8 (Table S2. Coverage for Key Variables).

firm conclusions about long-term efficacy. Several key outcomes that according to the original study protocol were to be measured (gender dysphoria, trauma symptoms, self-injury, suicidality, body esteem, and quality of life) are not reported in this paper.[300] The reason for these omissions is not apparent in the published manuscript. The study authors failed to report on robust measures of psychological well-being such as the number on antidepressants and other psychotropic medications.[301] The study effects for many of the measures reported was very modest at best and, even when statistically significant, do not have any meaningful clinical significance. For example, the depression scores showed little change over two years in the highest severity group.[302] There is also significant heterogeneity in responses with some subjects showing improvement, some no change, and others worsening.[303] Consequently, these data do not alleviate the serious concerns raised regarding the safety and efficacy of gender-affirming medical interventions.

129. Many conclusions in the above studies are drawn or characterized in fundamentally unscientific ways without apparent regard to the scientific process of disproving a null hypothesis. Instead, these studies — along with the comments, responses, and professional criticism they have received — suggest that the authors began with a conclusion and then looked for data to support that conclusion. That is a vastly unsound way of doing science, and patients will not be aware of these methodological limitations and distortions when informed of these purported conclusions.

[300] D. Chen et al. (2023), Psychosocial Functioning, 388 N. Engl. J. Med. at 240-50.
[301] *Id.*
[302] D. Chen et al. (2023), Psychosocial Functioning, 388 N. Engl. J. Med. at 240, Supplementary Appendix at 13 (Table S6. Proportions of Youth Scoring in the Clinical Range for Depression and Anxiety at Each Timepoint).
[303] D. Chen et al. (2023), Psychosocial Functioning, 388 N. Engl. J. Med. at 240-50.

130. There remains a significant and unmet need to improve our understanding of the biological, psychological, and environmental basis for the manifestation of patient reports of discordance of gender identity and biological sex in affected individuals, as well as the long-term effects of "affirming" interventions.[304] In particular, there is a concerning lack of randomized controlled trials or adequately controlled longitudinal studies comparing outcomes of youth with gender dysphoria who received psychological support, were encouraged to socially transition, or were put on medical interventions, and how these differential treatments affect the usual and natural progression to resolution of gender dysphoria and other variables. Such studies can be ethically designed and executed with provisions for other dignity-affirming measures to all treatment groups.[305] But they have not been performed in the existing literature, leaving that literature in a state insufficient to enable sound conclusions about the efficacy of "affirming" treatments.

INTERNATIONAL RESPONSES

131. Recognizing the paucity of evidence supporting "affirming" treatments, along with the proven risks of those treatments, other countries are increasingly limiting use of those treatments.

132. **Finland**: The National Science Review in Finland carefully examined all relevant science and suspended transition treatments for minors under age 16.[306] The review determined

[304] J. Olson-Kennedy et al., Research priorities for gender nonconforming/transgender youth: gender identity development and biopsychosocial outcomes, 23 Current Op. in Endocrinol., Diabetes & Obesity 172, 172-79 (2016).
[305] See generally J. Sugarman, Ethics in the Design and Conduct of Clinical Trials, 24 Epidemiologic Reviews 54, 54-58 (2002).
[306] See 2020 Recommendation of the Council for Choices in Health Care in Finland (PALKO / COHERE Finland) Medical Treatment Methods for Dysphoria Related to Gender Variance in Minors, Palveluvalikoima, Nov. 6, 2020, available at https://segm.org/sites/default/files/Finnish_Guidelines_2020_Minors_Unofficial%20Translation.pdf. See also Recommendations -

that "[t]he first-line treatment for gender dysphoria is psychosocial support and, as necessary, psychotherapy and treatment of possible comorbid psychiatric disorders."[307] According to the review, "[c]ross-sex identification in childhood, even in extreme cases, generally disappears during puberty."[308] The review also found: "Potential risks of GnRH therapy include disruption in bone mineralization and the as yet unknown effects on the central nervous system";[309] "there are no medical treatment[s] [for transitioning] that can be considered evidence-based";[310] and, "[t]he reliability of the existing studies with no control groups is highly uncertain."[311] Thus, "because of this uncertainty, no decisions should be made that can permanently alter a still-maturing minor's mental and physical development,"[312] and "[n]o gender confirmation surgeries are performed on minors."[313] "Since reduction of psychiatric symptoms cannot be achieved with hormonal and surgical interventions, it is not a valid justification for gender reassignment. A young person's identity and personality development must be stable so that they can genuinely face and discuss their gender dysphoria, the significance of their own feelings, and the need for various treatment options. For children and adolescents, these factors are key reasons for postponing any interventions until adulthood. . . . In light of available evidence, gender reassignment of minors is an experimental practice."[314]

Choices in health care, Palveluvalikoimaneuvosto, https://palveluvalikoima.fi/en/recommendations (last visited Apr 13, 2023).

[307] PALKO / COHERE Finland, Recommendation, Nov. 6, 2020 (unofficial translation), at 5.

[308] *Id.*

[309] *Id.* at 6.

[310] *Id.*

[311] *Id.* at 7.

[312] *Id.*

[313] *Id.*

[314] *Id.* at 7-8.

133. **Sweden**: The world-renowned Karolinska Hospital reviewed the current research and suspended pediatric gender transitions for patients under 16 outside of experimental, monitored clinical trials settings as of May 2021.[315] Treatment will focus on psychotherapy and assessment.[316] The "Dutch protocol" for treating gender-dysphoric minors has been discontinued over concerns of medical harm and uncertain benefits.[317]

Moreover, in a national policy review, a report commissioned by the Swedish government concluded that:

- We have not found any scientific studies which explains the increase in incidence in children and adolescents who seek the heath care because of gender dysphoria.

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[315] Karolinska Universitetssjukhuset — Astrid Lindgrens Barnsjukhus, English, unofficial translation, Guideline Regarding Hormonal Treatment of Minors with Gender Dysphoria at Tema Barn - Astrid Lindgren Children's Hospital (ALB), K2021-4144, Apr. 2021, at 2, available at https://segm.org/sites/default/files/Karolinska%20Guideline%20K2021-4144%20April%202021%20%28English%2C%20unofficial%20translation%29.pdf; Karolinska Universitetssjukhuset — Astrid Lindgrens Barnsjukhus, English, unofficial translation, Policy Change Regarding Hormonal Treatment of Minors with Gender Dysphoria at Tema Barn - Astrid Lindgren Children's Hospital, K2021-3343, Mar. 2021, at 1-2, available at https://segm.org/sites/default/files/Karolinska%20Policy%20Change%20K2021-3343%20March%202021%20%28English%2C%20unofficial%20translation%29.pdf. See also Karolinska Universitetssjukhuset — Astrid Lindgrens Barnsjukhus, Riktlinje gällande hormonell behandling till minderariga patienter med könsdysfori inom Tema Barn, K2021-4144, Apr. 2021, available at https://segm.org/sites/default/files/Karolinska%20Riktlinje%20K2021-4144%20April%202021%20%28Swedish%29.pdf (Swedish-language document); Karolinska Universitetssjukhuset — Astrid Lindgrens Barnsjukhus, Policyförändring gällande hormonell behandling till minderariga patienter med könsdysfori inom Tema Barn - Astrid Lindgrens Barnsjukhus, K2021-3343, Mar. 2021, available at https://segm.org/sites/default/files/Karolinska%20Policyförändring%20K2021-3343%20March%202021%20%28Swedish%29.pdf (Swedish-language document).

[316] See Society for Evidence-Based Medicine, Sweden's Karolinska Ends All Use of Puberty Blockers and Cross-Sex Hormones for Minors Outside of Clinical Studies, SEGM.org, May 5, 2021, https://segm.org/Sweden_ends_use_of_Dutch_protocol ((featuring links to PDF copies of the Karolinska Policy and Guidelines documents, along with unofficial English translations, at the bottom of the page).

[317] *Id.*

- We have not found any studies on changes in prevalence of gender dysphoria over calendar time, nor any studies on factors that can affect the societal acceptance of seeking for gender dysphoria.

- There are few studies on gender affirming surgery in general in children and adolescents and only single studies on gender affirming genital surgery.

- Studies on long-term effects of gender affirming treatment in children and adolescents are few, especially for the groups that have appeared during the recent decennium. . . .

- . . . No relevant randomized controlled trials in children and adolescents were found.[318]

From these findings, the Swedish National Board of Heath in December of 2022 issued updated guidelines for the care of adolescents and children with gender dysphoria.[319] This medical board concluded that "the risks of puberty blockers and gender-affirming treatment are likely to outweigh the expected benefits of these treatments."[320] Noting that there is uncertainty about the cause for the rapid rise in number of people being diagnosed with gender dysphoria, documented

[318] See Sweden Policy Review, Gender dysphoria in children and adolescents: an inventory of the literature, SBU Policy Support no 307, 2019, https://www.sbu.se/307e.

[319] Socialstyrelsen —The National Board of Health and Welfare, Vård av barn och ungdomar med könsdysfori Nationellt kunskapsstöd med rekommendationer till profession och beslutsfattare (2022), https://www.socialstyrelsen.se/globalassets/sharepoint-dokument/artikelkatalog/kunskapsstod/2022-12-8302.pdf (full report in Swedish, PDF format). See also Uppdaterat kunskapsstöd för vård vid könsdysfori hos unga, Socialstyrelsen (2022), https://www.socialstyrelsen.se/om-socialstyrelsen/pressrum/press/uppdaterat-kunskapsstod-for-vard-vid-konsdysfori-hos-unga/ (last visited Apr 14, 2023) (announcing and publishing the full Swedish report); Socialstyrelsen —The National Board of Health and Welfare, Care of children and adolescents with gender dysphoria Summary of national guidelines, December 2022, https://www.socialstyrelsen.se/globalassets/sharepoint-dokument/artikelkatalog/kunskapsstod/2023-1-8330.pdf (English-language Summary from Socialstyrelsen).

[320] Socialstyrelsen —The National Board of Health and Welfare, Care of children and adolescents with gender dysphoria Summary of national guidelines, December 2022, at 3, https://www.socialstyrelsen.se/globalassets/sharepoint-dokument/artikelkatalog/kunskapsstod/2023-1-8330.pdf (English-language Summary from Socialstyrelsen). See also J. Block (2023), Gender dysphoria in young people is rising-and so is professional disagreement, 380 BMJ 382, at *2, *3.

evidence of detransitioning young adults with uncertainty regarding the prevalence of this outcome, and lack of uniformity in experience-based knowledge among providers, GnRH analogues, gender-affirming hormones and mastectomy should be provided only in exceptional cases and ideally as part of an experimental trial.[321]

The results of the Swedish systematic review of the current published literature related to hormone treatment of gender dysphoric youth that served as the basis for this policy change were pubished on April 17, 2023 in the peer reviewed journal Acta Paediatrica.[322] The authors of this systematic review identified 9,934 abstracts related to hormone administration to childen with gender dysphoria among the English language literature as of November 9, 2022. From these abstracts, 36 studies met their rigorous inclusion criteria for in-depth analysis. Twelve studies were assessed to have a high risk of bias and were therefore excluded from analysis. The remaining 24 studes were assessed for findings relevant to the inclusion criteria. This included 21 studies in which adolescents were given GnRH analogues (a.k.a. puberty blockers) and 3 studies where cross-sex hormones were administered without prior GnRHa treatment. Among the studies, the authors did not find any randomized controlled trials addressing the psychosocial effects, bone health, body composition and metabolism or persistence in children with gender dyshporia undergoing treatment with GnRHa medications. The authors of this study found serious methodological weaknesses in each of the the three longitudinal observational studies assessed. This included small sample size, and high attrition rates. This prevented any verifiable conclusions regarding the long-term effects of hormone therapy on psychological health to be drawn. GnRHa

[321] *Id.* at 3-4.
[322] Ludvigsson JF, Adolfsson J, Höistad M, Rydelius PA, Kriström B, Landén M. A systematic review of hormone treatment for children with gender dysphoria and recommendations for research. Acta Paediatr. 2023 Apr 17. doi: 10.1111/apa.16791. Epub ahead of print. PMID: 37069492.

therapy was found to delay bone maturation and bone mineral density gain that was only partially recovered by cross-sex hormone administration when studied at age 22 years. Among the key finding of this published peer reviewed study were that the long long-term effects of hormone therapy on psychosocial health are unknown, GnRHa treatment delays bone maturation and gain in bone mineral density and that GnRHa treatment in children with gender dysphoria should be considered experimental treatment of individual cases rather than standard procedure.

134. **United Kingdom**: The British official medical review office, National Institute of Health and Care Excellence (NICE), published reports on the use of both puberty blockers and hormones for transitioning purposes.[323] The assessment of the evidence into the drugs was commissioned by the National Health Service England (NHS). The review found that the evidence for using puberty-blocking drugs to treat young people struggling with their gender identity is "very low certainty."[324] The review on GnRH analogues found only "small, uncontrolled observational studies, which are subject to bias and confounding, and all the results are of very low certainty using modified GRADE. They all reported physical and mental health comorbidities and concomitant treatments very poorly."[325]

[323] Nice Evidence Reviews — Cass Review, https://cass.independent-review.uk/nice-evidence-reviews/ (last visited Apr. 29, 2023).
[324] NICE, Evidence review: Gonadotrophin releasing hormone analogues for children and adolescents with gender dysphoria, (Oct. 2020), https://cass.independent-review.uk/wp-content/uploads/2022/09/20220726_Evidence-review_GnRH-analogues_For-upload_Final.pdf.
[325] *Id.* at 11-12.

NICE also reviewed the evidence base for cross-sex hormones.[326] This review found the evidence of clinical effectiveness and safety of cross-sex hormones was also of "very low" quality.[327] The review concluded: "Any potential benefits of gender-affirming hormones must be weighed against the largely unknown long-term safety profile of these treatments in children and adolescents with gender dysphoria."[328]

A recent independent review of gender identity services in the United Kingdom, by Dr. Hilary Cass, concluded that "Evidence on the appropriate management of children and young people with gender incongruence and dysphoria is inconclusive both nationally and internationally."[329] In summarizing a few of the key points and context from the Interim Report, the Cass Review stated, "There is lack of consensus and open discussion about the nature of gender dysphoria and therefore about the appropriate clinical response."[330]

Following the Cass Review, the NHS ordered the closure of the Tavistock clinic, the UK's only dedicated gender identity clinic for children and young people.[331] As the BBC summarized, the Cass Review found that "the current model of care was leaving young people 'at considerable risk' of poor mental health and distress, and having one clinic was not 'a safe or viable long-term option.'"[332] The Tavistock will be replaced by a new regional hospital-based

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[326] NICE, Evidence review: Gender-affirming hormones for children and adolescents with gender dysphoria, (Oct. 2020), https://cass.independent-review.uk/wp-content/uploads/2022/09/20220726_Evidence-review_Gender-affirming-hormones_For-upload_Final.pdf.
[327] See, e.g., *id.* at 7, 47.
[328] *Id.* at 14.
[329] H. Cass (2022), The Cass Review — Interim Report, at 18.
[330] The Cass Review, Interim report — Cass Review, Publications, https://cass.independent-review.uk/publications/interim-report/ (last visited Apr 14, 2023) (announcing the submission of the Interim Report to NHS and summarizing some key findings).
[331] J. Andersson et al., NHS to close Tavistock child gender identity clinic, BBC News, Jul. 28, 2022, https://www.bbc.com/news/uk-62335665.
[332] *Id.*

service where related services for mental health and autism can be provided by clinicians who have expertise in safeguarding and supporting children.[333] Thus, gender-related distress will be addressed "within a broader child and adolescent health context."[334]

This new model is in sharp contrast to recommendations made by WPATH in SOC-8. (Indeed, WPATH criticizes the UK's recent approach.[335]) Differences in approach include the prioritization of parent versus child expectations for care, recommendations against social affirmation of pre-pubertal youth, the provision of puberty blockers within the experimental setting, initial focus on exploration and treatment of mental health problems, and use of psychological support as a primary intervention.[336]

135. **Norway:** Adding to the growing list of European countries acknowledging the lack of reliable scientific evidence supporting the gender affirmation model, the Norwegian Healthcare Investigation Board (Ukom) issued in March of 2023 a new report on the treatment of people with gender incongruence and gender dysphoria.[337]

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[333] Letter from Dr. Hilary Cass, Chair, Independent Review of Gender Identity Services for Children and Young People, to John Stewart, National Director Specialised Commissioning, NHS England, (Jul. 19, 2022), at 2, https://cass.independent-review.uk/wp-content/uploads/2022/07/Cass-Review-Letter-to-NHSE_19-July-2022.pdf.

[334] *Id.*

[335] WPATH, WPATH, ASIAPATH, EPATH, PATHA, and USPATH Response to NHS England in the United Kingdom (UK) Statement regarding the Interim Service Specification for the Specialist Service for Children and Young People with Gender Dysphoria (Phase 1 Providers) by NHS England, (2022), https://www.wpath.org/media/cms/Documents/Public%20Policies/2022/25.11.22%20AUSPATH%20Statement%20reworked%20for%20WPATH%20Final%20ASIAPATH.EPATH.PATHA.USPATH.pdf?_t=1669428978#:~:text=the%20specialist%20service.-,WPATH%2C%20ASIAPATH%2C%20EPATH%2C%20PATHA%2C%20and%20USPATH%20believe%20that,to%20puberty%20suppression%20and%20gender%2D.

[336] See generally, E. Coleman et al. (2022), SOC-8, 23 Int'l. J. Transgender Health, at 51-5258; H. Cass (2022), The Cass Review – Interim Report.

[337] Ukom. Pasientsikkerhet for barn ogunge med kjønnsinkongruens. https://ukom.no/rapporter/pasientsikkerhet-for-barn-og-unge-med-kjonnsinkongruens/sammendrag March 2023

As reported by Jennifer Block in the BMJ,[338] this report is highly critical of the guidelines published by Norway's Healthcare directory in 2020. The report expressed concerns that the 2020 guidelines were not based upon systematic review of the scientific literature on the treatment of gender dysphoria. According to Stine Marit Moen, Ukom's medical director, "The report found that there is insufficient evidence for the use of puberty blockers and cross sex hormone treatments in young people, especially for teenagers who are increasingly seeking health services and being referred to specialist healthcare. Ukom defines such treatments as utprøvende behandling, or 'treatments under trial.'"[339]

CONCLUSIONS

136. There are no long-term, peer-reviewed, published, reliable, and valid research studies documenting the reliability and validity of assessing gender identity by relying solely upon the expressed desires of a patient.

137. There are no long-term, peer-reviewed, published, reliable, and valid research studies documenting any valid and reliable biological, medical, surgical, radiological, psychological, or other objective assessment of gender identity or gender dysphoria.

138. A large percentage of children (over 80% in some studies) who questioned their gender identity will, if not affirmed in a sex-discordant gender identity, develop an acceptance of their natal (biological) sex.

139. A currently unknown percentage and number of patients reporting gender dysphoria suffer from mental illness(es) that complicate and may distort their judgments and perceptions of gender identity.

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[338] Block J. Norway's guidance on paediatric gender treatment is unsafe, says review. BMJ. 2023 Mar 23;380:697

[339] *Id*

140. There are no long-term, peer-reviewed, published, reliable, and valid research studies documenting the number or percentage of patients receiving gender affirming medical interventions who are helped by such procedures.

141. There are no long-term, peer-reviewed, published, reliable, and valid research studies documenting the number or percentage of patients receiving gender-affirming medical interventions who are injured or harmed by such procedures.

142. "Affirming" treatments have no known, peer-reviewed, and published error rates.

143. The gender-affirming approach has limited, very weak scientific support for short-term alleviation of dysphoria and no long-term outcomes data demonstrating superiority over the other approaches.

144. Because of the major methodological limitations and weaknesses of the extant published literature in the field of gender dysphoria, one cannot make a conclusion that "affirming" treatments are justified as a safe and effective long-term solution to gender dysphoria in consideration of the significant risks and unsubstantiated long-term benefits.

145. With the limited and poor-quality data currently available about the purported efficacy of blocking normally timed puberty, administering cross-sex hormones, and gender-affirming surgeries in alleviating psychological morbidity for youth who experience sex-discordant gender identity and the serious medical risks associated with these interventions, it cannot be concluded that this approach is "medically necessary." Use of such medical interventions remains a largely experimental approach.

146. Experimentation on gender-discordant youths is especially likely to cause harm to patients from historically marginalized communities. That is because children in such communities are disproportionally affected by gender discordance. These include:

- children with a history of psychiatric illness;[340]
- children of color;[341]
- children with mental developmental disabilities;[342]
- children on the autistic spectrum;[343] and
- children residing in foster care homes and adopted children.[344]

147. Patients suffering from gender dysphoria or related issues have a right to be protected from experimental, potentially harmful treatments lacking reliable, valid, peer-reviewed, published, long-term scientific evidence of safety and effectiveness.

148. The treatment protocols and recommendations of politically influenced, non-science associations like WPATH and the American Academy of Pediatrics that engage in consensus-seeking methodologies by vote rather than science are not based on competent, credible, methodologically sound science, and have no known or published error rate.

149. The committee that developed the Endocrine Society gender-dysphoria guidelines relied on low-quality scientific evidence in making strong treatment recommendations and failed to adequately review the scientific evidence pertaining to long-term risk of medical interventions to affirm sex-discordant gender identity

[340] See, e.g., R. Kaltiala-Heino et al., Two years of gender identity service for minors: overrepresentation of natal girls with severe problems in adolescent development, 9 Child Adolesc. Psychiatry Mental Health 9 (2015).
[341] See, e.g., G. N. Rider et al., Health and Care Utilization of Transgender and Gender Nonconforming Youth: A Population-Based Study, 141 Pediatrics e20171683 (2018).
[342] See, e.g., C. Bedard et al., Gender Identity and Sexual Orientation in People with Developmental Disabilities, 28 Sexuality and Disability 165 (2010).
[343] See, e.g., A. L. C. De Vries et al., Autism Spectrum Disorders in Gender Dysphoric Children and Adolescents, 40 J. Autism Dev. Disord. 930 (2010).
[344] See, e.g., D. E. Shumer et al., Overrepresentation of Adopted Adolescents at a Hospital-Based Gender Dysphoria Clinic, 2 Transgender Health 76 (2017).

150. Administering hormones to a child whose gender dysphoria is highly likely to resolve is risky, unscientific, and unethical. Iatrogenic damages from these interventions, including sterility, stunted growth, metabolic changes that increase risk of heart disease and diabetes, and many more, are often irreversible.

151. Because of these concerns about the safety, efficacy, and scientific validity of controversial, unproven, and experimental treatment paradigms, I have not personally engaged in the delivery of gender-affirming medical interventions to children with gender dysphoria. Given the unproven long-term benefits and the well-documented risks and harms of "transitioning" children, I decline to participate in such experimental treatments until the science has proven that the relative risks and benefits of this approach warrant such procedures.

152. My decision is strengthened by the knowledge that the vast majority of children who report gender dysphoria will, if not affirmed in their sex-discordant gender identity grow out of the problem — a natural coping-developmental process — and willingly accept their biological sex. Since there are no reliable assessment methods for identifying the small percentage of children with persisting sex-gender identity discordance from the vast majority who will accept their biological sex, and since puberty blocking treatments, hormone transition treatments, and surgical transition treatments are all known to have potentially life-long devastating, negative effects on patients, I and many colleagues view it as unethical to treat children with an unknown future by using experimental, aggressive, and intrusive gender affirming medical interventions.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on May 19, 2023.

Paul W Hruz

Paul W. Hruz, M.D., Ph.D.

Curriculum Vitae

Date: 3/19/2023
Name: Paul W. Hruz, M.D., Ph.D.

Contact Information

Office:	Phone: 314-286-2797 Fax: 314-286-2892
Mail:	Washington University in St. Louis School of Medicine Department of Pediatrics Endocrinology and Diabetes 660 South Euclid Avenue St Louis MO 63110
Email:	Office: hruz_p@wustl.edu

Present Position

Associate Professor of Pediatrics, Endocrinology and Diabetes
Associate Professor of Pediatrics, Cell Biology & Physiology

Education

1987	BS, Chemistry, Marquette University, Milwaukee, WI
1993	PhD, Biochemistry, Medical College of Wisconsin, Milwaukee, WI Elucidation of Structural, Mechanistic, and Regulatory Elements in 3-Hydroxy-3-Methlyglutaryl-Coenzyme A Lyase, Henry Miziorko
1994	MD, Medicine, Medical College of Wisconsin, Milwaukee, WI
1994 - 1997	Pediatric Residency, University of Washington, Seattle, Washington
1997 - 2000	Pediatric Endocrinology Fellowship, Washington University, Saint Louis, MO
2017	Certification in Healthcare Ethics, National Catholic Bioethics Center, Philadelphia, PA

Academic Positions / Employment

1996 - 1997	Locum Tenens Physician, Group Health of Puget Sound Eastside Hospital, Group Health of Puget Sound Eastside Hospital, Seattle , WA
2000 - 2003	Instructor in Pediatrics, Endocrinology and Diabetes, Washington University in St. Louis, St. Louis, MO
2003 - 2011	Assistant Professor of Pediatrics, Endocrinology and Diabetes, Washington University in St. Louis, St. Louis, MO
2004 - 2011	Assistant Professor of Pediatrics, Cell Biology & Physiology, Washington University in St. Louis, St. Louis, MO
2011 - Pres	Associate Professor of Pediatrics, Cell Biology & Physiology, Washington University in St. Louis, St. Louis, MO

2011 - Pres	Associate Professor of Pediatrics, Endocrinology and Diabetes, Washington University in St. Louis, St. Louis, MO
2012 - 2017	Division Chief, Endocrinology and Diabetes, Washington University in St. Louis, St. Louis, MO

Clinical Title and Responsibilities

	General Pediatrician, General Pediatric Ward Attending: 2-4 weeks per year, St. Louis Children's Hospital
2000 - Pres	Pediatric Endocrinologist, Endocrinology Night Telephone Consult Service: Average of 2-6 weeks/per year, St. Louis Children's Hospital
2000 - Pres	Pediatric Endocrinologist, Inpatient Endocrinology Consult Service: 3-6 weeks per year, St. Louis Children's Hospital
2000 - Pres	Pediatric Endocrinologist, Outpatient Endocrinology Clinic: Approximately 150 patient visits per month, St. Louis Children's Hospital

Teaching Title and Responsibilities

2009 - Pres	Lecturer, Markey Course-Diabetes Module
2008 – 2016	Fellowship Program Director- Pediatric Endocrinology and Diabetes
2020 - 2020	Facilitator, Reading Elective-Interdisciplinary/Miscellaneous Course #M80-800, Washington University School of Medicine
2019 – Pres	Associate Fellowship Program Director- Pediatric Endocrinology and Diabetes

University, School of Medicine and Hospital Appointments and Committees

University

2012 - 2020	Disorders of Sexual Development Multidisciplinary Care Program

School of Medicine

2013 - 2020	Molecular Cell Biology Graduate Student Admissions Committee
2014 - Pres	Research Consultant, ICTS Research Forum - Child Health

Hospital

2000 - Pres	Attending Physician, St. Louis Children's Hospital

Medical Licensure and Certifications

1997 - Pres	Board Certified in General Pediatrics
2000 - Pres	MO Stae License #2000155004
2001 - Pres	Board Certified in Pediatric Endocrinology & Metabolism

Honors and Awards

1987	National Institute of Chemists Research and Recognition Award
1987	Phi Beta Kappa
1987	Phi Lambda Upsilon (Honorary Chemical Society)
1988	American Heart Association Predoctoral Fellowship Award

1994	Alpha Omega Alpha
1994	Armond J. Quick Award for Excellence in Biochemistry
1994	NIDDK/Diabetes Branch Most Outstanding Resident
1998	Pfizer Postdoctoral Fellowship Award
2002	Scholar, Child Health Research Center of Excellence in Developmental Biology at Washington University
2013	Julio V Santiago, M.D. Scholar in Pediatrics
2017	Redemptor Hominis Award for Outstanding Contributions to the Study of Bioethics
2018	Eli Lilly Outstanding Contribution to Drug Discovery: Emerging Biology Award
2018	Scholar-Innovator Award, Harrington Discovery Institute
2021	Linacre Award

Editorial Responsibilities

Editorial Ad Hoc Reviews

	AIDS
	AIDS Research and Human Retroviruses
	American Journal of Pathology
	American Journal of Physiology
	British Journal of Pharmacology
	Circulation Research
	Clinical Pharmacology & Therapeutics
	Comparative Biochemistry and Physiology
	Diabetes
	Experimental Biology and Medicine
	Future Virology
	Journal of Antimicrobial Chemotherapy
	Journal of Clinical Endocrinology & Metabolism
	Journal of Molecular and Cellular Cardiology
	Obesity Research
2000 - Pres	Journal of Biological Chemistry
2013 - Pres	PlosOne
2016 - Pres	Scientific Reports
2018 - Pres	Nutrients

Editorial Boards

2014 - 2015	Endocrinology and Metabolism Clinics of North America

National Panels, Committees

2017 - Pres	Consultant, Catholic Health Association
2021 - Pres	Consulting Fellow, National Catholic Bioethics Center

National Boards

2020 - Pres	WU ICTS Clinical and Translational Research Funding Program (CTRFP) Review Committee

Professional Societies and Organizations

American Diabetes Association

Endocrine Society

Pediatric Endocrine Society

Major Invited Professorships and Lectures

2002	Pediatric Grand Rounds, St. Louis Children's Hospital, St Louis, MO
2004	National Disease Research Interchange, Human Islet Cell Research Conference, Philadelphia, PA
2004	NIDA-NIH Sponsored National Meeting on Hormones, Drug Abuse and Infections, Bethesda, MD
2005	Endocrine Grand Rounds, University of Indiana, Indianapolis, IN
2005	The Collaborative Institute of Virology, Complications Committee Meeting, Boston, MA
2006	Metabolic Syndrome Advisory Board Meeting, Bristol-Meyers Squibb, Pennington, NJ
2007	American Heart Association and American Academy of HIV Medicine State of the Science Conference: Initiative to Decrease Cardiovascular Risk and Increase Quality of Care for Patients Living with HIV/AIDS, Chicago, IL
2007	Minority Access to Research Careers Seminar, University of Arizona, Tucson, AZ
2007	MSTP Annual Visiting Alumnus Lecture, Medical College of Wisconsin , Milwaukee, WI
2007	Pediatric Grand Rounds, St Louis Children’s Hospital, St Louis, MO
2008	Division of Endocrinology, Diabetes and Nutrition Grand Rounds, Boston University, Boston, MA
2009	Pediatric Grand Rounds, St Louis Children's Hospital, St. Louis, MO
2010	American Diabetes Association Scientific Sessions, Symposium Lecture Orlando, FL
2010	School of Biological Sciences Conference Series, University of Missouri Kansas City, Kansas City, MO
2011	Life Cycle Management Advisory Board Meeting, Bristol-Myers Squibb,, Chicago, IL
2013	Pediatric Grand Rounds, St Louis Children's Hospital, ST LOUIS, MO
2013	Clinical Practice Update Lecture, St Louis Children's Hospital, St Louis, MO
2014	Pediatric Academic Societies Meeting,, Vancouver, Canada
2014	American Diabetes Association 74th Scientific Sessions, , San Francisco, CA
2017	Division of Pediatric Endocrinology Metabolism Rounds, University of Michigan, Ann Arbor, MI
2017	Catholic Medical Association National Conference, Denver, CO
2018	Obstetrics, Gynecology & Women's Health Grand Rounds, Saint Louis University, St. Louis, MO
2018	Medical Grand Rounds, Sindicato Médico del Uruguay, Montevideo, Uraquay
2018	Internal Medicine Grand Rounds, Texas Tech , Lubbock, TX
2019	Veritas Center for Ethics in Public Life Conference, Franciscan University, Steubenville, OH
2019	MaterCare International Conference, Rome, Italy
2019	Child Health Policy Forum, Notre Dame University, South Bend , IN

2021	Obstetrics & Gynecology Grand Rounds, University of Tennessee, Knoxville , TN
2022	The World Federation of Catholic Medical Associations (*FIAMC*), Rome, Italy

Consulting Relationships and Board Memberships

1996 - 2012	Consultant, Bristol Myers Squibb
1997 - 2012	Consultant, Gilead Sciences

Research Support

Completed Governmental Support

2001 - 2006	K-08 A149747, NIH Mechanism of GLUT4 Inhibition by HIV Protease Inhibitors Role: Principal Investigator
2007 - 2012	R01 Mechanisms for Altered Glucose Homeostasis During HAART Role: Principal Investigator Total cost: $800,000.00
2009 - 2011	R01 Student Supp Mechanisms for Altered Glucose Homeostasis During HAART Role: Principal Investigator Total cost: $25,128.00
2009 - 2014	R01 Direct Effects of Antiretroviral Therapy on Cardiac Energy Homeostasis Role: Principal Investigator Total cost: $1,250,000.00
2017 - 2019	R-21 1R21AI130584 , National Institutes of Health SELECTIVE INHIBITION OF THE P. FALCIPARUM GLUCOSE TRANSPORTER PFHT Role: Principal Investigator Total cost: $228,750.00

Completed Non-Governmental Support

2015	Novel HIV Protease Inhibitors and GLUT4 Role: Principal Investigator
2008 - 2011	II Insulin Resistance and Myocardial Glucose Metabolism in Pediatric Heart Failure Role: Co-Investigator PI: Hruz Total cost: $249,999.00
2009 - 2012	Research Program Regulation of GLUT4 Intrinsic Activity Role: Principal Investigator Total cost: $268,262.00
2010 - 2011	Protective Effect of Saxagliptin on a Progressive Deterioration of Cardiovascular Function Role: Principal Investigator
2012 - 2015	II Solution-State NMR Structure and Dynamics of Facilitative Glucose Transport Proteins Role: Principal Investigator Total cost: $375,000.00

2017 - 2020 Prevention And Treatment Of Hepatic Steatosis Through Selective Targeting Of GLUT8
Role: Co-Principal Investigator
PI: DeBosch
Total cost: $450,000.00

2017 - 2021 Matching Micro Grant
Novel Treatment of Fatty Liver Disease (CDD/LEAP)
Role: Principal Investigator
Total cost: $68,500.00

2018 - 2021 LEAP Innovator Challenge
Novel Treatment of Fatty Liver Disease
Role: Principal Investigator
Total cost: $68,500.00

2019 - 2021 Scholar-Innovator Award HDI2019-SI-4555 , Harrington Foundation
Novel Treatment of Non-Alcoholic Fatty Liver Disease
Role: Principal Investigator
Total cost: $379,000.00

Current Governmental Support

2021 - 2025 R-01 DK126622 (Co-investigator), 8/25/2021-7/31/2025, NIH-NIDDK, , NIH
Leveraging glucose transport and the adaptive fasting response to modulate hepatic metabolism
Role: Co-Investigator
PI: DeBosch

Trainee/Mentee/Sponsorship Record

2002 - 2002 Nishant Raj- Undergraduate Student, Other
Study area: Researcher

2002 - 2010 Joseph Koster, PhD, Postdoctoral Fellow
Study area: Researcher

2003 - 2004 Johann Hertel, Medical Student
Study area: Research
Present position: Assistant Professor, University of North Carolina, Chapel Hill, NC

2003 - 2003 John Paul Shen, Medical Student
Study area: Research

2004 - 2005 Carl Cassel- High School Student, Other
Study area: Research

2004 - 2004 Christopher Hawkins- Undergraduate Student, Other
Study area: Researcher

2004 - 2004 Kaiming Wu- High School Student, Other
Study area: Research

2005 - 2005 Helena Johnson, Graduate Student

2005 - 2005 Jeremy Etzkorn, Medical Student
Study area: Researcher

2005 - 2005 Dominic Doran, DSc, Postdoctoral Fellow
Study area: HIV Protease Inhibitor Effects on Exercize Tolerance

2006 - 2006 Ramon Jin, Graduate Student
Study area: Research

2006 - 2006 Taekyung Kim, Graduate Student
Study area: Research

2007 - 2007 Jan Freiss- Undergraduate Student, Other
Study area: Researcher

2007 - 2008 Kai-Chien Yang, Graduate Student
Study area: Research
Present position: Postdoctoral Research Associate, University of Chicago

2007 - 2007 Paul Buske, Graduate Student
Study area: Research

2007 - 2007 Randy Colvin, Medical Student
Study area: Researcher

2008 - 2011 Arpita Vyas, MD, Clinical Fellow
Study area: Research
Present position: Assistant Professor, Michigan State University, Lansing MI

2008 - 2009 Candace Reno, Graduate Student
Study area: Research
Present position: Research Associate, University of Utah

2008 - 2012 Dennis Woo- Undergraduate Student, Other
Study area: Researcher
Present position: MSTP Student, USC, Los Angeles CA

2008 - 2008 Temitope Aiyejorun, Graduate Student
Study area: Research

2009 - 2009 Anne-Sophie Stolle- Undergraduate Student, Other
Study area: Research

2009 - 2009 Matthew Hruz- High School Student, Other
Study area: Research
Present position: Computer Programmer, Consumer Affairs, Tulsa OK

2009 - 2009 Stephanie Scherer, Graduate Student
Study area: Research

2010 - 2014 Lauren Flessner, PhD, Postdoctoral Fellow
Present position: Instructor, Syracuse University

2010 - 2010 Constance Haufe- Undergraduate Student, Other
Study area: Researcher

2010 - 2011 Corinna Wilde- Undergraduate Student, Other
Study area: Researcher

2010 - 2010 Samuel Lite- High School Student, Other
Study area: Research

2011 - 2016 Thomas Kraft, Graduate Student
Study area: Glucose transporter structure/function
Present position: Postdoctoral Fellow, Roche, Penzberg, Germany

2011 - 2011 Amanda Koenig- High School Student, Other
Study area: Research

2011 - 2012 Lisa Becker- Undergraduate Student, Other

2011 - 2011 Melissa Al-Jaoude- High School Students, Other

2019 Ava Suda, Other, Pre-med

Bibliography

A. Journal Articles

1. Hruz PW, Narasimhan C, Miziorko HM. 3-Hydroxy-3-methylglutaryl coenzyme A lyase: affinity labeling of the Pseudomonas mevalonii enzyme and assignment of cysteine-237 to the active site. *Biochemistry*. 1992;31(29):6842-7. PMID:1637819
2. Hruz PW, Miziorko HM. Avian 3-hydroxy-3-methylglutaryl-CoA lyase: sensitivity of enzyme activity to thiol/disulfide exchange and identification of proximal reactive cysteines. *Protein Sci*. 1992;1(9):1144-53. doi:10.1002/pro.5560010908 PMCID:PMC2142181 PMID:1304393
3. Mitchell GA, Robert MF, Hruz PW, Wang S, Fontaine G, Behnke CE, Mende-Mueller LM, Schappert K, Lee C, Gibson KM, Miziorko HM. 3-Hydroxy-3-methylglutaryl coenzyme A lyase (HL). Cloning of human and chicken liver HL cDNAs and characterization of a mutation causing human HL deficiency. *J Biol Chem*. 1993;268(6):4376-81. PMID:8440722
4. Hruz PW, Anderson VE, Miziorko HM. 3-Hydroxy-3-methylglutaryldithio-CoA: utility of an alternative substrate in elucidation of a role for HMG-CoA lyase's cation activator. *Biochim Biophys Acta*. 1993;1162(1-2):149-54. PMID:8095409
5. Roberts JR, Narasimhan C, Hruz PW, Mitchell GA, Miziorko HM. 3-Hydroxy-3-methylglutaryl-CoA lyase: expression and isolation of the recombinant human enzyme and investigation of a mechanism for regulation of enzyme activity. *J Biol Chem*. 1994;269(27):17841-6. PMID:8027038
6. Hruz PW, Mueckler MM. Cysteine-scanning mutagenesis of transmembrane segment 7 of the GLUT1 glucose transporter. *J Biol Chem*. 1999;274(51):36176-80. PMID:10593902
7. Murata H, Hruz PW, Mueckler M. The mechanism of insulin resistance caused by HIV protease inhibitor therapy. *J Biol Chem*. 2000;275(27):20251-4. doi:10.1074/jbc.C000228200 PMID:10806189
8. Hruz PW, Mueckler MM. Cysteine-scanning mutagenesis of transmembrane segment 11 of the GLUT1 facilitative glucose transporter. *Biochemistry*. 2000;39(31):9367-72. PMID:10924131
9. Hruz PW, Mueckler MM. Structural analysis of the GLUT1 facilitative glucose transporter (review). *Mol Membr Biol*. 2001;18(3):183-93. PMID:11681785
10. Murata H, Hruz PW, Mueckler M. Investigating the cellular targets of HIV protease inhibitors: implications for metabolic disorders and improvements in drug therapy. *Curr Drug Targets Infect Disord*. 2002;2(1):1-8. PMID:12462148
11. Hruz PW, Murata H, Qiu H, Mueckler M. Indinavir induces acute and reversible peripheral insulin resistance in rats. *Diabetes*. 2002;51(4):937-42. PMID:11916910
12. Murata H, Hruz PW, Mueckler M. Indinavir inhibits the glucose transporter isoform Glut4 at physiologic concentrations. *AIDS*. 2002;16(6):859-63. PMID:11919487
13. Koster JC, Remedi MS, Qiu H, Nichols CG, Hruz PW. HIV protease inhibitors acutely impair glucose-stimulated insulin release. *Diabetes*. 2003;52(7):1695-700. PMCID:PMC1403824 PMID:12829635
14. Liao Y, Shikapwashya ON, Shteyer E, Dieckgraefe BK, Hruz PW, Rudnick DA. Delayed hepatocellular mitotic progression and impaired liver regeneration in early growth response-1-deficient mice. *J Biol Chem*. 2004;279(41):43107-16. doi:10.1074/jbc.M407969200 PMID:15265859
15. Shteyer E, Liao Y, Muglia LJ, Hruz PW, Rudnick DA. Disruption of hepatic adipogenesis is associated with impaired liver regeneration in mice. *Hepatology*. 2004;40(6):1322-32. doi:10.1002/hep.20462 PMID:15565660
16. Hertel J, Struthers H, Horj CB, Hruz PW. A structural basis for the acute effects of HIV protease inhibitors on GLUT4 intrinsic activity. *J Biol Chem*. 2004;279(53):55147-52. doi:10.1074/jbc.M410826200 PMCID:PMC1403823 PMID:15496402

17. Yan Q, Hruz PW. Direct comparison of the acute in vivo effects of HIV protease inhibitors on peripheral glucose disposal. *J Acquir Immune Defic Syndr*. 2005;40(4):398-403. PMCID:PMC1360159 PMID:16280693
18. Hruz PW. Molecular Mechanisms for Altered Glucose Homeostasis in HIV Infection. *Am J Infect Dis*. 2006;2(3):187-192. PMCID:PMC1716153 PMID:17186064
19. Turmelle YP, Shikapwashya O, Tu S, Hruz PW, Yan Q, Rudnick DA. Rosiglitazone inhibits mouse liver regeneration. *FASEB J*. 2006;20(14):2609-11. doi:10.1096/fj.06-6511fje PMID:17077279
20. Hruz PW, Yan Q, Struthers H, Jay PY. HIV protease inhibitors that block GLUT4 precipitate acute, decompensated heart failure in a mouse model of dilated cardiomyopathy. *FASEB J*. 2008;22(7):2161-7. doi:10.1096/fj.07-102269 PMID:18256305
21. Hruz PW. HIV protease inhibitors and insulin resistance: lessons from in-vitro, rodent and healthy human volunteer models. *Curr Opin HIV AIDS*. 2008;3(6):660-5. doi:10.1097/COH.0b013e3283139134 PMCID:PMC2680222 PMID:19373039
22. Flint OP, Noor MA, Hruz PW, Hylemon PB, Yarasheski K, Kotler DP, Parker RA, Bellamine A. The role of protease inhibitors in the pathogenesis of HIV-associated lipodystrophy: cellular mechanisms and clinical implications. *Toxicol Pathol*. 2009;37(1):65-77. doi:10.1177/0192623308327119 PMCID:PMC3170409 PMID:19171928
23. Tu P, Bhasin S, Hruz PW, Herbst KL, Castellani LW, Hua N, Hamilton JA, Guo W. Genetic disruption of myostatin reduces the development of proatherogenic dyslipidemia and atherogenic lesions in Ldlr null mice. *Diabetes*. 2009;58(8):1739-48. doi:10.2337/db09-0349 PMCID:PMC2712781 PMID:19509018
24. Guo W, Wong S, Pudney J, Jasuja R, Hua N, Jiang L, Miller A, Hruz PW, Hamilton JA, Bhasin S. Acipimox, an inhibitor of lipolysis, attenuates atherogenesis in LDLR-null mice treated with HIV protease inhibitor ritonavir. *Arterioscler Thromb Vasc Biol*. 2009;29(12):2028-32. doi:10.1161/ATVBAHA.109.191304 PMCID:PMC2783673 PMID:19762785
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26. Gazit V, Weymann A, Hartman E, Finck BN, Hruz PW, Tzekov A, Rudnick DA. Liver regeneration is impaired in lipodystrophic fatty liver dystrophy mice. *Hepatology*. 2010;52(6):2109-17. doi:10.1002/hep.23920 PMCID:PMC2991544 PMID:20967828
27. Hresko RC, Hruz PW. HIV protease inhibitors act as competitive inhibitors of the cytoplasmic glucose binding site of GLUTs with differing affinities for GLUT1 and GLUT4. *PLoS One*. 2011;6(9):e25237. doi:10.1371/journal.pone.0025237 PMCID:PMC3179492 PMID:21966466
28. Vyas AK, Yang KC, Woo D, Tzekov A, Kovacs A, Jay PY, Hruz PW. Exenatide improves glucose homeostasis and prolongs survival in a murine model of dilated cardiomyopathy. *PLoS One*. 2011;6(2):e17178. doi:10.1371/journal.pone.0017178 PMCID:PMC3040766 PMID:21359201
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39. Kraft TE, Heitmeier MR, Putanko M, Edwards RL, Ilagan MX, Payne MA, Autry JM, Thomas DD, Odom AR, Hruz PW. A Novel Fluorescence Resonance Energy Transfer-Based Screen in High-Throughput Format To Identify Inhibitors of Malarial and Human Glucose Transporters. *Antimicrob Agents Chemother*. 2016;60(12):7407-7414. PMCID:PMC5119023 PMID:27736766
40. Mayer AL, Higgins CB, Heitmeier MR, Kraft TE, Qian X, Crowley JR, Hyrc KL, Beatty WL, Yarasheski KE, Hruz PW, DeBosch BJ. SLC2A8 (GLUT8) is a mammalian trehalose transporter required for trehalose-induced autophagy. *Sci Rep*. 2016;6:38586. PMCID:PMC5138640 PMID:27922102
41. Edwards RL, Brothers RC, Wang X, Maron MI, Ziniel PD, Tsang PS, Kraft TE, Hruz PW, Williamson KC, Dowd CS, John ARO. MEPicides: potent antimalarial prodrugs targeting isoprenoid biosynthesis. *Sci Rep*. 2017;7(1):8400. PMCID:PMC5567135 PMID:28827774
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43. Wei C, Heitmeier M, Hruz PW, Shanmugam M. Evaluating the Efficacy of GLUT Inhibitors Using a Seahorse Extracellular Flux Analyzer. *Methods Mol Biol*. 2018;1713:69-75. PMID:29218518
44. Heitmeier MR, Payne MA, Weinheimer C, Kovacs A, Hresko RC, Jay PY, Hruz PW. Metabolic and Cardiac Adaptation to Chronic Pharmacologic Blockade of Facilitative Glucose Transport in Murine Dilated Cardiomyopathy and Myocardial Ischemia. *Sci Rep*. 2018;8(1):6475. PMID:29691457
45. Zhang Y, Higgins CB, Mayer AL, Mysorekar IU, Razani BB, Graham MJ, Hruz PW, DeBosch BJ. TFEB-dependent Induction of Thermogenesis by the Hepatocyte SLC2A Inhibitor Trehalose. *Autophagy*. 2018. PMID:29996716

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47. Heitmeier MR, Hresko RC, Edwards RL, Prinsen MJ, Ilagan MXG, Odom John AR, Hruz PW. Identification of druggable small molecule antagonists of the Plasmodium falciparum hexose transporter PfHT and assessment of ligand access to the glucose permeation pathway via FLAG-mediated protein engineering. *PLoS One*. 2019;14(5):e0216457. PMCID:PMC6508677 PMID:31071153
48. Hruz PW. Deficiencies in Scientific Evidence for Medical Management of Gender Dysphoria. *Linacre Q*. 2020;87(1):34-42. PMCID:PMC7016442 PMID:32431446
49. Zhang Y, Shaikh N, Ferey JL, Wankhade UD, Chintapalli SV, Higgins CB, Crowley JR, Heitmeier MR, Stothard AI, Mihi B, Good M, Higashiyama T, Swarts BM, Hruz PW, Shankar K, Tarr PI, DeBosch BJ. Lactotrehalose, an Analog of Trehalose, Increases Energy Metabolism Without Promoting Clostridioides difficile Infection in Mice. *Gastroenterology*. 2020;158(5):1402-1416.e2. PMCID:PMC7103499 PMID:31838076
50. Malone WJ, Hruz PW, Mason JW, Beck S. Letter to the Editor from William J. Malone: "Proper Care of Transgender and Gender Diverse Persons in the Setting of Proposed Discrimination: A Policy Perspective". *J Clin Endocrinol Metab*. 2021. PMID:33772300
51. McMillin SL, Evans PL, Taylor WM, Weyrauch LA, Sermersheim TJ, Welc SS, Heitmeier MR, Hresko RC, Hruz PW, Koumanov F, Holman GD, Abel ED, Witczak CA. Muscle-Specific Ablation of Glucose Transporter 1 (GLUT1) Does Not Impair Basal or Overload-Stimulated Skeletal Muscle Glucose Uptake. *Biomolecules*. 2022;12(12):1734. PMID: 36551162; PMCID: PMC9776291.
52. Tayebi N, Leon-Ricardo B, McCall K, Mehinovic E, Engelstad K, Huynh V, Turner TN, Weisenberg J, Thio LL, Hruz P, Williams RSB, De Vivo DC, Petit V, Haller G, Gurnett CA. Quantitative determination of SLC2A1 variant functional effects in GLUT1 deficiency syndrome. Ann Clin Transl Neurol. 2023 May;10(5):787-801. doi: 10.1002/acn3.51767. Epub 2023 Mar 31. PMID: 37000947; PMCID: PMC10187726.

C2. Chapters

1. Henderson KE, Baranski TJ, Bickel PE, Clutter PE, Clutter WE, McGill JB. Endocrine Disorders in HIV/AIDS. In: *The Washington Manual Endocrinology Subspecialty Consult* Philadelphia, PA; 2008:321-328.
2. Paul W Hruz. Medical Approaches to Alleviating Gender Dysphoria In: Edward J Furton, eds. *Transgender Issues in Catholic Health Care* Philadelphia PA; 2021:1-42.
3. Cara Buskmiller and Paul Hruz. A Biological Understanding of Man and Woman In: John Finley, eds. *Sexual Identity: The Harmony of Philosophy, Science, and Revelation* Steubenville OH; 2022:Chapter 2, pp 65-103.

C4. Invited Publications

1. Grunfeld C, Kotler DP, Arnett DK, Falutz JM, Haffner SM, Hruz P, Masur H, Meigs JB, Mulligan K, Reiss P, Samaras K, Working Group 1. Contribution of metabolic and anthropometric abnormalities to cardiovascular disease risk factors. *Circulation*. 2008;118(2):e20-8. PMCID: PMC3170411 PMID: 18566314
2. Hruz PW. HIV protease inhibitors and insulin resistance: lessons from in-vitro, rodent and healthy human volunteer models. *Curr Opin HIV AIDS*. 2008;3(6):660-5. PMCID: PMC2680222 PMID: 19373039

3. Hruz PW. Molecular mechanisms for insulin resistance in treated HIV-infection. *Best Pract Res Clin Endocrinol Metab*. 2011;25(3):459-68. PMCID: PMC3115529 PMID: 21663839
4. Hruz PW. HIV and endocrine disorders. *Endocrinol Metab Clin North Am*. 2014;43(3): xvii–xviii. PMID: 25169571
5. Hruz PW. Commentary. *Clin Chem*. 2015;61(12):1444. PMID: 26614228
6. Hruz PW, Mayer LS, and McHugh PR. Growing Pains: Problems with Pubertal Suppression in Treating Gender Dysphoria *The New Atlantis*. 2017;52:3-36.
7. Hruz, PW. The Use of Cross-Sex Steroids in Treating Gender Dysphoria *Natl Cathol Bioeth Q*. 2018;17(4):1-11.
8. Hruz, PW. Experimental Approaches to Alleviating Gender Dysphoria in Children *Nat Cathol Bioeth Q*. 2019;19(1):89-104.

Expert Witness Testimony

2009 Rosas v. Astrazeneca

2012 O'Connor v. Stamford

2016 Carcaño et al. v. Patrick McCrory (United States District Court, M.D. North Carolina)

2016 Jane Doe v. Board of Education of the Highland School District (United States District Court For the Southern District of Ohio Eastern Division, Case No. 2:16-CV-, 524)

2017 Ward v. Janssen (Circuit Court of St Louis, Division 16, MO, Case No. 1522-CC00213-01)

2017 Adams v. St John's School Board (United States District Court For the Middle District of Florida, FL Civil Action No. 3:17-cv-00739-TJCJBT)

2017 Ashton Whitaker v. Kenosha Unified School District (United States District Court Eastern District of Wisconsin, Civ. Action No. 2:16-cv-00943)

2018 Terri Bruce v. State of South Dakota (The United States District Court District of South Dakota Western Division, Case No. 17-5080)

2019 Cause DF-15-09887-SD of the 255th Judicial Circuit of Dallas County, TX regarding the dispute between J.A. D.Y. and J.U. D.Y., Children

2021 Kadel vs. Falwell (The United States District Court For The Middle District Of North Carolina, Case No.: 1:19-cv-272-LCB-LPA)

2022 Brandt v Rutledge (The United States District Court Eastern District of Arkansas Central Division, Case No. 4:21-CV-00450-JM)

2022 Eknes-Tucker vs Ivey (United States District Court Middle District of Alabama Northern Division, Case 2:22-cv-00184-LCB-SRW)

2022 D.H. et al. v. Snyder (United States District Court For the District Court of Arizona, Case No. 4:20-cv-00335-SHR)

EXHIBIT 5

IN THE UNITED STATES DISTRICT COURT
FOR THE MIDDLE DISTRICT OF TENNESSEE
NASHVILLE DIVISION

L.W. et al., *by and through her parents and next friends, Samantha Williams and Brian Williams,*	)	
Plaintiffs,	)	No. 3:23-cv-00376 JUDGE RICHARDSON
v.	)	
JONATHAN SKRMETTI et al.,	)	
Defendants.	)	

EXPERT DECLARATION OF STEPHEN B. LEVINE, M.D.

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I. CREDENTIALS

1. I am Clinical Professor of Psychiatry at Case Western Reserve University School of Medicine and maintain an active private clinical practice. I received my M.D. from Case Western Reserve University in 1967 and completed a psychiatric residency at the University Hospitals of Cleveland in 1973. I became an Assistant Professor of Psychiatry at Case Western in 1973, became a Full Professor in 1985, and in 2021 was honored to be inducted into the Department of Psychiatry's "Hall of Fame."

2. Since July 1973, my specialties have included psychological problems and conditions relating to individuals' sexuality and sexual relations, therapies for sexual problems, and the relationship between love, intimate relationships, and wider mental health. In 2005, I received the Masters' and Johnson Lifetime Achievement Award from the Society of Sex Therapy and Research. I am a Distinguished Life Fellow of the American Psychiatric Association.

3. I have served as a book and manuscript reviewer for numerous professional publications. I have been the Senior Editor of the first (2003), second (2010), and third (2016) editions of the *Handbook of Clinical Sexuality for Mental Health Professionals*. In addition to five previously solo-authored books for professionals, I have published *Psychotherapeutic Approaches to Sexual Problems* (2020). The book has a chapter titled "The Gender Revolution."

4. In total I have authored or co-authored over 180 journal articles and book chapters, 27 of which deal with the issue of gender dysphoria. I was an invited member of a Cochrane Collaboration subcommittee that sought to publish a review of the scientific literature on the effectiveness of puberty blocking hormones and of cross-sex hormones for gender dysphoria for adolescents. Cochrane Reviews are a well-respected cornerstone of evidence-

based practice, comprising a systematic review that aims to identify, appraise, and synthesize all the empirical evidence that meets pre-specified eligibility criteria in response to a particular research question.

5. I first encountered a patient suffering what we would now call gender dysphoria in July 1973. In 1974, I founded the Case Western Reserve University Gender Identity Clinic and have served as Co-Director of that clinic since that time. Across the years, our Clinic treated hundreds of patients who were experiencing a transgender identity. An occasional child was seen during this era. I was the primary psychiatric caregiver for several dozen of our patients and supervisor of the work of other therapists. I was an early member of the Harry Benjamin International Gender Dysphoria Association (later known as WPATH) and served as the Chairman of the committee that developed the 5th version of its Standards of Care. In 1993 the Gender Identity Clinic was renamed, moved to a new location, and became independent of Case Western Reserve University. I continue to serve as Co-Director.

6. In the course of my five decades of practice treating patients who suffered from gender dysphoria, I have at one time or another recommended or supported social transition, cross-sex hormones, and surgery for particular patients, but only after extensive diagnostic and psychotherapeutic work.

7. In 2006, Judge Mark Wolf of the Eastern District of Massachusetts asked me to serve as an independent, court-appointed expert in a litigation involving the treatment of a transgender inmate within the Massachusetts prison system. In that litigation, the U.S. Court of Appeals for the First Circuit in a 2014 (En Banc) opinion cited and relied on my expert testimony. I have been retained by the Massachusetts Department of Corrections as a consultant on the treatment of transgender inmates since 2007.

8. In 2019, I was qualified as an expert and testified concerning the diagnosis,

understanding, developmental paths and outcomes, and therapeutic treatment of transgenderism and gender dysphoria, particularly as it relates to children, in the matter of *In the Interest of J.A.D.Y. and J.U.D.Y.*, Case No. DF-15-09887-S, 255th Judicial District, Dallas County, TX (the "*Younger* litigation").

9. In 2019, I provided written expert testimony in the landmark case in the United Kingdom in the case of *Bell v. The Tavistock and Portman NHS Foundation Trust*. I have provided expert testimony in other litigation as listed in my curriculum vitae, which is attached as Exhibit "A".

10. I am regularly requested to speak on the topic of gender dysphoria and have given countless presentations to academic conferences and Departments of Psychiatry around the country. In May 2022, I organized and co-presented a symposium on the management of adolescent-onset transgender identity at American Psychiatric Association's Annual Meeting.

11. A fuller review of my professional experience, publications, and awards is provided in my curriculum vitae, a copy of which is attached hereto as Exhibit "A".

12. The bases for my opinions expressed in this report are my professional experience as a psychiatrist, my knowledge of the pertinent scientific literature, and my review of the complaints filed by the plaintiffs and the United States and the expert declarations of Armand H. Matheny Antommaria, M.D., Ph.D, FAAP, HEC-C, Jack Turban, M.D., Aron Janssen, M.D., and Deanna Adkins, M.D.

13. I am being compensated for my time spent in connection with this case at a rate of $400.00 per hour. My compensation is not dependent upon the outcome of this litigation or the substance of my opinions.

II. SUMMARY

14. A summary of the key points that I explain in this report is as follows:

a. Sex as defined by biology and reproductive function is clear, binary, and cannot be changed. While hormonal and surgical procedures may enable some individuals to "pass" as the opposite gender during some or all of their lives, such procedures carry with them physical, psychological, and social risks, and no procedures can enable an individual to perform the reproductive role of the opposite sex. (Section III.A.)

b. The diagnosis of "gender dysphoria" encompasses a diverse array of conditions, with widely differing pathways and characteristics depending on age of onset, biological sex, mental health, intelligence, motivations for gender transition, socioeconomic status, country of origin, etc. Data from one population (e.g., adults) cannot be assumed to be applicable to others (e.g., children). (Section III.B.)

c. Among practitioners in the field, there are currently widely varying views concerning both the causes of and appropriate therapeutic response to gender dysphoria in children and adolescents. There are no generally accepted "standards of care," and existing studies do not provide a basis for a scientific conclusion as to which therapeutic response results in the best long-term outcomes for affected individuals. The scientific basis for affirmative care is uncertain. (Section III.)

d. Transgender identity is not biologically based; it is not determined prenatally. Rather, gender dysphoria is a psychiatric condition that cannot be identified by any biological test or measurement. (Sections V.A, IV.B.)

e. Disorders of sexual development ("DSDs") are biologically-based

phenomena. It is an error to conflate and/or scientifically link DSDs with incidents of gender dysphoria. (Sections V.C, V.D.)

f. The large majority of children who are diagnosed with gender dysphoria "desist"—that is, their gender dysphoria does not persist—by puberty or adulthood. Desistance is also increasingly observed among teens and young adults who have experienced "rapid onset gender dysphoria" — first manifesting gender dysphoria during or shortly after adolescence. (Section VI.A., VI.B.)

g. "Social transition" —the active affirmation of transgender identity—in young children is a powerful social intervention that will substantially reduce the number of children "desisting" from transgender identity. Therefore, the profound implications of "affirmative" treatment—which include taking puberty blockers and cross-sex hormones—must be taken into account where social transition is being considered. (Section VII.A,, VII.B.)

h. Administration of puberty blockers is not a benign "pause" of puberty, but rather a powerful medical and psychotherapeutic intervention that almost invariably leads to persistence in a transgender identity and, ultimately, to the administration of cross-sex hormones. (Section VII.C.)

i. The knowledge base concerning the "affirmative" treatment of gender dysphoria available today has very low scientific quality with many relevant long-term implications remaining unknown. (Section VIII.A.)

j. There are no studies that show that affirmation of transgender identity in young children reduces suicide or suicidal ideation, or improves long-term outcomes, as compared to other therapeutic approaches. Meanwhile, multiple studies show that adult individuals living transgender lives suffer much higher rates of suicidal ideation,

completed suicide, and negative physical and mental health conditions than does the general population. This is true before and after transition, hormones, and surgery. (Section VIII.B., VIII.C.)

k. In light of what is known and not known about the impact of affirmation on the incidence of suicide, suicidal ideation, and other indicators of mental and physical health, it is scientifically baseless, and therefore unethical, to assert that a child or adolescent who express an interest in a transgender identity will kill him- or herself unless adults and peers affirm that child in a transgender identity. (Section IX.)

l. Hormonal interventions to treat gender dysphoria are experimental in nature and have not been shown to be safe, but rather put an individual at risk of a wide range of long-term and even life-long harms including: physical health risks; sterilization and the associated emotional response; impaired sexual response; surgical complications and life-long after-care; alienation of family and romantic relationships; elevated mental health risks of depression, anxiety, and substance abuse. (Section X.)

III. BACKGROUND ON THE FIELD

A. The biological baseline of the binary sexes

15. Biological sex is very well defined in all biological sciences including medicine. It is pervasively important in human development throughout the lifecycle.

16. Sex is not "assigned at birth" by humans visualizing the genitals of a newborn; it is not imprecise. Rather, it is clear, binary, and determined at conception. The sex of a human individual at its core structures the individual's biological reproductive capabilities—to produce ova and bear children as a mother, or to produce semen and beget children as a father. As physicians know, sex determination occurs at the instant of conception, depending on whether a

sperm's X or Y chromosome fertilizes the egg. A publication of the federal government's National Institute of Health accurately summarizes the scientific facts:

> "Sex is a biological classification, encoded in our DNA. Males have XY chromosomes, and females have XX chromosomes. Sex makes us male or female. Every cell in your body has a sex— making up tissues and organs, like your skin, brain, heart, and stomach. Each cell is either male or female depending on whether you are a man or a woman." (NIH, How Sex and Gender Influence Health and Disease, 2022.)

17. The binary of biological sex is so fundamental and wide-ranging in its effects on human (and mammal) development and physiology that since 2014, the NIH has required all funded research on humans or vertebrate animals to include "sex as a biological variable" and give "adequate consideration of both sexes in experiments." (NIH 2015.) In 2021, the Endocrine Society issued a position paper elaborating on the application of the NIH requirement. The Endocrine Society correctly stated that "Sex is a biological concept . . . all mammals have 2 distinct sexes;" that "biological sex is . . . a fundamental source of intraspecific variation in anatomy and physiology;" and that "In mammals, numerous sexual traits (gonads, genitalia, etc.) that typically differ in males and females are tightly linked to each other because one characteristic leads to sex differences in other traits." (Bhargava et al. 2021 at 221, 229.)

18. The Endocrine Society emphasized that "The terms sex and gender should not be used interchangeably," and noted that even in the case of those "rare" individuals who suffer from some defect such that they "possess a combination of male- and female-typical characteristics, those clusters of traits are sufficient to classify most individuals as either biologically male or female." They concluded, "Sex is an essential part of vertebrate biology, but gender is a human phenomenon. Sex often influences gender, but gender cannot influence sex." (Bhargava et al. 2021 at 220-221, 228.)

19. As these statements and the NIH requirement suggest, biological sex pervasively

influences human anatomy, its development and physiology. This includes, of course, the development of the human brain, in which many sexually dimorphic characteristics have now been identified. In particular, the Endocrine Society and countless other researchers have determined that human brains undergo particular sex-specific developmental stages during puberty. This predictable developmental process is a genetically controlled coordinated endocrine response that begins with pituitary influences leading to increases in circulating sex hormones. (Bhargava et al. 2021 at 225, 229; Blakemore et al. 2010 at 926-927, 929; NIH 2001.)

20. Humans have viewed themselves in terms of binary sexes since the earliest historical records. Recognizing a concept of "gender identity" as something distinct from sex is a rather recent innovation whose earliest manifestations likely began in the late 1940s. Its usage became common in medicine in the 1980s and subsequently in the larger culture. Definitions of gender have been evolving and remain individual-centric and subjective. In a statement on "Gender and Health," the World Health Organization defines "gender" as "the characteristics of women, men, girls and boys that are socially constructed" and that "var[y] from society to society and can change over time," and "gender identity" as referring to "a person's deeply felt, internal and individual experience of gender." (WHO Gender and Health.) As these definitions indicate, a person's "felt" "experience of gender" is inextricably bound up with and affected by societal gender roles and stereotypes—or, more precisely, by the affected individual's *perception* of societal gender roles and stereotypes and their personal idiosyncratic meanings. Typically, gendered persons also have subtly different, often idiosyncratic, reactions to societal gender roles and stereotypes without preoccupation with changing their anatomy.

21. Thus, the self-perceived gender of a child begins to develop along with the early stages of identity formation generally, influenced in part from how others label the infant: "I love you, son (daughter)." This designation occurs thousands of times in the first two years of life when

a child begins to show awareness of the two possibilities. As acceptance of the designated gender corresponding to the child's sex is the outcome in >99% of children everywhere, anomalous gender identity formation begs for understanding. Is it biologically shaped? Is it biologically determined? Is it the product of how the child was privately regarded and treated? Is it a product of the quality of early life caregiver attachments? Does it stem from trauma-based rejection of maleness or femaleness, and if so, flowing from what trauma? Does it derive from a tense, chaotic interpersonal parental relationship without physical or sexual abuse? Is it a symptom of another, as of yet, unrevealed, emotional disturbance or neuropsychiatric condition (autism)? The answers to these relevant questions are not scientifically known but are not likely to be the same for every trans-identified child, adolescent, or adult.

22. Under the influence of hormones secreted by the testes or ovaries, numerous additional sex-specific differences between male and female bodies continuously develop postnatally, culminating in the dramatic maturation of the primary and secondary sex characteristics with puberty. These include differences in hormone levels, height, weight, bone mass, shape, musculature, internal organ size, body fat levels and distribution, and hair patterns, as well as physiological differences such as menstruation and ejaculation. These are genetically programmed biological consequences of sex—the actual meaning of sex over time. Among the consequences of sex is the evolution and consolidation of gender identity during childhood, adolescence, and adulthood.

23. Despite the increasing ability of hormones and various surgical procedures to reconfigure some male bodies to visually pass as female, or vice versa, the biology of the person remains as defined by his (XY) or her (XX) chromosomes, including cellular, anatomic, and physiologic characteristics and the particular disease vulnerabilities associated with that chromosomally defined sex. For instance, the XX (genetically female) individual who takes

testosterone to stimulate certain male secondary sex characteristics will nevertheless remain unable to produce sperm and father children. Contrary to assertions and hopes that medicine and society can fulfill the aspiration of the trans individual to become "a complete man" or "a complete woman," this is not biologically attainable. (Levine 2018 at 6; Levine 2016 at 238.) It is possible for some adolescents and adults to pass unnoticed—that is, to be perceived by most individuals as a member of the gender that they aspire to be—but with limitations, costs, and risks, as I detail later.

B. Definition and diagnosis of gender dysphoria

24. Specialists have used a variety of terms over time, with somewhat shifting definitions, to identify and speak about a distressing incongruence between an individual's genetically determined sex and the gender with which they identify or to which they aspire. The American Psychiatric Association first used the term "gender identity disorder" in its *Diagnostic and Statistical Manual of Mental Disorders* in 1980 (DSM-III). The term "gender dysphoria" was introduced in the 2013 version of the DSM (DSM-5). Today's version of the DSM ("DSM-5-TR") defines gender dysphoria with separate sets of criteria for adolescents and adults on the one hand, and children on the other.

25. There are at least five distinct pathways to gender dysphoria: early childhood onset; onset near or after puberty with no prior cross gender patterns; onset after defining oneself as gay for several or more years and participating in a homosexual lifestyle; adult onset after years of heterosexual transvestism; and onset in later adulthood with few or no prior indications of cross-gender tendencies or identity. (Levine 2021.)

26. Gender dysphoria has very different characteristics depending on age and sex at onset. Young children who are living a transgender identity commonly suffer materially fewer symptoms of concurrent mental distress than do older patients. (Zucker 2018 at 10.) The

developmental and mental health patterns for each of these groups are sufficiently different that data developed in connection with one of these populations cannot be assumed to be applicable to another.

27. The criteria used in DSM-5-TR to identify Gender Dysphoria include a number of signs of discomfort with one's natal sex and vary somewhat depending on the age of the patient, but in all cases require "clinically significant distress or impairment in . . . important areas of functioning" such as social, school, or occupational settings. The symptoms must persist for at least six months.

28. Children who conclude that they are transgender are often unaware of a vast array of adaptive possibilities for how to live life as a man or a woman—possibilities that become increasingly apparent over time to both males and females. A boy or a girl who claims or expresses interest in pursuing a transgender identity often does so based on stereotypical notions of femaleness and maleness that reflect constrictive notions of what men and women can be. (Levine 2017 at 7.) A young child's—or even an adolescent's—understanding of this topic is quite limited. Nor can they grasp what it may mean for their future to be sterile. (Levine et al, 2022.) These children and adolescents consider themselves to be relatively unique; they do not realize that discomfort with the body and perceived social role is neither rare nor new to civilization. What is new is that such discomfort is thought to indicate that they must be a trans person.

C. Impact of gender dysphoria on minority and vulnerable groups

29. Given that, as I discuss later, a diagnosis of gender dysphoria is now frequently putting even young children on a pathway that leads to irreversible physical changes and sterilization by young adulthood, it should be of serious concern to all practitioners that minority and vulnerable groups are receiving this diagnosis at disproportionately high rates. These include: children of color (Rider et al. 2018), children with mental developmental disabilities (Reisner et

al. 2015), children on the autistic spectrum (at a rate more than 7x the general population) (Shumer et al. 2016; van der Miesen et al. 2018), children with ADHD (Becerra- Culqui et al. 2018), children residing in foster care homes, adopted children (at a rate more than 3x the general population) (Shumer et al. 2017), victims of childhood sexual or physical abuse or other "adverse childhood events" (Thoma 2021 et al.; Newcomb et al. 2020; Kozlowska et al.,2021), children with a prior history of psychiatric illness (Edwards-Leeper et al. 2017; Kaltiala- Heino et al. 2015; Littman 2018), and more recently adolescent girls (in a large recent study, at a rate more than 2x that of boys) (Rider et al. 2018 at 4).

D. Three competing conceptual models of gender dysphoria and transgender identity

30. Discussions about appropriate responses by mental health professionals ("MHPs") to actual or sub-threshold gender dysphoria are complicated by the fact that various speakers and advocates (or a single speaker at different times) view transgenderism through at least three very different paradigms, often without being aware of, or at least without acknowledging, the distinctions.

31. Gender dysphoria is **conceptualized and described by some professionals and laypersons as though it were a serious, physical medical illness that causes suffering**, comparable to diseases that are curable before it spreads, such as melanoma or sepsis. Within this paradigm, whatever is causing distress associated with gender dysphoria—whether secondary sex characteristics such as facial hair, nose and jaw shape, presence or absence of breasts, or the primary anatomical sex organs of testes, ovaries, penis, or vagina—should be removed to alleviate the illness. The promise of these interventions is the cure of the gender dysphoria.

32. Gender dysphoria is a psychiatric, not a medical, diagnosis. Since its inception in

DSM-III in 1980, it has always been specified in the psychiatric DSM manuals and has not been specified in medical diagnostic manuals. Notably, gender dysphoria is the only psychiatric condition to be treated by surgery, even though no endocrine or surgical intervention package corrects any identified biological abnormality. (Levine 2016 at 240.)

33. Gender dysphoria is alternatively **conceptualized in developmental terms**, as an adaptation to a psychological problem that may have been first manifested as a failure to establish a comfortable conventional sense of self in early childhood. This paradigm starts from the premise that all human lives are influenced by past processes and events. Trans lives are not exceptions to this axiom. (Levine 2016 at 238.) MHPs who think of gender dysphoria through this paradigm may work both to identify and address causes of the basic problem of the deeply uncomfortable self or a sense of self impaired by later adversity or abuse. The purpose is to ameliorate suffering when the underlying problem cannot be solved. MHPs first work with the patient and (ideally) family to learn about the events and processes that may have led to the trans person repudiating the gender associated with his sex. The developmental paradigm is mindful of temperamental, parental bonding, psychological, sexual, and physical trauma influences, and the fact that young children work out their psychological issues through fantasy and play and adolescents work out their issues by adopting various interests and identity labels.

34. There is evidence among adolescents that peer social influences through "friend groups" (Littman 2018) or through the internet can increase the incidence of gender dysphoria or claims of transgender identity. Responsible MHPs will want to probe these potential influences to better understand what is truly deeply tied to the psychology of the patient, and what may instead be being "tried on" by the youth as part of the adolescent process of self-exploration and self-definition. The dramatic recent increase in adolescents who do not identify as heterosexual is evidence of social influences in today's cultural environment.

35. In addition, the developmental paradigm recognizes that, with the important exception of genetic sex, essentially all aspects of an individual's identity evolve—often markedly—across the individual's lifetime. This includes gender. Some advocates assert that a transgender identity is biologically caused, fixed from early life, and eternally present in an unchanging manner. As I review later, however, this assertion is not supported by science.[1]

36. The third paradigm through which gender dysphoria is alternatively conceptualized is from **a sexual minority rights perspective**. Under this paradigm, any response other than medical and societal affirmation and implementation of a patient's claim to "be" the opposite gender is a violation of the individual's civil right to self-expression. Any effort to ask "why" questions about the patient's condition, or to address underlying causes, is viewed as a violation of autonomy and civil rights. In the last few years, this paradigm has been successful in influencing public policy and the education of pediatricians, endocrinologists, and many mental health professionals. Obviously, however, this is not a medical or psychiatric perspective. Unfortunately, it appears to be the most powerful perspective that exists in the public, non-scientific debate.

E. Four competing models of therapy

37. Few would disagree that the human psyche is complex. Few would disagree that children's and adolescents' developmental pathways typically have surprising twists and turns. The complexity and unpredictability of childhood and adolescent development equally applies to trans-identifying youth. Because of past difficulties of running placebo-controlled clinical trials in the transgender treatment arena, substantial disagreements among professionals about the causes of trans identities and their ideal treatments exist. These current disagreements might have been minimized if trans treated persons were carefully followed up to determine long term

[1] Even the advocacy organization The Human Rights Campaign asserts that a person can have "a fluid or unfixed gender identity." https://www.hrc.org/resources/glossary-of-terms.

outcomes. They have not been. When we add this to the very different current paradigms for understanding transgender phenomena, it is not scientifically surprising that disagreements are sharply drawn. It is with this in mind that I summarize below the leading approaches, and offer certain observations and opinions concerning them.

(1) The "watchful waiting" therapy model

38. In Section V.A below I review the uniform finding of eleven follow-up studies that the large majority of children who present with gender dysphoria will desist from desiring a transgender identity by adulthood if left untreated by social transition approaches.

39. When a pre-adolescent child presents with gender dysphoria, a "watchful waiting" approach seeks to allow for the fluid nature of gender identity in children to naturally evolve—that is, take its course from forces within and surrounding the child. Watchful waiting has two versions:

a. Treating any other psychological co-morbidities—that is, other mental illnesses as defined by DSM-5-TR (separation anxiety disorder, attention deficit hyperactivity disorder, autism spectrum disorder, obsessive compulsive disorder, etc), or subthreshold for diagnosis but behavioral problems that the child may exhibit (school avoidance, bedwetting, inability to make friends, aggression/defiance) without a focus on gender (**model #1**); and

b. No treatment at all for anything but a regular follow-up appointment. This might be labeled a "hands off" approach **(model #2**).

(2) The psychotherapy model: Alleviate distress by identifying and addressing causes (model #3)

40. One of the foundational principles of psychotherapy has long been to work with a patient to identify the causes of observed psychological distress and then to address those causes

as a means of alleviating the distress. The National Institute of Mental Health has promulgated the idea that 75% of adult psychopathology has its origins in childhood experience.

41. Many experienced practitioners in the field of gender dysphoria, including myself, have believed that it makes sense to employ these long-standing tools of psychotherapy for patients suffering gender dysphoria, asking the question as to what factors in the patient's life are the determinants of the patient's repudiation of his or her natal sex. (Levine 2017 at 8; Spiliatis 2019; Levine 2021.Levine et al, 2022) I and others have reported success in alleviating distress in this way for at least some patients, whether the patient's sense of discomfort or incongruence with his or her natal sex entirely disappeared or not. Relieving accompanying psychological co-morbidities leaves the patient freer to consider the pros and cons of transition as he or she matures.

42. Among other things, the psychotherapist who is applying traditional methods of psychotherapy may help—for example—the male patient to appreciate the wide range of masculine emotional and behavioral patterns as he grows older. He may discuss with his patient, for example, that one does not have to become a "woman" to be kind, compassionate, caring, noncompetitive, to love the arts, and to be devoted to others' feelings and needs. (Levine 2017 at 7.) Many biologically male trans individuals, from childhood to older ages, speak of their perceptions of femaleness as enabling them to discuss their feelings openly, whereas they perceive boys and men to be constrained from emotional expression within the family and larger culture, and to be aggressive. Men, of course, can be emotionally expressive, just as they can wear pink. Converse examples can be given for girls and women. These types of ideas regularly arise during psychotherapies.

43. As I note above, many gender-nonconforming children and adolescents in recent years derive from minority and vulnerable groups who have reasons to feel isolated and have an uncomfortable sense of self. A trans identity may be a hopeful attempt to redefine the self in a

manner that increases their comfort and decreases their anxiety. The clinician who uses traditional methods of psychotherapy may not focus on their gender identity, but instead work to help them to address the actual sources of their discomfort. They may enable the patient to understand the commonality of discomfort with the body's physiology, the growth process, and the struggle to accept oneself during the pubertal developmental process. Patients need to understand that this discomfort with one's body, per se, and one's attractiveness relative to others, typically lasts for several or more years. Success in this effort may remove or reduce the desire for a redefined identity. This often involves a focus on disruptions in their attachment to parents in vulnerable children, for instance, those in the foster care system.

44. Because "watchful waiting" can include treatment of accompanying psychological co-morbidities, and the psychotherapist who hopes to relieve gender dysphoria may focus on potentially causal sources of psychological distress rather than on the gender dysphoria itself, there is no sharp line between "watchful waiting" and the psychotherapy model in the case of prepubescent children.

45. To my knowledge, there is no evidence beyond anecdotal reports that psychotherapy can enable a return to male identification for genetically male boys, adolescents, and men, or return to female identification for genetically female girls, adolescents, and women. On the other hand, anecdotal evidence of such outcomes does exist; I and other clinicians have witnessed reinvestment in the patient's biological sex in some individual patients who are undergoing psychotherapy. The Internet contains many such reports, and I have published a paper on a patient who sought my therapeutic assistance to reclaim his male gender identity after 30 years living as a woman and is in fact living as a man today. (Levine 2019.) I have seen children desist even before puberty in response to thoughtful parental interactions and a few meetings of the child with a therapist. There are now a series of articles and at least one major book on the

psychological treatment of adolescents. (D'Angelo et al. 2021 at 7-16; Evans & Evans 2021.) Among detransitioners, a large percentage express regret that their affirmative therapists did not recommend psychotherapy before encouraging hormonal treatment (*Littman, (2021). Individuals treated for gender dysphoria with medical and/or surgical transition who subsequently detransitioned: A survey of 100 detransitioners. Archives of Sexual Behavior, 50(8)3353-3369). Exposito-Campos pointed out the large amount reports on detransition and the far greater traffic on various nonprofessional websites (Exposito-Campos, 2021).*

(3) The affirmation therapy model (model #4)

46. While it is widely agreed that the therapist should not directly challenge a claimed transgender identity in a child, some advocates and practitioners go much further, and promote and recommend that any expression of transgender identity should be immediately accepted as decisive, and thoroughly affirmed by means of consistent use of clothing, toys, pronouns, etc., associated with transgender identity. They argue that the child should be comprehensively re-socialized in grade school or junior or senior high school in their aspired-to gender. As I understand it, this is asserted as a reason why male students who assert a female gender identity must be permitted to compete in girls' or women's athletic events. These advocates treat any question about the causes of the child's transgender identification as inappropriate. They may not recognize the child's ambivalence. They assume that observed psychological co-morbidities in the children or their families are unrelated or will get better with transition, and need not be addressed by the MHP who is providing supportive guidance concerning the child's gender identity.

47. Some advocates, indeed, assert that unquestioning affirmation of any claim of transgender identity in children is essential, and that the child will otherwise face a high risk of suicide or severe psychological damage. This claim is simply not supported by the clinical data we have available to us. Indeed, available long-term data contradicts this claim. I address physical

and mental health outcomes in Section VII below, and suicide in Section VIII below.

48. The commonly referenced scientific basis for affirmative care of both early life onset and adolescent onset gender dysphoria are two reports from deVries et al (2011, 2014) that seemingly demonstrated the resolution of gender dysphoria after a sequence of puberty blocking hormones, cross-sex hormones, and breast removal or vaginoplasty. However, recently three articles describing the distinct limitations of the "Dutch Protocol" have been widely circulating throughout the world. (Levine et al, 2022; Biggs, 2022, Abbruzzese et al, 2023). It is now apparent that the basis for such affirmative care is not scientifically solid. Rapid diffusion of the innovative Dutch Protocol occurred without the scientifically required confirmatory more rigorous studies. The one attempt to repeat their protocol in the UK failed to demonstrate psychological benefits claimed by the Dutch studies. (Carmichael et al 2021).

49. I do not know what proportion of practitioners are using which model. However, in my opinion, in the case of young children, prompt and thorough affirmation of a transgender identity disregards the principles of child development and family dynamics and is not supported by science. Instead of science, this approach is currently being reinforced by an echo-chamber of approval from other like-minded child-oriented professionals who do not sufficiently consider the known negative medical and psychiatric outcomes of trans adults. Rather than recommend social transition in grade school, the MHP must focus attention on the child's underlying internal and familial issues. Ongoing relationships between the MHP and the parents, and the MHP and the child, are vital to help the parents, child, other family members, and the MHP to understand over time the issues that need to be dealt with by each of them.

50. Likewise, since the child's sense of gender develops in interaction with his parents and their own gender roles and relationships, the responsible MHP will almost certainly need to delve into family and marital dynamics. This, however, requires time and effort and for

many parents, a challenge to find a therapist to do such work with them.

IV. THERE IS NO CONSENSUS OR AGREED "STANDARD OF CARE" CONCERNING THERAPEUTIC APPROACHES TO CHILD OR ADOLESCENT GENDER DYSPHORIA.

51. There is far too little firm clinical evidence in this field to permit any evidence-based standard of care. Given the lack of scientific evidence, it is neither surprising nor improper that—as I detailed in Section II—there is a diversity of views among practitioners as to the best therapeutic response for the child, adolescent, or young adult who suffers from gender dysphoria.

52. Reviewing the state of opinion and practice in 2021, the Royal Australian and New Zealand College of Psychiatrists observed that "There are polarised views and mixed evidence regarding treatment options for people presenting with gender identity concerns, especially children and young people." (RANZCP, 2021.) Similarly, a few years earlier prominent Dutch researchers noted: "[T]here is currently no general consensus about the best approach to dealing with the (uncertain) future development of children with GD, and making decisions that may influence the function and/or development of the child — such as social transition." (Ristori & Steensma 2016 at 18.)[2] In this Section, I comment on some of the more important areas of disagreement within the field.

A. Experts and organizations disagree as to whether "distress" is a necessary element for diagnoses that justifies treatment for gender identity issues.

53. As outlined in Section II.B above, "clinically significant distress" is one of the criteria used in DSM-5 to identify gender dysphoria. This indicates a heightened level of distress that rises beyond a threshold level of social awkwardness or discomfort with the changing body. It is known that many trans-identified youth with incongruence between their sexed bodies and

[2] *See also* Zucker 2020 which questions the merit of social transition as a first-line treatment.

their gender identity choose not to take hormones; their incongruence is quite tolerable as they further clarify their three elements of sexual identity—gender identity, orientation, and intention (what the person wants to do with a partners body during sex and what that person wants to do to their own body to be aroused). This population raises the questions of what distress is being measured when DSM-5-TR criteria are met and what else might be done about it. However, there is no "clinically significant distress" requirement in World Health Organization's International Classification of Diseases (ICD-11) criteria for gender incongruence, which rather indicates "a marked and persistent incongruence between an individual's experienced gender and the assigned sex." (World Health Organization 2019.)

54. Therefore, even between these two committee-based authorities, there is a significant disagreement as to what constitutes a gender condition justifying life-changing interventions. To my knowledge, some American gender clinics and practitioners are essentially operating under the ICD-11 criteria rather than the DSM-5-TR criteria, prescribing transition for children, hormonal interventions for slightly older children, and different hormones for adolescents who assert a desire for a transgender identity whether or not they are exhibiting "clinically significant distress." Others adhere to the DSM-5 diagnostic standard.

55. It is ironic that affirmative care is said by advocates to be life enhancing and often to be lifesaving because of the risk of suicide. Based on the DSM-5-TR criterion, distress is required for the diagnosis and its subsequent hormonal and surgical treatments. Gender incongruence is often referred to as a unique form of suffering. Yet, ICD-11 the criteria for the diagnosis of Gender Incongruence do not require distress, just the wish to have the characteristics of the other sex and to change their own sex demarcating features. It seems that as the field moves on in time, the emphasis is on desire rather than distress, pain, or suffering. The intense suffering required for the diagnosis of this former "medical disorder" has now become "this is

not a disorder at all, and people should be given what they desire, whether or not they are distressed or whether their functioning is impaired."

56. I will add that even from within one "school of thought," it is not responsible to make a single, categorical statement about the proper treatment of children or adolescents presenting with gender dysphoria or other gender-related issues. There is no single pathway to the development of a trans identity and no reasonably uniform short- or long-term outcome of medically treating it. As individuals grow physically, mature psychologically, and experience or fail to experience satisfying romantic relationships, their life course depends on their differing psychological, social, familial, and life experiences. There should be no trust in assertions that trans identified youth must be treated in a particular manner to avoid harm for two reasons. First, there is no systematic data on the nature of, and the rate of harms of either affirmative treatment, no treatment, or psychological only treatment. Second, as in other youthful psychiatric and other challenges, outcomes vary. There is no psychiatric condition—depression, anxiety, schizophrenia—where one size fits all.

B. Opinions and practices vary widely about the utilization of social transition for children and adolescents.

57. The World Professional Association for Transgender Health (WPATH) has published a guidance document under the title "Standards of Care." Below, I will provide some explanation of WPATH and its "Standards of Care," which are not the product of a strictly scientific organization, and they are by no means accepted by all or even most practitioners as setting out best practices.

58. Here, however, I will note that WPATH does not take a position concerning whether or when social transition may be appropriate for pre-pubertal children. Instead, the WPATH "Standards of Care version 7" states that the question of social transition for children is a "controversial issue" and calls for mental health professionals to support families in what it

describes as "difficult decisions" concerning social transition. Its version 8, however, no longer uses the word "controversial" even though it extensively discusses the dangers of harms versus the possibility of benefits of early transition (Coleman et al, 2022.)

59. Dr. Erica Anderson is a prominent practitioner in this area who identifies as a transgender woman, who was the first transgender president of USPATH, and who is a former board member of WPATH. Dr. Anderson recently resigned from those organizations and has condemned automatic approval of transition upon the request of a child or adolescent, noting that "adolescents . . . are notoriously susceptible to peer influence," that transition "doesn't cure depression, doesn't cure anxiety disorders, doesn't cure autism-spectrum disorder, doesn't cure ADHD," and instead that "a comprehensive biopsychosocial evaluation" should proceed allowing a child to transition. (Davis 2022.) And as I have explained previously, my own view based on 50 years of experience in this area favors strong caution before approving life-altering interventions such as social transition, puberty blockers, or cross-sex hormones.

C. The WPATH "Standards of Care" is not an impartial or evidence-based document.

60. Because WPATH is frequently cited by advocates of social, hormonal, and surgical transition, I provide some context concerning that private organization and its "Standards of Care." WPATH insists its guidance is evidence-based. But its reviews of the evidence strikingly omit evidence to the contrary. This renders it unbalanced or biased and not in keeping with the traditions of respected clinical science.

61. I was a member of the Harry Benjamin International Gender Dysphoria Association from 1974 until 2001. From 1997 through 1998, I served as the Chairman of the eight-person International Standards of Care Committee that issued the fifth version of the Standards of Care. I resigned my membership in 2002 due to my regretful conclusion that the organization and

its recommendations had become dominated by politics and ideology, rather than by scientific process, as it was years earlier. In approximately 2007, the Harry Benjamin International Gender Dysphoria Association changed its name to the World Professional Association for Transgender Health (WPATH).

62. WPATH is a voluntary membership organization. Since at least 2002, attendance at its biennial meetings has been open to trans individuals who are not licensed professionals. While this ensures taking patients' needs into consideration, it limits the ability for honest and scientific debate, and means that WPATH can no longer be considered a purely professional organization. Its associate members are not health care professionals. The later have various medical specialties, various mental health degrees, and varying experience and approaches to caring for these patients.

63. WPATH takes a decided view on issues as to which there is a wide range of opinion among professionals. WPATH explicitly views itself as not merely a scientific organization, but also as an advocacy organization. (Levine 2016 at 240.) WPATH is supportive to those who want sex reassignment surgery ("SRS"). Skepticism as to the benefits of SRS to patients, and strong alternate views, are not well tolerated in discussions within the organization or their educational outreach programs. Such views have been known to be shouted down and effectively silenced by the large numbers of nonprofessional adults who attend the organization's biennial meetings. Two groups of individuals that I regularly work with have attended recent and separate WPATH continuing education sessions. There, questions about alternative approaches were quickly dismissed with "There are none. This is how it is done." Such a response does not accurately reflect what is known, what is unknown, and the diversity of clinical approaches in this complex field.

64. The reviews of WPATH's 7th edition of standards of care published in 2021 by Dahlen et al and Sapir in 2022 have clarified the low quality, low reliability, and bias inherent in its

recommendations. (Dahlen et al 2022.) Its 8th edition, which is three times the length of the 7th, has not gained additional confidence in its scientific merit. The Standards of Care ("SOC") document is the product of an effort to be balanced, but it is not politically neutral. WPATH aspires to be both a scientific organization and an advocacy group for the transgendered. It articulates policy. These aspirations sometimes conflict. The limitations of the Standards of Care, however, are not primarily political. They are caused by the lack of rigorous research in the field, which allows room for passionate convictions on how to care for the transgendered. And, of course, once individuals have socially, medically, and surgically transitioned, WPATH members and the trans people themselves at the meetings are committed to supporting others in their transitions. Not only have some trans participants been distrustful or hostile to those who question the wisdom of these interventions, their presence makes it difficult for professionals to raise their concerns. Vocal trans rights advocates have a worrisome track record of attacking those who have alternative views. (Dreger 2015; McNamarra, et al 2022.)

65. In recent years, WPATH has fully adopted some mix of the medical and civil rights paradigms. It has downgraded the role of counseling or psychotherapy as a requirement for these life-changing processes. WPATH no longer considers preoperative psychotherapy to be a requirement. It is important to WPATH that the person has gender dysphoria; but the pathway to the development of this state is not. (Levine 2016 at 240.) The trans person is assumed to have thoughtfully considered his or her options before seeking hormones, for instance. In actual practice, that thoughtful person may be as young as age 11!

66. Most psychiatrists and psychologists who treat patients suffering sufficiently severe distress from gender dysphoria to seek inpatient psychiatric care are not members of WPATH. Many psychiatrists, psychologists, and pediatricians who treat some patients suffering gender dysphoria on an outpatient basis are not members of WPATH. WPATH represents a self-

selected subset of the profession along with its many non-professional members; it does not capture the clinical experiences of others. WPATH claims to speak for the medical profession; however, it does not welcome skepticism and therefore, deviates from the philosophical core of medical science. There are pediatricians, psychiatrists, endocrinologists, and surgeons who object strongly, on professional grounds, to transitioning children and providing affirmation in a transgender identity as the first treatment option. WPATH does not speak for all of the medical profession.

67. In 2010 the WPATH Board of Directors issued a statement advocating that incongruence between sex and felt gender identity should cease to be identified in the DSM as a pathology.[3] This position was debated but not adopted by the (much larger) American Psychiatric Association, which maintained the definitions and diagnoses of gender dysphoria as a pathology in the DSM-5 manual issued in 2013.

68. In my experience some current members of WPATH have little ongoing experience with the mentally ill, and many trans care facilities are staffed by MHPs who are not deeply experienced with recognizing and treating frequently associated psychiatric co-morbidities. Further, being a mental health professional, per se, does not guarantee experience and skill in recognizing and effectively intervening in serious or subtle patterns. Because the 7th version of the WPATH SOC deleted the requirement for therapy, trans care facilities that consider these Standards sufficient are permitting patients to be counseled to transition by means of social presentation, hormones, and surgery by individuals with masters rather than medical degrees. The 8th version of the SOC continues this tradition. When this document recommends a comprehensive

[3] WPATH *De-Psychopathologisation Statement* (May 26, 2010), available at wpath.org/policies (last accessed January 21, 2020).

psychiatric evaluation, it fails to elaborate its duration, the topics to be covered, and necessary treatment results of the commonly found previous and co-current psychiatric conditions. It emphasizes the test the evaluation; it does not emphasize what to do with the identified problems, other than to state that they must be under reasonable control. Policy statements are one thing, but how those policies are implemented is another.

D. Opinions and practices differ widely with respect to the proper role of psychological counseling before, as part of, or after a diagnosis of gender dysphoria.

69. In Version 7 of its Standards of Care, released in 2012, WPATH downgraded the role of counseling or psychotherapy, and the organization no longer sees psychotherapy without transition and hormonal interventions as a potential path to eliminate gender dysphoria by enabling a patient to return to or achieve comfort with the gender identity aligned with his or her biology. Around the world, many prominent voices and practitioners disagree. For example, renowned gender therapists Dr. Laura Edwards-Leeper and Dr. Erica Anderson (who, as mentioned above, identifies as a transgender woman) have recently spoken out arguing that children and adolescents are being subjected to puberty blockers and hormonal intervention far too quickly, when careful and extended psychotherapy and investigation for potential causes of feelings of dysphoria (such as prior sexual abuse) should be the first port of call and might resolve the dysphoria. (Edwards-Leeper & Anderson 2021; Davis 2022.)

70. In a recently published position statement on gender dysphoria, the Royal Australian and New Zealand College of Psychiatrists emphasized the critical nature of mental health treatment for gender dysphoric minors, stressing "the importance of the psychiatrist's role to undertake thorough assessment and evidence-based treatment ideally as part of a multidisciplinary team, especially highlighting co-existing issues which may need addressing and treating." The Royal College also emphasized the importance of assessing the "psychological

state and context in which Gender Dysphoria has arisen," before any treatment decisions are made. (RANZCP, 2021.)

71. Dr. Paul Hruz of the University of Washington St. Louis Medical School has noted, "The WPATH has rejected psychological counseling as a viable means to address sex–gender discordance with the claim that this approach has been proven to be unsuccessful and is harmful. (Coleman et al. 2012.) Yet the evidence cited to support this assertion, mostly from case reports published over forty years ago, includes data showing patients who benefited from this approach (Cohen-Kettenis and Kuiper 1984)." (Hruz 2020.)

72. In several recent publications, my colleagues and I have demonstrated that both the Endocrine Society's and WPATH's citations for the scientific basis of affirmative care of adolescents reference the same two Dutch studies. We have demonstrated in considerable detail the limitations of these studies, their lack of applicability to today's transgendered youth, and the dangers of following therapeutic fashion rather than evidence-based medicine. (Levine et al, 2022; Abbruzzese et al, 2023.)

E. Opinions and practices vary widely with respect to the administration of puberty blockers and cross-sex hormones.

73. There is likewise no broadly accepted standard of care with respect to use of puberty blockers. The WPATH Standards of Care explicitly recognize the lack of any consensus on this important point, stating: "Among adolescents who are referred to gender identity clinics, the number considered eligible for early medical treatment—starting with GnRH analogues to suppress puberty in the first Tanner stages—differs among countries and centers. Not all clinics offer puberty suppression. . . The percentages of treated adolescents are likely influenced by the organization of health care, insurance aspects, cultural differences, opinions of health professionals, and diagnostic procedures offered in different settings."

74. The use of puberty blockers as a therapeutic intervention for gender dysphoria is often justified by reference to the seminal work of a respected Dutch research team that developed a protocol that administered puberty blockers to children no younger than age 14. However, it is well known that many clinics in North America now administer puberty blockers to children at much younger ages than the "Dutch Protocol" allows. (Zucker 2019.) The Dutch protocol only treated children with these characteristics: a stable cross gender identity from early childhood; dysphoria that worsened with the onset of puberty; were otherwise psychologically healthy; had healthy families; the patient and family agreed to individual and family counselling throughout the protocol. But the experience and results of the Dutch model is being used as a justification for giving puberty blockers to children who differ considerably from these criteria. Its authors have also recently noted this fact (de Vries 2020).

75. However, Zucker notes that "it is well known" that clinicians are administering cross-sex hormones, and approving surgery, at ages lower than the minimum age thresholds set by that "Dutch Protocol." (Zucker 2019 at 5.)

76. Similarly, at least one prominent clinic—that of Dr. Safer at Columbia's Mt. Sinai Medical Center—is quite openly admitting patients even for *surgical* transition who are not eligible under the criteria set out in WPATH's Standards of Care. A recent study published by Dr. Safer and colleagues revealed that of a sample of 139 individuals, 45% were eligible for surgery "immediately" under the center's own criteria, while only 15% were eligible under WPATH's criteria. That is, *three times* as many patients immediately qualified for surgery under the center's loose standards than would have qualified under WPATH criteria. (Lichenstein et al. 2020.)

77. Internationally, there has been a recent marked trend *against* use of puberty blockers, as a result of extensive evidence reviews by national medical bodies, which I discuss later. The main gender clinic in Sweden has declared that it will no longer authorize use of puberty blockers for

minors below the age of 16. Finland has similarly reversed its course, issuing new guidelines that allow puberty blockers only on a case-by-case basis after an extensive psychiatric assessment. A landmark legal challenge against the UK's National Health Service in 2020 by "detransitioner" Keira Bell led to the suspension of the use of puberty blockers and new procedures to ensure better psychological care, as well as prompting a thorough evidence review by the National Institute for Health and Care Excellence (NICE 2021a; NICE 2021b).[4] That review in 2022 reorganized trans adolescent care throughout the UK and emphasized the need to focus on the patients' psychological state rather than treat first the gender incongruence. Puberty blockers are not to be initially employed.

78. In this country, some voices in the field are now publicly arguing that *no* comprehensive mental health assessment at all should be required before putting teens on puberty blockers or cross-sex hormones (Ghorayshi 2022), while Dr. Anderson and Dr. Edwards-Leeper argue that U.S. practitioners are already moving too quickly to hormonal interventions. (Edwards-Leeper & Anderson 2021; Davis 2022.) It is evident that opinions and practices are all over the map.

79. In 2018, committee of the American Academy of Pediatricians issued a policy statement supporting administration of puberty blockers to children diagnosed with gender dysphoria. No other American medical association has endorsed the use of puberty blockers. Pediatricians are neither endocrinologists nor psychiatrists. Many pediatricians were horrified by the recommendation. Dr. James Cantor published a peer-reviewed paper detailing that the Academy's statement was not evidence-based and misdescribed the few scientific sources it did reference. (Cantor 2019.) It has been well noted in the field that the AAP has declined invitations to publish any rebuttal to Dr. Cantor's analysis. But this is all part of ongoing debate, simply

[4] The decision requiring court approval for administration of hormones to any person younger than age 16 was later reversed on procedural grounds by the Court of Appeal and is currently under consideration by the UK Supreme Court.

highlighting the absence of any generally agreed standard of care. In 2022, the same committee of the AAP modified their recommendation supporting alternative treatments but still held out that affirmative care is still a viable option. Evidence after all is required for policy decisions and the 2018 evidence base is now widely appreciated as insubstantial. Nonetheless, the 2018 policy, now softened considerably, is what is quoted as "social transition is supported by the American Academy of Pediatrics." No mention is made of the many pediatricians who find this policy to be dangerous.

80. The 2017 Endocrine Society Guidelines themselves expressly state that they are *not* "standards of care." The document states: "The guidelines cannot guarantee any specific outcome, *nor do they establish a standard of care*. The guidelines are not intended to dictate the treatment of a particular patient." (Hembree et al. 2017 at 3895 (emphasis added).) Nor do the Guidelines claim to be the result of a rigorous scientific process. Rather, they expressly advise that their recommendations concerning use of puberty blockers are based only on "low quality" evidence.

81. The 2017 Guidelines assert that patients with gender dysphoria often must be treated with "a safe and effective hormone regimen. . ." Notably, however, the Guidelines do not make any firm statement that use of puberty blockers for this purpose *is* safe, and the Guidelines go no further than "suggest[ing]" use of puberty blockers—language the Guidelines warn represents only a "weak recommendation." (Hembree 2017 at 3872.) Several authors have pointed out that not only were the Endocrine Society suggestions regarding use of puberty blockers reached on the basis of "low quality" evidence, but its not-quite claims of 'safety' and 'efficacy' are starkly contradicted by several in-depth evidence reviews. (Laidlaw et al., 2019; Malone et al. 2021.) The most recent systematic independent reviews of hormonal treatment of adolescents reaffirmed the poor quality of

evidence making their use questionable (Brignardello-Peterson, & Wiercioch 2022; Ludviggsson et al, 2023). I detail these contradictory findings in more detail in Section VII below.

82. While there is too little meaningful clinical data and no consensus concerning best practices or a "standard of care" in this area, there are long-standing ethical principles that do or should bind all medical and mental health professionals as they work with, counsel, and prescribe for these individuals.

83. One of the oldest and most fundamental principles guiding medical and psychological care—part of the Hippocratic Oath—is that the physician must "do no harm." This states an ethical responsibility that cannot be delegated to the patient. Physicians themselves must weigh the risks of treatment against the harm of not treating. If the risks of treatment outweigh the benefits, principles of medical ethics prohibit the treatment.

V. TRANSGENDER IDENTITY IS NOT BIOLOGICALLY BASED.

84. There is no medical consensus that transgender identity has any biological basis. Furthermore, there is considerable well-documented evidence that is inconsistent with the hypothesis of a biological basis for gender identity—at least in the large majority of currently-presenting patients.

A. No theory of biological basis has been scientifically validated.

85. At the outset, the attempt to identify a single, biological cause for psychiatric conditions (including gender dysphoria) has been strongly criticized as "out of step with the rest of medicine" and as a lingering "ghost" of an understanding of the nature of psychiatric conditions that is now broadly disproven. (Kendler 2019 at 1088-1089.) Gender dysphoria is defined and diagnosed only as a psychiatric, not a medical, condition. Courts need to have clarified that just because some physicians use medication and surgery to treat gender dysphoria does not make it a

"medical condition" or that the psychological identity has been determined by a biological mechanism.

86. While some have pointed to very small brain scan studies as evidence of a biological basis, no studies of brain structure of individuals identifying as transgender have found any statistically significant correlation between any distinct structure or pattern and transgender identification, after controlling for sexual orientation and exposure to exogenous hormones. (Sarawat et al. 2015 at 202; Frigerio et al. 2021.)

87. Indeed, the Endocrine Society 2017 Guidelines recognizes: "With current knowledge, we cannot predict the psychosexual outcome for any specific child," and "there are currently no criteria to identify the GD/gender-incongruent children to whom this applies. At the present time, clinical experience suggests that persistence of GD/gender incongruence can only be reliably assessed after the first signs of puberty." (Hembree et al. 2017 at 3876.)

88. In short, no biological test or measurement has been identified that provides any ability to predict which children will exhibit, and which children will persist in, gender dysphoria or a transgender identification. Unless and until such a test is identified, the theory of a biological basis is a hypothesis still searching for support. A hypothesis is not a fact, and responsible scientists will not confuse the two. It should be noted that employing the belief in biological determinism of gender dysphoria eases a doctor's ethical qualms about changing the body to fit the current state of a patient's mind. These doctors may consider themselves fixing a mistake of nature as they would when repairing a cleft palate or providing cortisone to a child whose adrenal glands' function is insufficient.

B. Large changes across time and geography in the epidemiology of transgender identification are inconsistent with the hypothesis of a biological basis for transgender identity.

89. In fact, there is substantial evidence that the "biological basis" theory is incorrect,

at least with respect to the large majority of patients presenting with gender dysphoria today.

90. **Vast changes in incidence:** Historically, there were very low reported rates of gender dysphoria or transgender identification. In 2013, the DSM-5 estimated the incidence of gender dysphoria in adults to be at 2-14 per 100,000, or between 0.002% and 0.014%. (APA 2013 at 454.) Recently however, these numbers have increased dramatically, particularly in adolescent populations. Recent surveys estimate that between 2-9% of high school students self- identify as transgender or "gender non-conforming." with a significantly large increase in adolescents claiming "nonbinary" gender identity as well. (Johns et al. 2019; Kidd et al. 2021.) Consistent with these surveys, gender clinics around the world have seen numbers of referrals increase rapidly in the last decade, with the Tavistock clinic in London seeing a 30-fold increase in the last decade (GIDS 2019), and similar increases being observed in Finland (Kaltiala-Heino et al. 2018), the Netherlands (de Vries 2020), and Canada (Zucker 2019). The rapid change in the number of individuals experiencing gender dysphoria points to social and cultural, not biological, causes.

91. **Large change in sex ratio:** In recent years there has been a marked shift in the sex ratio of patients presenting with gender dysphoria or transgender identification. The Tavistock clinic in London saw a ratio of 4 biological females(F):5 biological males(M) shift to essentially 11F:4M in a decade. (GIDS 2019.) One researcher summarizing multiple sources documented a swing of 1F:2M or 1F:1.4M through 2005 to 2F:1M generally (but as high as 7F:1M) in more recent samples. (Zucker 2019 at 2.) This phenomenon has been noted by Dr. Erica Anderson, who said: "The data are very clear that adolescent girls are coming to gender clinics in greater proportion than adolescent boys. And this is a change in the last couple of years. And it's an open question: What do we make of that? We don't really know what's going on. And we should be concerned about it." (Davis 2022.) Again, this large and rapid change in who is experiencing gender dysphoria points to social, not biological, causes.

92. **Clustering**: Dr. Littman's recent study documented "clustering" of new presentations of gender dysphoria among natal females in specific schools and among specific friend groups. This again points strongly to social causes for gender dysphoria at least among the adolescent female population. (Littman 2018.)

93. **Desistance:** As I discuss later, there are very high levels of desistance among children diagnosed with gender dysphoria, as well as increasing (or at least increasingly vocal) numbers of individuals who first asserted a transgender identity during or after adolescence, underwent substantial medical interventions to "affirm" that trans-identity, and then "desisted" and reverted to a gender identity congruent with their sex. (See Section V.B below.) These narratives, too, point to a social and/or psychological cause, rather than a biological one.

94. **"Fluid" gender identification:** Advocates and some practitioners assert that gender identity is not binary but can span an almost endless range of gender identity self-labels, which a given individual may try on, inhabit, and often discard. (A recent article identifies 72.[5]) I have not heard any theory offered for how there is or could be a biological basis for gender identity as now expansively defined.

95. I frequently read attempts to explain away the points in this Section V. They include: these problems always existed, but children are now learning that there are effective treatments for their dilemma and are simply seeking them. And children have hidden their trans identity throughout childhood and now that trans people are recognized and accepted, they are presenting themselves. And now pediatricians realize that girls can have gender dysphoria and are referring them to gender clinics. But these are all mere hypotheses unsupported by concrete evidence. One set of unproven hypotheses cannot provide support for the unproven hypothesis of

[5] Allarakha, *What Are the 72 Other Genders?*, MedicineNet, available at: https://www.medicinenet.com/what_are_the_72_other_genders/article.html.

biological basis. And none of these hypotheses could even potentially explain the failure of science thus far to identify any predictive biological marker of transgender identification. There is much sociological evidence that in the last decade, increasing numbers of adolescents are identifying as something other than heterosexual. Biological phenomena do not evolve suddenly.

96. **Therapies affect gender identity outcomes:** Finally, the evidence shows that therapeutic choices can have a powerful effect on whether and how gender identity does change, or gender dysphoria desists. Social transition of juveniles, for instance, strongly influences gender identity outcomes to such an extent that it has been described a "unique predictor of persistence." (See Section VI.B below.) Again, this observation cuts against the hypothesis of biological origin.

C. Disorders of sexual development (or DSDs) and gender identity are very different phenomena, and it is an error to conflate the two.

97. Some have pointed to individuals who suffer from disorders of sexual development (DSDs) as evidence that sex is not binary or clearly defined, or as somehow supporting the idea that transgender identification has a biological basis. I have extensively detailed that sex is clear, binary, and determined at conception. (Section III.) Here I explain that gender dysphoria is an entirely different phenomenon than DSDs—which unlike transgender identity are indeed biological phenomena. It is an error to conflate the two distinct concepts.

98. Every DSD reflects a genetic enzymatic defect with negative anatomic and physiological consequences. As the Endocrine Society recognized in a 2021 statement: "Given the complexities of the biology of sexual determination and differentiation, it is not surprising that there are dozens of examples of variations or errors in these pathways associated with genetic mutations that are now well known to endocrinologists and geneticists; in medicine, these situations are generally termed *disorders of sexual development* (DSD) or *differences in*

sexual development." Gender Identity on the other hand is uniformly defined as a subjective "sense" of being, a feeling or state of mind. (Section II.C.)

99. The vast majority of those who experience gender dysphoria, or a transgender identity, do not suffer from any DSD, nor from any genetic enzymatic disorder at all. Conversely, many who suffer from a DSD do not experience a gender identity different from their chromosomal sex (although some may). In short, those who suffer from gender dysphoria are not a subset of those who suffer from a DSD, nor are those who suffer from a DSD a subset of those who suffer from gender dysphoria. The two are simply different phenomena, one physical with psychological effects, the other mental with physical effects only if treated medically or surgically. The issue here is not whether biological forces play a role in personality development; it is whether there is strong evidence that it is determinative. Science has come too far to revert to single explanations for gender dysphoria or any psychiatric diagnosis.

100. The importance of this distinction is evident from the scientific literature. For example, in a recent study of clinical outcomes for gender dysphoric patients, Tavistock Clinic researchers *excluded* from their analysis any patients who did not have "normal endocrine function and karyotype consistent with birth registered sex." (Carmichael et al. 2021 at 4.) In other words, the researchers specifically *excluded* from their study anyone who suffered from genetic-based DSD, or a DSD comprising any serious defect in hormonal use pathways, to ensure the study was focused only on individuals experiencing the psychological effects of what we might call "ordinary" gender dysphoria.

D. Studies of individuals born with DSDs suggest that there may be a biological predisposition towards *typical* gender identifications, but they provide no support for a biological basis for *trans*gender identification.

101. Studies of individuals born with serious DSDs have been pointed to as evidence of a biological basis for transgender identification. They provide no such support.

102. One well-known study by Meyer-Bahlburg reviewed the case histories of a number of XY (i.e. biologically male) individuals born with severe DSDs who were surgically "feminized" in infancy and raised as girls. (Meyer-Bahlburg 2005.) The majority of these individuals nevertheless later adopted male gender identity—suggesting a strong biological predisposition towards identification aligned with genetic sex, even in the face of feminized genitalia from earliest childhood, and parental "affirmation" in a transgender identity. But at the same time, the fact that some of these genetically male individuals did *not* later adopt male gender identity serves as evidence that medical and social influences can indeed encourage and sustain transgender identification.

103. Importantly, the Meyer-Bahlburg study did *not* include any individuals who were assigned a gender identity congruent with their genetic sex who subsequently adopted a *trans*gender identity. Therefore, the study can provide no evidence of any kind that supports the hypothesis of a biological basis for *trans*gender identity. A second study in this area (Reiner & Gearhart 2004) likewise considered exclusively XY subjects, and similarly provides evidence only for a biological bias towards a gender identity congruent with one's genetic sex, even in the face of medical and social "transition" interventions. None of this provides any evidence at all of a biological basis for transgender identity.

VI. GENDER IDENTITY IS EMPIRICALLY NOT FIXED FOR MANY INDIVIDUALS.

104. There is extensive evidence that gender identity changes over time for many individuals.[6] That evidence is summarized below.

A. Most children who experience gender dysphoria ultimately "desist" and resolve to cisgender identification.

[6] See n1 *supra*.

105. A distinctive and critical characteristic of juvenile gender dysphoria is that multiple studies from separate groups and at different times have reported that in the large majority of patients, absent a substantial intervention such as social transition or puberty blocking hormone therapy, it does *not* persist through puberty.

106. A recent article reviewed all existing follow-up studies that the author could identify of children diagnosed with gender dysphoria (11 studies) and reported that "every follow-up study of GD children, without exception, found the same thing: By puberty, the majority of GD children ceased to want to transition." (Cantor 2019 at 1.) Another author reviewed the existing studies and reported that in "prepubertal boys with gender discordance . . . the cross gender wishes usually fade over time and do not persist into adulthood, with only 2.2% to 11.9% continuing to experience gender discordance." (Adelson et al. 2012 at 963; see also Cohen-Kettenis 2008 at 1895.) The Endocrine Society recognized this important baseline fact in its 2017 Guidelines. (Hembree 2017 at 3879.) It should be noted that the reason that the Dutch Protocol waited until age 14 to initiate puberty blockers was that it was well known that many children would desist if left free of hormonal intervention until that age.

107. Findings of high levels of desistance among children who experience gender dysphoria or incongruence have been reaffirmed in the face of critiques through thorough reanalysis of the underlying data. (Zucker 2018.)

108. As I explained in detail in Section V above, it is not yet known how to distinguish those children who will desist from that small minority whose trans identity will persist.

109. It does appear that prevailing circumstances during particularly formative years can have a significant impact on the outcome of a juvenile's gender dysphoria. A 2016 study reviewing the follow-up literature noted that "the period between 10 and 13 years" was "crucial" in that "both persisters and desisters stated that the changes in their social environment, the

anticipated and actual feminization or masculinization of their bodies, and the first experiences of falling in love and sexual attraction in this period, contributed to an increase (in the persisters) or decrease (in the desisters) of their gender related interests, behaviors, and feelings of gender discomfort." (Ristori & Steensma 2016 at 16.) In 2022, Olson et al. published data about the very low rates of desistence five years after social transition of children between ages of 3 and 12 (Olsen et al, 2022.) As I discuss again in Section VII below, there is considerable evidence that early transition and affirmation causes far more children to persist in a transgender identity.

B. Desistance is increasingly observed among teens and young adults who first manifest GD during or after adolescence.

110. Desistance within a relatively short period may also be a common outcome for post-pubertal youths who exhibit recently described "rapid onset gender disorder." I have observed an increasingly vocal online community of young women who have reclaimed a female identity after claiming a male gender identity at some point during their teen years, and young "detransitioners" (individuals in the process of reidentifying with their birth sex after having undergone a gender transition) are now receiving increasing attention in both clinical literature and social media channels.

111. Almost all scientific articles on this topic have appeared within the last few years. Perhaps this historic lack of coverage is not entirely surprising – one academic who undertook an extensive review of the available scientific literature in 2021 noted that the phenomenon was "socially controversial" in that it "poses significant professional and bioethical challenges for those clinicians working in the field of gender dysphoria." (Expósito Campos 2021 at 270.) This review reported on the multiple reasons for why individuals were motivated to detransition, which included coming to "understand[ ] how past trauma, internalized sexism, and other psychological difficulties influenced the experience of GD."

112. In 2021, Lisa Littman of Brown University conducted a ground-breaking study of

100 teenage and young adults who had transitioned and lived in a transgender identity for a number of years, and then "detransitioned" or changed back to a gender identity matching their sex. Littman noted that the "visibility of individuals who have detransitioned is new and may be rapidly growing." (Littman 2021 at 1.) Of the 100 detransitioners included in Littman's study, 60% reported that their decision to detransition was motivated (at least in part) by the fact that they had become more comfortable identifying as their natal sex, and 38% had concluded that their gender dysphoria was caused by something specific such as trauma, abuse, or a mental health condition. (Littman 2021 at 9.)

113. A significant majority (76%) did not inform their clinicians of their detransition. (Littman 2021 at 11.)

114. A similar study that recruited a sample of 237 detransitioners (the large majority of whom had initially transitioned in their teens or early twenties) similarly reported that a common reason for detransitioning was the subject's conclusion that his or her gender dysphoria was related to other issues (70% of the sample). (Vandenbussche 2021.)

115. The existence of increasing numbers of youth or young adult detransitioners has also been recently noted by Dr. Edwards-Leeper and Dr. Anderson. (Edwards-Leeper & Anderson 2021.) Edwards-Leeper and Anderson noted "the rising number of detransitioners that clinicians report seeing (they are forming support groups online)" which are "typically youth who experienced gender dysphoria and other complex mental health issues, rushed to medicalize their bodies and regretted it." Other clinicians working with detransitioners have also noted the recent phenomenon. (Marchiano 2020.)

116. A growing body of evidence suggests that for many teens and young adults, a post-pubertal onset of transgender identification can be a transient phase of identity exploration, rather than a permanent identity, as evidenced by a growing number of young detransitioners (Entwistle

2020; Littman 2021; Vandenbussche 2021). Previously, the rate of detransition and regret was reported to be very low, although these estimates suffered from significant limitations and were likely undercounting true regret (D'Angelo 2018). As gender-affirmative care has become popularized, the rate of detransition appears to be accelerating.

117. A recent study from a UK adult gender clinic observed that 6.9% of those treated with gender-affirmative interventions detransitioned within 16 months, and another 3.4% had a pattern of care suggestive of detransition, yielding a rate of probable detransition in excess of 10%. Another 21.7%, however, disengaged from the clinic without completing their treatment plan. While some of these individuals later re-engaged with the gender service, the authors concluded, "detransitioning might be more frequent than previously reported." (Hall et al. 2021.)

118. Another study from a UK primary care practice found that 12.2% of those who had started hormonal treatments either detransitioned or documented regret, while the total of 20% stopped the treatments for a wider range of reasons. The mean age of their presentation with gender dysphoria was 20, and the patients had been taking gender-affirming hormones for an average 5 years (17 months-10 years) prior to discontinuing. Comparing these much higher rates of treatment discontinuation and detransition to the significantly lower rates reported by the older studies, the researchers noted: "Thus, the detransition rate found in this population is novel and questions may be raised about the phenomenon of overdiagnosis, overtreatment, or iatrogenic harm as found in other medical fields" (Boyd et al. 2022 at 15.) Indeed, given that regret may take up to 8-11 years to materialize (Dhejne et al., 2014; Wiepjes et al., 2018), many more detransitioners are likely to emerge in the coming years. Detransitioner research is still in its infancy, but the Littman and Vandenbussche studies in 2021 both report that detransitioners from the recently transitioning cohorts feel they were rushed into medical gender-affirmative interventions with irreversible effects, often without the benefit of appropriate, or in some instances any, psychologic exploration.

VII. TRANSITION AND AFFIRMATION ARE IMPORTANT PSYCHOLOGICAL AND MEDICAL INTERVENTIONS THAT CHANGE GENDER IDENTITY OUTCOMES.

A. If both a typical gender or a transgender long-term gender identity outcome are possible for a particular patient, the alternatives are not medically neutral.

119. Where a juvenile experiences gender dysphoria, the gender identity that is stabilized will have a significant impact on the course of their life. Living in a transgender identity for a time will make desistance, if it is ever considered, more difficult to accomplish.

120. If the juvenile desists from the gender dysphoria and becomes reasonably comfortable with a gender identity congruent with their sex—the most likely outcome from a statistical perspective absent affirming intervention—the child will not require ongoing pharmaceutical maintenance and will not have their fertility destroyed post-puberty.

121. However, if the juvenile persists in a transgender identity, under current practices, the child is most likely to require regular administration of hormones for the rest of their lives, exposing them to significant physical, mental health, and relational risks (which I detail in Section IX below), as well as being irreversibly sterilized chemically and/or surgically. The child is therefore rendered a "patient for life" with complex medical implications to further a scientifically unproven course of treatment.

B. Social transition of young children is a powerful psychotherapeutic intervention that radically changes outcomes, almost eliminating desistance.

122. Social transition has a critical effect on the persistence of gender dysphoria. It is evident from the scientific literature that engaging in therapy that encourages social transition before or during puberty—which would include participation on athletic teams designated for the opposite sex—is a psychotherapeutic intervention that dramatically changes outcomes. A prominent group of authors has written that "The gender identity affirmed during puberty appears to predict the gender identity that will persist into adulthood." (Guss et al. 2015 at 421.) Similarly, a comparison

of recent and older studies suggests that when an "affirming" methodology is used with children, a substantial proportion of children who would otherwise have desisted by adolescence—that is, achieved comfort identifying with their natal sex—instead persist in a transgender identity. (Zucker 2018 at 7.) Olson's publication not only affirmed Zucker's observation but provided very low rates of retransition or desistence among those socialized before or after grade school years. (Olson et al, 2022.)

123. Indeed, a review of multiple studies of children treated for gender dysphoria across the last three decades found that early social transition to living as the opposite sex severely reduces the likelihood that the child will revert to identifying with the child's natal sex, at least in the case of boys. That is, while, as I review above, studies conducted before the widespread use of social transition for young children reported desistance rates in the range of 80-98%, a more recent study reported that fewer than 20% of boys who engaged in a partial or complete social transition before puberty had desisted when surveyed at age 15 or older. (Zucker 2018 at 7[7]; Steensma et al. 2013.[8]) Another researcher observed that a partial or complete gender social transition prior to puberty "proved to be a unique predictor of persistence." (Singh et al. 2021 at 14.)

124. Some vocal practitioners of prompt affirmation and social transition even proudly claim that essentially *no* children who come to their clinics exhibiting gender dysphoria or cross-gender identification desist in that identification and return to a gender identity consistent with their biological sex.[9] This is a very large change as compared to the desistance rates documented apart

[7] Zucker found social transition by the child to be strongly correlated with persistence for natal boys, but not for girls. (Zucker 2018 at 5.)

[8] Only 2 (3.6%) of 56 of the male desisters observed by Steensma et al. had made a complete or partial transition prior to puberty, and of the twelve males who made a complete or partial transition prior to puberty, only two had desisted when surveyed at age 15 or older. Steensma 2013 at 584.

[9] *See, e.g.*, Ehrensaft 2015 at 34: "In my own clinical practice . . . of those children who are carefully assessed as transgender and who are allowed to transition to their affirmed gender, we have

from social transition.

125. Even voices generally supportive of prompt affirmation and social transition are acknowledging a causal connection between social transition and this change in outcomes. As the Endocrine Society recognized in its 2017 Guidelines: "If children have completely socially transitioned, they may have great difficulty in returning to the original gender role upon entering puberty. . . [S]ocial transition (in addition to GD/gender incongruence) has been found to contribute to the likelihood of persistence." (Hembree et al. 2017 at 3879.) The fact is that these unproven interventions with the lives of kids and their families have systematically documented outcomes. Given this observed phenomenon, I agree with Dr. Ken Zucker who has written that social transition in children must be considered "a form of psychosocial treatment." (Zucker 2020 at 1.)

126. Moreover, as I review below, social transition cannot be considered or decided alone. Studies show that engaging in social transition starts a juvenile on a "conveyor belt" path that almost inevitably leads to the administration of puberty blockers, which in turn almost inevitably leads to the administration of cross-sex hormones. The emergence of this well- documented path means that the implications of taking puberty blockers *and* cross-sex hormones must be taken into account even where "only" social transition is being considered or requested by the child or family. As a result, there are a number of important "known risks" associated with social transition.

C. Administration of puberty blockers is a powerful medical and psychotherapeutic intervention that radically changes outcomes, almost eliminating desistance on the historically observed timeline.

127. It should be understood that puberty blockers are usually administered to early-stage adolescents as part of a path that includes social transition. Yet medicine does not know what the long-term health effects on bone, brain, and other organs are of a "pause" between ages 11-16.

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no documentation of a child who has 'desisted' and asked to return to his or her assigned gender."

Medicine also does not know if the long-term effects of these compounds are different in boys than in girls. The mental health professional establishment likewise does not know the long-term effects on coping skills, interpersonal comfort, and intimate relationships of this "pause" while one's peers are undergoing their maturational gains in these vital arenas of future mental health. I address medical, social, and mental health risks associated with the use of puberty blockers in Section X. Here, I note that the data strongly suggests that the administration of puberty blockers, too, must be considered to be a component of a "psychosocial treatment" with complex implications, rather than simply a "pause."

128. Multiple studies show that the large majority of children who begin puberty blockers go on to receive cross-sex hormones. (de Vries 2020 at 2.) A recent study by the Tavistock and Portman NHS Gender Identity Development Service (UK)—the world's largest gender clinic—found that 98% of adolescents who underwent puberty suppression continued on to cross-sex hormones. (Carmichael et al 2021 at 12.)[10]

129. These studies demonstrate that going on puberty blockers virtually eliminates the possibility of desistance in juveniles. Rather than a "pause," puberty blockers appear to act as a psychosocial "switch," decisively shifting many children to a persistent transgender identity. Therefore, as a practical and ethical matter, the decision to put a child on puberty blockers must be considered as the equivalent of a decision to put that child on cross-sex hormones, with all the considerations and informed consent obligations implicit in that decision.

[10] *See also* Brik 2020 where Dutch researchers found nearly 97% of adolescents who received puberty blockers proceeded to cross-sex hormones.

VIII. TRANSITION AND AFFIRMATION ARE EXPERIMENTAL THERAPIES THAT HAVE NOT BEEN SHOWN TO IMPROVE MENTAL OR PHYSICAL HEALTH OUTCOMES BY YOUNG ADULTHOOD.

130. It is undisputed that children and adolescents who present with gender dysphoria exhibit a very high level of mental health comorbidities. (Section III.C.) Whether the gender dysphoria is cause or effect of other diagnosed or undiagnosed mental health conditions, or whether these are merely coincident comorbidities, is hotly disputed, but the basic fact is not.

A. The knowledge base concerning therapies for gender dysphoria is "very low quality."

131. It is important for all sides to admit that the knowledge base concerning the causes and treatment of gender dysphoria has low scientific quality. In evaluating claims of scientific or medical knowledge, it is axiomatic in science that no knowledge is absolute, and to recognize the widely accepted hierarchy of reliability when it comes to "knowledge" about medical or psychiatric phenomena and treatments. Unfortunately, in this field opinion is too often confused with knowledge, rather than clearly locating what exactly is scientifically known. In order of increasing confidence, such "knowledge" may be based upon data comprising:

a. Expert opinion—it is perhaps surprising to educated laypersons that expert opinion standing alone is the lowest form of knowledge, the least likely to be proven correct in the future. Reliance on well-known or well-credentialled "experts," or the head of a gender clinic, is sometimes referred to as eminence-based medicine. Their opinions do not garner as much respect from professionals as what follows;

b. A single case or series of cases (what could be called anecdotal evidence) (Levine 2016 at 239.);

c. A series of cases with a control group;

d. A cohort study;

e. A randomized double-blind clinical trial;

f. A review of multiple trials;

g. A meta-analysis of multiple trials that maximizes the number of patients treated despite their methodological differences to detect trends from larger data sets.

132. Prominent voices in the field have emphasized the severe lack of scientific knowledge in this field. The American Academy of Child and Adolescent Psychiatry has recognized that "Different clinical approaches have been advocated for childhood gender discordance. . . . There have been no randomized controlled trials of any treatment. [T]he proposed benefits of treatment to eliminate gender discordance … must be carefully weighed against … possible deleterious effects." (Adelson et al. at 968–69.) Similarly, the American Psychological Association has stated, "because no approach to working with [transgender and gender nonconforming] children has been adequately, empirically validated, consensus does not exist regarding best practice with pre-pubertal children." (APA 2015 at 842.)

133. Critically, "there are no randomized control trials with regard to treatment of children with gender dysphoria." (Zucker 2018 at 8.) On numerous critical questions relating to cause, developmental path if untreated, and the effect of alternative treatments, the knowledge base remains primarily at the level of the practitioner's exposure to individual cases, or multiple individual cases. As a result, claims to certainty are not justifiable. (Levine 2016 at 239.)

134. Within the last two years, at least five formal, independent, systematic evidence reviews concerning hormonal interventions for gender dysphoria have been conducted. All five found all of the available clinical evidence to be very low quality.

135. The British National Health Service (NHS) commissioned formal "evidence reviews" of all clinical papers concerning the efficacy and safety of puberty blockers and cross- sex

hormones as treatments for gender dysphoria. These evidence reviews were performed by the U.K. National Institute for Health and Care Excellence (NICE), applying the respected "GRADE" criteria for evaluating the strength of clinical evidence.

136. Both the review of evidence concerning puberty blockers and the review of evidence concerning cross-sex hormones were published in 2020, and both found that *all* available evidence as to both efficacy and safety was "very low quality" according to the GRADE criteria. (NICE 2021a; NICE 2021b.) This work is sometimes referred to as the Cass Report.[11] "Very low quality" according to GRADE means there is a high likelihood that the patient *will not experience* the hypothesized benefits of the treatment. (Balshem et al. 2011.)

137. Similarly, the highly respected Cochrane Library—the leading source of independent systematic evidence reviews in health care—commissioned an evidence review concerning the efficacy and safety of hormonal treatments now commonly administered to "transitioning transgender women" (i.e., testosterone suppression and estrogen administration to biological males). That review, also published in 2020, concluded that "We found insufficient evidence to determine the efficacy or safety of hormonal treatment approaches for transgender women in transition." (Haupt et al. 2020 at 2.) It must be understood that both the NICE and the Cochrane reviews considered *all* published scientific studies concerning these treatments. Similarly, McMasters University's skillful methodological unit recently reached the same conclusion (Brignardello-Peterson, & Wiercioch, 2022).

138. As to social transition, as I have noted above, considerable evidence suggests that socially transitioning a pre-pubertal child puts him or her on a path from which very few children escape—a path which includes puberty blockers and cross-sex hormones before age 18. And for

[11] https://cass.independent-review.uk/publications/interim-report/

some, surgery before the age of majority. A decision about social transition for a child must be made in light of what is known and what is unknown about the effects of those expected future interventions. Social transition, therefore, is not merely reversible behavioral change. It is the beginning of a medically dependent future and should be explained as such.

139. I discuss safety considerations in Section IX below. Here, I detail what is known about the effectiveness of social and hormonal transition and affirmation to improve the mental health of individuals diagnosed with gender dysphoria.

B. Youth who adopt a transgender identity show no durable improvement in mental health after social, hormonal, or surgical transition and affirmation.

140. As I noted above, the evidence reviews for the efficacy and safety of hormonal interventions published in 2020 concluded that the supporting evidence is so poor that there is "a high likelihood that the patient will not experience the hypothesized benefits of the treatment." There is now some concrete evidence that, on average, they do not experience those benefits.

141. An important paper published in 2021 by Tavistock clinic clinicians provided the results of the first longitudinal study that measured widely used metrics of general psychological function and suicidality before commencement of puberty blockers, and then at least annually after commencing puberty blockers. After up to three years, they "found no evidence of change in psychological function with GnRHa treatment as indicated by parent report (CBCL) or self- report (YSR) of overall problems, internalizing or externalizing problems or self-harm" as compared to the pre-puberty-blocker baseline evaluations. "Outcomes that were not formally tested also showed little change." (Carmichael at al. 2021, at 18-19.) Similarly, a study by Bränström and Pachankis of the case histories of a set of individuals diagnosed with GD in Sweden found no positive effect on mental health from hormonal treatment. (Landen 2020.)

142. A cohort study by authors from Harvard and Boston Children's Hospital found that youth and young adults (ages 12-29) who self-identified as transgender had an elevated risk of

depression (50.6% vs. 20.6%) and anxiety (26.7% vs. 10.0%); a higher risk of suicidal ideation (31.1% vs. 11.1%), suicide attempts (17.2% vs. 6.1%), and self-harm without lethal intent (16.7% vs. 4.4%) relative to the matched controls; and a significantly greater proportion of transgender youth accessed inpatient mental health care (22.8% vs. 11.1%) and outpatient mental health care (45.6% vs. 16.1%) services. (Reisner et al. 2015 at 6.) Similarly, a recent longitudinal study of transgender and gender diverse youth and young adults in Chicago found rates of alcohol and substance abuse "substantially higher than those reported by large population-based studies of youth and adults." (Newcomb et al. 2020 at 14.) Members of the clinical and research team at the prominent Dutch VU University gender dysphoria center recently compared mental health metrics of two groups of subjects before (mean age 14.5) and after (mean age 16.8) puberty blockers. But they acknowledged that the structure of their study meant that it "can . . . not provide evidence about . . . long-term mental health outcomes," and that based on what continues to be extremely limited scientific data, "Conclusions about the long-term benefits of puberty suppression should . . . be made with extreme caution." In other words, we just don't know. (van der Miesen et al. 2020, at 703.)

143. Kiera Bell, who was diagnosed with gender dysphoria at the Tavistock Clinic, given cross-sex hormones, and treated by mastectomy, before desisting and reclaiming her female gender identity, and a Swedish teen girl who appeared in a recent documentary after walking that same path, have both stated that they feel that they were treated "like guinea pigs," experimental subjects. They are not wrong.

144. A recent two-year prospective uncontrolled multisite NIMH study of 315 adolescents found that at the average age of 18 the primary benefit of hormones was happiness with their aesthetic appearance. The effects on depression and anxiety were very small and highly variable. There were two suicides in the study population. (Chen et al 2023.) This work did not address the relevant long term mental health outcomes of such treatment before their two-year finding.

However, in May 2022 a group from Sweden performed a systematic review of the mental health effects of hormonal transition because they asserted that the literature did not provide sufficient evidence to inform clinical decision making. They concluded that candidates for hormones had a high percentage of mental health problems, and the methodological quality of the 32 papers studied (representing between 3,000 and 4,000 patients) did not allow for a firm answer as to whether mental health was improved by hormonal treatment. (Thompson et al 2022).

C. Long-term mental health outcomes for individuals who persist in a transgender identity are poor.

145. The responsible MHP cannot focus narrowly on the short-term happiness of the young patient but must instead consider the happiness and health of the patient from a "life course" perspective. When we look at the available studies of individuals who continue to inhabit a transgender identity across adult years, the results are strongly negative.

146. In the United States, the death rates of trans veterans are comparable to those with schizophrenia and bipolar diagnoses—20 years earlier than expected. These crude death rates include significantly elevated rates of substance abuse as well as suicide. (Levine 2017, at 10.) Similarly, researchers in Sweden and Denmark have reported on almost all individuals who underwent sex-reassignment surgery over a 30-year period. (Dhejne et al. 2011; Simonsen et al. 2016.) The Swedish follow-up study similarly found a suicide rate in the post-SRS population 19.1 times greater than that of the controls; both studies demonstrated elevated mortality rates from medical and psychiatric conditions. (Levine 2017, at 10.)

147. A study in the American Journal of Psychiatry reported high mental health utilization patterns of adults for ten years after surgery for approximately 35% of patients. (Bränström & Pachankis, 2020.) Indeed, earlier Swedish researchers in a long-term study of all patients provided with SRS over a 30-year period (median time since SRS of > 10 years) concluded that individuals who have SRS exhibit such poor mental health that they should be provided very long-term

psychiatric care as the "final" transition step of SRS. (Dhejne et al. 2011, at 6-7.) Unfortunately, across the succeeding decade, in Sweden and elsewhere their suggestion has been ignored.

148. The most recent all-cause mortality study from the UK found a significant excess of deaths among trans individuals compared to age matched controls of both sexes. External causes of death (suicide, homicide, accidental poisoning) were particularly higher than control groups (Jackson et al 2023). The risk of death was 34% greater among trans identified individuals than the general population. The mean age of the trans group was 36 years.

149. I will note that these studies do not tell us whether the subjects first experienced gender dysphoria as children, adolescents, or adults, so we cannot be certain how their findings apply to each of these subpopulations which represent quite different pathways. But in the absence of knowledge, we should be cautious.

150. Meanwhile, no studies show that affirmation of pre-pubescent children or adolescents leads to more positive outcomes (mental, physical, social, or romantic) by, e.g., age 25 or older than does "watchful waiting" or ordinary therapy.

151. The many studies that I have cited here warn us that as we look ahead to the patient's life as a young adult and adult, the prognosis for the physical health, mental health, and social well-being of the child or adolescent who transitions to live in a transgender identity is not good. Gender dysphoria is not "easily managed" when one understands the marginalized, vulnerable physical, social, and psychological status of adult trans populations and their premature death patterns.

IX. TRANSITION AND AFFIRMATION DO NOT DECREASE, AND MAY INCREASE, THE RISK OF SUICIDE.

A. The risk of suicide among transgender youth is confused and exaggerated in the public mind.

152. While suicide is closely linked to mental health, I comment on it separately because rhetoric relating to suicide figures so prominently in debates about responses to gender dysphoria.

153. At the outset, I will note that any discussion of suicide when considering younger children involves very long-range and very uncertain prediction. Suicide in pre-pubescent children is extremely rare, and the existing studies of gender identity issues in pre-pubescent children do not report significant incidents of suicide. Any suggestion otherwise is misinformed. Our focus for this topic, then, is on adolescents and adults.

154. Some authors have reported rates of suicidal thoughts and behaviors among trans-identifying teens or adults ranging from 25% to as high as 52%, generally through non-longitudinal self-reports obtained from non-representative survey samples. (Toomey et al. 2018.) Some advocates of affirmative care assert that the only treatment to avoid this serious harm is to affirm gender identity. Contrary to these assertions, no studies show that affirmation of children (or anyone else) reduces suicide, prevents suicidal ideation, or improves long-term outcomes, as compared to either a "watchful waiting" or a psychotherapeutic model of response, as I have described above. Rhetorical references to figures such as 40%—and some published studies—confuse suicidal thoughts and actions that represent a cry for help, manipulation, or expression of rage with serious attempts to end life. Such statements or studies ignore a crucial and long-recognized distinction.

155. I have included suicidality in my discussion of mental health above. Here, I focus on actual suicide. Too often, in public comment suicidal thoughts are blurred with suicide. Yet the available data tells us that suicide among children and youth suffering from gender dysphoria is extremely rare.

156. An important analysis of data covering patients as well as those on the waiting list (and thus untreated) at the UK Tavistock gender clinic—the world's largest gender clinic—found a total of only four completed suicides across 11 years' worth of patient data, reflecting an estimated cumulative 30,000 patient-years spent by patients under the clinic's care or on its waiting list. This corresponded to an annual suicide rate of 0.013%. The proportion of individual patients who died

by suicide was 0.03%, which is orders of magnitude smaller than trans adolescents who self-report suicidal behavior or thoughts on surveys. (Biggs 2022b.)

157. Thus, only a minute fraction of trans-identifying adolescents who report thoughts or conduct considered to represent "suicidality" commit suicide. I agree with Dr. Zucker that the assertion by, for example, Karasic and Ehrensaft (2015) that completed suicides among transgender youth are "alarmingly high" "has no formal and systematic empirical basis." (Zucker 2019 at 3.)

158. Professor Biggs of Oxford, author of the study of incidence of suicide among Tavistock clinic patients, rightly cautions that it is "irresponsible to exaggerate the prevalence of suicide." (Biggs 2022b at 4.) It is my opinion that telling parents—or even allowing them to believe from their internet reading—that they face a choice between "a live son or a dead daughter" is both factually wrong and unethical. Informed consent requires clinicians to tell the truth and ensure that their patients understand the truth. To be kind, the clinicians who believe such figures represent high risk of ultimate suicide in adolescence simply do not know the truth; they are ill-informed.

B. Transition of any sort has not been shown to reduce levels of suicide.

159. Every suicide is a tragedy, and steps that reduce suicide should be adopted. I have noted above that suicidality (that is, suicidal thoughts or behaviors, rather than suicide) is common among transgender adolescents and young adults before, during, and after social and medical transition. If a medical or mental health professional believes that an individual he or she is diagnosing or treating for gender dysphoria presents a suicide risk, in my view it is unethical for that professional merely to proceed with treatment for gender dysphoria and hope that "solves the problem." Rather, that professional has an obligation to provide or refer the patient for evidence-based therapies for addressing depression and suicidal thoughts that are well-known to the profession. (Levine 2016, at 242.)

160. This is all the more true because there is in fact no evidence that social and/or medical

transition reduces the risk or incidence of actual suicide. As there are no long-term comparative studies of gender dysphoric adolescents with suicidal ideation, per se, let alone a comparative study of those who were given hormones and those who did not take hormones, there is no scientific basis for declaring affirmative care as reducing suicidal risk. In his analysis of those who were patients of or on the waiting list of the Tavistock clinic, Professor Biggs found that the suicide rate was not higher among those on the clinic's waiting list (and thus as-yet untreated), than for those who were patients under care. (Biggs 2022b.) And as corrected, Bränström and Pachankis similarly acknowledge that their review of records of GD patients "demonstrated no advantage of surgery in relation to . . . hospitalizations following suicide attempts." (I assume for this purpose that attempts that result in hospitalization are judged to be so serious as to predict a high rate of future suicide if not successfully addressed.")[12] Long-term life in a transgender identity, however, correlates with very high rates of completed suicide.

161. As with mental health generally, the patient, parent, or clinician fearing the risk of suicide must consider not just the next month or year, but a life course perspective.

162. There are now four long-term studies that analyze completed suicide among those living in transgender identities into adulthood. The results vary significantly but are uniformly highly negative. Dhejne reported a long-term follow-up study of subjects after sex reassignment surgery. Across the thirty-year study, subjects who had undergone SRS committed suicide at 19.1 times the expected rate compared to general population controls matched by age and both sexes. MtF subjects committed suicide at 13.9 times the expected rate, and FtM subjects committed suicide at 40.0 times the expected rate. (Dhejne et al. 2011 Supplemental Table S1.)

[12] Turban et al. (2020) has been described in press reports as demonstrating that administration of puberty suppressing hormones to transgender adolescents reduces suicide or suicidal ideation. The paper itself does not make that claim, nor permit that conclusion.

163. Asscheman, also writing in 2011, reported results of a long-term follow-up of all transsexual subjects of the Netherlands' leading gender medicine clinic who started cross-sex hormones before July 1, 1997, a total of 1331 patients. Due to the Dutch system of medical and death records, extensive follow-up was achieved. Median follow-up period was 18.5 years. The mortality rate among MtF patients was 51% higher than among the age-matched general population; the rate of completed suicide among MtF patients was six times that of the age- matched general population. (Asscheman et al. 2011.)

164. Importantly, Asscheman et al. found that "No suicides occurred within the first 2 years of hormone treatment, while there were six suicides after 2-5 years, seven after 5-10 years, and four after more than 10 years of CSH treatment at a mean age of 41.5 years." (Asscheman et al. 2011 at 637-638.) This suggests that studies that follow patients for only a year or two after treatment are insufficient. Asscheman et al.'s data suggest that such short-term follow-up is engaging only with an initial period of optimism, and it will simply miss the feelings of disillusion and the increase in completed suicide that follows in later years.

165. A retrospective, long-term study published in 2020 of a very large cohort (8263) of patients referred to the Amsterdam University gender clinic between 1972 and 2017 found that the annual rate of completed suicides among the transgender subjects was "three to four times higher than the general Dutch population." "[T]he incidence of observed suicide deaths was almost equally distributed over the different stages of treatment." The authors concluded that "vulnerability for suicide occurs similarly in the different stages of transition." (Wiepjes et al. 2020.) In other words, neither social nor medical transition reduced the rate of suicide.

166. As with Asscheman et al., Wiepjes et al. found that the median time between start of hormones and suicide (when suicide occurred) was 6.1 years for natal males, and 6.9 years for natal females. Again, short- or even medium-term studies will miss this suicide phenomenon.

167. A 2021 study analyzed the case histories of a cohort of 175 gender dysphoria patients treated at one of the seven UK adult gender clinics who were "discharged" (discontinued as patients) within a selected one-year period. The authors reported the rather shocking result that 7.7% (3/39) of natal males who were diagnosed and admitted for treatment, and who were between 17 and 24 years old, were "discharged" because they committed suicide *during* treatment. (Hall et al. 2021, Table 2.)

168. None of these studies demonstrates that the hormonal or surgical intervention *caused* suicide. That is possible, but as we have seen, the population that identifies as transgender suffers from a high incidence of comorbidities that correlate with suicide. What these studies demonstrate—at the least—is that this remains a troubled population in need of extensive and careful psychological care that they generally do not receive, and that neither hormonal nor surgical transition and "affirmation" resolve their underlying problems and put them on the path to a stable and healthy life.

169. In sum, claims that affirmation will reduce the risk of suicide for children and adolescents are not based on science. Instead, transition of any sort must be justified, if at all, as a life-enhancing measure, not a lifesaving measure. (Levine 2016, at 242.) In my opinion, this is an important fact that patients, parents, and even many MHPs fail to understand.

X. HORMONAL INTERVENTIONS ARE EXPERIMENTAL PROCEDURES THAT HAVE NOT BEEN PROVEN SAFE.

170. A number of voices in the field assert that puberty blockers act merely as a "pause" in the process of puberty-driven maturation, suggesting that this hormonal intervention has been proven to be fully reversible. This is also an unproven belief.

171. On the contrary, no studies have been done that meaningfully demonstrate that either puberty blockers or cross-sex hormones, as prescribed for gender dysphoria, are safe in other than the short run. No studies have attempted to determine whether the effects of puberty blockers, as

currently being prescribed for gender dysphoria, are fully reversible. There are only pronouncements. In fact, there are substantial reasons for concern that these hormonal interventions are not safe. Multiple researchers have expressed concern that the full range of possible harms have not even been correctly conceptualized.

172. Because, as I have explained in Section VI, recent evidence demonstrates that pre-pubertal social transition almost always leads to progression on to puberty blockers which in turn almost always leads to the use of cross-sex hormones, physicians bear the ethical responsibility for a thorough informed consent process for parents and patients that includes this fact and its full implications. Informed consent does not mean sharing with the parents and patients what the doctor believes: it means sharing what is known and what is not known about the intervention. So much of what doctors believe is based on mere trust in what they have been taught. Neither they themselves nor their teachers may be aware of the scientific foundation and scientific limitations of what they are recommending.

A. Use of puberty blockers has not been shown to be safe or reversible for gender dysphoria.

173. As I noted above, the recent very thorough literature review performed for the British NHS concluded that *all* available clinical evidence relating to "safety outcomes" from administration of puberty blockers for gender dysphoria is of "very low certainty." (NHS 2020, at 6.)

174. In its 2017 Guidelines, the Endocrine Society cautioned that "in the future we need more rigorous evaluations of the effectiveness and safety of endocrine and surgical protocols" including "careful assessment of . . . the effects of prolonged delay of puberty in adolescents on bone health, gonadal function, and the brain (including effects on cognitive, emotional, social, and sexual development)." (Hembree et al. 2017, at 3874.) No such "careful" or "rigorous" evaluation

of these very serious safety questions has yet been done.

175. Some advocates assume that puberty blockers are "safe" because they have been approved by the Food and Drug Administration (FDA) for use to treat precocious puberty—a rare condition in which the puberty process may start at eight or younger. No such conclusion can be drawn. As the "label" for Lupron (one of the most widely prescribed puberty blockers) explains, the FDA approved the drug only *until* the "age was appropriate for entry into puberty." The study provides no information at all as to the safety or reversibility of instead *blocking* healthy, normally-timed puberty's beginning, and *throughout* the years that body-wide continuing changes normally occur. Given the physical, social, and psychological dangers to the child with precocious puberty, drugs like Lupron are effective in returning the child to a puerile state like their peers without a high incidence of significant side effects—that is, they are "safe" to reverse the condition. But use of drugs to suppress normal puberty has multiple organ system effects whose long-term consequences have not been investigated.

176. Systematic data reviews are scientifically more reliable than individual reports with definable methodologic limitations. Without quoting extensively from the reviews done by Sweden, Finland, UK, and McMasters University, suffice it to say that their conclusions agree that the risks of puberty suppression and cross-sex hormones outweigh the possible benefits. They also point to the great unexplained increase in incidence of gender dysphoria, the increased incidence of detransition and regret, and the lack of evidence of efficacy.[13] (Swedish National Board of Health and Welfare, 2022).

13 https:/www.sociialstyrelsen.se/globalassets/sharepointdokument/artikelkatalog/kunskapsstod/2022-7799.pdf

177. **Fertility**: The Endocrine Society Guidelines rightly say that research is needed into the effect of puberty blockade on "gonadal function" and "sexual development." The core purpose and function of puberty blockers is to prevent the maturation of the ovaries or testes, the sources of female hormones and male hormones when stimulated by the pituitary gland. From this predictable process fertility is accomplished within a few years. Despite widespread assertions that puberty blockers are "fully reversible," there has been no study published on the critical question of whether patients ever develop normal levels of fertility if puberty blockers are terminated after a "prolonged delay of puberty." The 2017 Endocrine Society Guidelines are correct that are no data on achievement of fertility "following prolonged gonadotropin suppression" (that is, puberty blockade). (Hembree et al. 2017, at 3880.)

178. **Bone strength**: Multiple studies have documented adverse effects from puberty blockers on bone density. (Klink et al. 2015; Vlot et al. 2016; Joseph et al. 2019.) The most recent found that after two years on puberty blockers, the bone density measurements for a significant minority of the children had declined to clinically concerning levels. Density in the spines of some subjects fell to a level found in only 0.13% of the population. (Biggs 2021.) Some other studies have found less-concerning effects on bone density. While the available evidence remains limited and conflicting, it is not possible to conclude that the treatment is "safe."

179. **Brain development:** Important neurological growth and development in the brain occurs across puberty. The anatomic and functional effect on brain development of blocking the natural puberty process has not been well studied. A prominent Australian clinical team recently expressed concern that "no data were (or are) available on whether delaying the exposure of the brain to a sex steroid affects psychosexual, cognitive, emotional, or other neuropsychological maturation." (Kozlowska et al. 2021, at 89.) In my opinion, given the observed correlation between puberty and brain development, the default hypothesis must be that there *would* be a negative

impact. For the purpose of protecting patients all over the world, the burden of proof should be on advocates to first demonstrate to a reasonable degree of certainty that brain structure and its measurable cognitive and affect processing are not negatively affected. This recalls the ethical principle: Above All Do No Harm.

180. The Endocrine Society Guidelines acknowledge as much, stating that side effects of pubertal suppression "may include . . . unknown effects on brain development," that "we need more rigorous evaluations of . . . the effects of prolonged delay of puberty in adolescents on . . . the brain (including effects on cognitive, emotional, social, and sexual development)," and stating that "animal data suggests there may be an effect of GnRH analogs [puberty blockers] on cognitive function." (Hembree et al. 2017, at 3874, 3882, 3883.) Given this concern, one can only wonder why this relevant question has not been scientifically investigated in a large group of natal males and females.

181. There has been a longitudinal study of one natal male child, assessed before, and again 20 months after, puberty suppression was commenced. It reported a reduction in the patient's "global IQ," measured an anomalous absence of certain structural brain development expected during normal male puberty, and hypothesized that "a plausible explanation for the G[lobal] IQ decrease should consider a disruption of the synchronic [i.e., appropriately timed] development of brain areas by pubertal suppression." (Schneider et al. 2017, at 7.) This should cause parents and practitioners serious concern.

182. Whether any impairment of brain development is "reversed" upon later termination of puberty blockade has, to my knowledge, not been studied at all. As a result, assertions by medical or mental health professionals that puberty blockade is "fully reversible" are unjustified and based on hope rather than science.

183. Without a number of additional case studies—or preferably statistically significant clinical studies—two questions remain unanswered: Are there brain anatomic or functional impairment from puberty blockers? And are the documented changes reversed over time when puberty blockers are stopped? With these questions unanswered, it is impossible to assert with certainty that the effects of this class of medications are "fully reversible." Such an assertion is another example of ideas based on beliefs rather than on documentation, on hope not science.

184. **Psycho-social harm**: Puberty is a time of stress, anxiety, bodily discomfort during physical development, and identity formation for *all* humans. No careful study has been done of the long-term impact on the young person's coping skills, interpersonal comfort, and intimate relationships from remaining puerile for, e.g., two to five years while one's peers are undergoing pubertal transformations, and of then undergoing an artificial puberty at an older age. However, pediatricians and mental health professionals hear of distress, concern, and social awkwardness in those who naturally have a delayed onset of puberty. In my opinion, individuals in whom puberty is delayed multiple years are likely to suffer at least subtle negative psychosocial and self-confidence effects as they stand on the sidelines witnessing their peers developing the social relationships (and attendant painful social learning experiences) that come with adolescence. (Levine 2018 at 9.) Social anxiety and social avoidance are common findings in the evaluation of trans-identified children and teens. Are we expected to believe that creating years of being further different than their peers has no lasting internal consequences? Do we ignore Adolescent Psychiatry's knowledge of the importance of peer groups among adolescents?

185. We simply do not know what all the psychological impacts of NOT grappling with puberty at the ordinary time may be, because it has not been studied. And we have no information as to whether that impact is "fully reversible." We should at least consider that the normal pubertal ushering of an adolescent into the world of sexual attraction, romantic preoccupations, sexual

desires, and forays into interpersonal intimate relationships can be a positive experience for an untreated trans identified child. In contrast, puberty is presented solely as a negative process to be avoided by puberty blockers. In psychiatry we have the concept that conflict is inevitable, and its resolution strengthens a person's capacities to deal with the future. This applies to individuals of any age.

186. In addition, since the overwhelming proportion of children who begin puberty blockers continue on to cross-sex hormones, it appears that there is an important element of "psychological irreversibility" in play. The question of to what extent the physical and developmental impacts of puberty blockers might be reversible is an academic one, if psycho-social realities mean that very few patients well ever be able to make that choice once they have started down the road of social transition and puberty blockers.

B. Use of cross-sex hormones in adolescents for gender dysphoria has not been shown to be medically safe except in the short term.

187. As with puberty blockers, all evidence concerning the safety of extended use of cross-sex hormones is of "very low quality." The U.K. NICE evidence review cautioned that "the safety profiles" of cross-sex hormone treatments are "largely unknown," and that several of the limited studies that do exist reported high numbers of subjects "lost to follow-up," without explanation—a worrying indicator. (NICE 2020b.)

188. The 2020 Cochrane Review reported that: "We found insufficient evidence to determine the . . . safety of hormonal treatment approaches for transgender women in transition." (Haupt et al. 2020 at 4.) Even the Endocrine Society tagged all its recommendations for the administration of cross-sex hormones as based on "low quality evidence." (Hembree et al. 2017 at 3889.)

189. **Sterilization**: It is undisputed, however, that harm to the gonads is an expected effect, to the extent that it must be assumed that cross-sex hormones will sterilize the patient. Thus, the Endocrine Society 2017 Guidelines caution that "[p]rolonged exposure of the testes to estrogen has been associated with testicular damage," that "[r]estoration of spermatogenesis after prolonged estrogen treatment has not been studied," and that "[i]n biological females, the effect of prolonged treatment with exogenous testosterone upon ovarian function is uncertain." (Hembree et al. 2017, at 3880.)[14]

190. The Guidelines go on to recommend that the practitioner counsel the patient about the (problematic and uncertain) options available to collect and preserve fertile sperm or ova before beginning cross-sex hormones. The life-long negative emotional impact of infertility on both men and women has been well studied. While this impact has not been studied specifically within the transgender population, the opportunity to be a parent is likely a human, emotional need, and so should be considered an important risk factor when considering gender transition for any patient. What has been documented is the low rate of acceptance of banking sperm or ova in this population, which is an expensive ongoing process.

191. **Sexual response**: Puberty blockers prevent maturation of the sexual organs and response. Some, and perhaps many, transgender individuals who did not go through puberty consistent with their sex and are then put on cross-sex hormones face significantly diminished sexual response as they enter adulthood and are unable ever to experience orgasm. In the case of males, the cross-sex administration of estrogen limits penile genital growth and function. In the case of females, prolonged exposure to exogenous testosterone impairs vaginal function. Much has been written

[14] *See also* Guss et al. 2015 at 4 ("a side effect [of cross-sex hormones] may be infertility") and at 5 ("cross-sex hormones . . . may have irreversible effects"); Tishelman et al. 2015 at 8 (Cross-sex hormones are "irreversible interventions" with "significant ramifications for fertility").

about the negative psychological and relational consequences of anorgasmia among non-transgender individuals that is ultimately applicable to the transgendered. (Levine 2018, at 6.) At the same time, prolonged exposure of females to exogenous testosterone often increases sexual drive to a distracting degree. It is likely that parents and physicians are uncomfortable discussing any aspects of genital sexual activity with patients. And these young often interpersonally sexually inexperienced patients are both too embarrassed to talk about the subject and too young to seriously consider the topic.

192. **Cardiovascular harm**: Several researchers have reported that cross-sex hormones increase the occurrence of various types of cardiovascular disease, including strokes, blood clots, and other acute cardiovascular events. (Getahun et al. 2018; Guss et al. 2015; Asscheman et al. 2011.) With that said, I agree with the conclusion of the Endocrine Society committee (like that of the NICE Evidence Review) that: "A systematic review of the literature found that data were insufficient (due to very low-quality evidence) to allow a meaningful assessment of patient-important outcomes, such as death, stroke, myocardial infarction, or venous thromboembolism in transgender males. Future research is needed to ascertain the potential harm of hormonal therapies." (Hembree et al. 2017 at 3891.) Future research questions concerning long-term harms need to be far more precisely defined. The question of whether cross-sex hormones are safe for adolescents and young adults cannot be answered by analogies to hormone replacement therapy in menopausal women (which is not a cross-sex usage). Medicine has answered safety questions for menopausal women in terms of cancer and cardiovascular safety: at what dose, for what duration, and at what age range. The science of endocrine treatment of gender dysphoric youth is being bypassed by short-term clinical impressions of safety even though physicians know that cardiovascular and cancer processes often develop over many years.

193. Further, in contrast to administration for menopausal women, hormones begun in

adolescence are likely to be administered for four to six decades. The published evidence of adverse impact, coupled with the lack of data sufficient to reach a firm conclusion, make it irresponsible to assert that cross-sex hormones "are safe." We must not forget the diverse sources of evidence of premature death among the trans communities.

194. **Harm to family and friendship relationships:** As a psychiatrist, I recognize that mental health is a critical part of health generally, and that relationships cannot be separated from and profoundly impact mental health. Gender transition routinely leads to isolation from at least a significant portion of one's family in adulthood. In the case of a juvenile transition, this will be less dramatic while the child is young, but commonly increases over time as siblings who marry and have children of their own do not wish the transgender individual to be in contact with those children. By adulthood, the friendships of transgender individuals tend to be confined to other transgender individuals (often "virtual" friends known only online) and the generally limited set of others who are comfortable interacting with transgender individuals. (Levine 2017, at 5.) My concerns about this are based on decades of observations in my professional work with patients and their families. It is important to recognize that the tradition throughout medicine is the focus on the patient. This is true in adolescent medicine as well and seems natural and self-evident. However, when a trans identity occurs in a family, every member—parents, siblings, grandparents, etc—is affected. I am used to watching parents become depressed, siblings take sides, and family dysfunction increase. It is rare to find a medical or mental health professional whose work reflects that each of these family members are deeply connected and share in the uncertainties that are embedded in any trans identity. There may be too much focus on the trans person as a patient and not enough as a trans person developing in an interpersonal, ever-changing matrix called a family.

195. **Sexual-romantic harms associated with transition:** After adolescence, transgender individuals find the pool of individuals willing to develop a romantic and intimate

relationship with them to be greatly diminished. When a trans person who passes well reveals his or her natal sex, many potential mates lose interest. When a trans person does not pass well, options are likely further diminished. But regardless of a person's appearance, these adults soon learn that many of their dates are looking for exotic sexual experiences rather than genuinely loving relationships. (Levine 2017, at 5, 13; Levine 2013, at 40.)

C. The timing of harms.

196. The multi-year delay between start of hormones and the spike in completed suicide observed by Professor Biggs in the Tavistock data (as discussed in Section VIII above) warns us that the safety and beneficence of these treatments cannot be judged based on short-term studies, or studies that do not continue into adulthood. Similarly, several of the harms that I discuss above would not be expected to manifest until the patients reaches at least middle-age. For example, stroke or other serious cardiovascular event is a complication that is unlikely to manifest during teen years even if its likelihood over the patient's lifetime has been materially increased via obesity, lipid abnormalities, and smoking. Regret over sterilization or over an inability to form a stable romantic relationship may occur sooner. Psychological challenges of being a trans adult may become manifest after the medical profession is only doing routine follow up care—or, in many cases, has lost contact with the patient altogether. Because few, if any, clinics in this country are conducting systematic long-term follow-up with their child and adolescent patients, the doctors who counsel, prescribe, or perform hormonal and surgical therapies are unlikely ever to become aware of the later negative life impacts, however severe. These concerns are compounded by the findings in the recent "detransitioner" research that 76% did not inform their clinicians of their detransition. (Littman 2021.)

197. The possibility that steps along the transition and affirmation pathway, while lessening the pain of gender dysphoria in the short term, could lead to additional sources of crippling

emotional and psychological pain, are too often not considered by advocates of social transition and not considered at all by the trans child. (Levine 2016, at 243.) Clinicians must distinguish the apparent short-term safety of hormones from likely or possible long-term consequences, and help the patient or parents understand these implications as well. The young patient may feel, "I don't care if I die young, just as long I get to live as a woman." The mature adult may take a different view. Hopefully, so will the child's physician.

198. Individual patients often pin excessive hope in transition, believing that transition will solve what are in fact ordinary social stresses associated with maturation, or mental health co-morbidities. In this way, transition can prevent them from mastering personal challenges at the appropriate time or directly addressing conditions that require treatment. When the hoped-for "vanishing" of other mental health or social difficulties does not occur, disappointment, distress, and depression may ensue. It is noteworthy that half of the respondents to the larger "detransitioner" survey reported that their transition had not helped the gender dysphoria, and 70% had concluded that their gender dysphoria was related to other issues. (Vandenbussche 2021.) Without the clinical experience of monitoring the psychosocial outcomes of these young patients as they age into adulthood, many such professionals experience no challenge to their affirmative beliefs. But medical and mental health professionals who deliver trans affirmative care for those with previous and co-existing mental health problems have an ethical obligation to inform themselves, and to inform patients and parents, that these dramatic treatments are not a panacea.

199. Whether we consider physical or mental health, science does not permit us to say that either puberty blockers or cross-sex hormones are "safe," and the data concerning the mental health of patients before, during, and after such treatments strongly contradict the assertion that gender dysphoria is "easily managed."

XI. REPLY TO THE EXPERT REPORTS OF DRS. ARMAND H. MATHENY

ANTOMMARIA, DEANNA ADKINS, JACK TURBAN, AND ARON JANSSEN

A. WPATH & Endocrine Society Guidelines.

200. Section (D) of Dr. Janssen's report emphasizes how WPATH and The Endocrine Society guidelines require that trans youth undergo careful psychiatric assessment prior to starting puberty-delaying or hormonal medications. However, neither these guidelines nor Dr. Janssen provide instruction for how to perform the assessments. Instead, it is left to the individual "qualified" mental health professional—that is, mental health professionals who uncritically accept WPATH's and The Endocrine Society's standards of care. These organizations assured professionals that psychiatric, social, and learning problems did not preclude medical interventions. The frequently observed co-morbidities—autism, ADD, ADHD, learning difficulties, depression, eating disorders, anxiety states, self-harm, suicidality, and substance dependence—just had to be "under reasonable control" for a trans youth to qualify for medical interventions. This guidance, too, is not further defined. (Coleman et al., 2022). Of what value to the patient is a careful psychiatric assessment if it is not followed by a serious attempt to modify or ameliorate the observed co-morbidities? Such assessments may be useful for research purposes if instruments are designed to measure the impact of affirmative care on these co-morbidities, but this is not happening. The attempt to ameliorate the co-morbidities takes time measured in months if not longer. The downgrading of mental health treatment has led to a dramatically short duration between assessment and endocrine treatment. This was the source of the dismay of Edwards-Lepper and Anderson discussed above. (Edwards-Lepper & Anderson, 2021).

201. In 2022, WPATH removed all age requirements for the use of puberty blockers, cross-sex hormones, and mastectomies from its guidelines. In the place of age restrictions, health care providers must assess the capacity of adolescents (even 9 year-olds in the first blushes of puberty are called adolescents) to give informed consent (assent in legal terms). WPATH guidance used to

indicate that 13- and 14-years-olds were too young to undergo mastectomies; now, following the removal of age restrictions from the guidelines (Coleman et al., 2012, 2022), the operation seems justifiable for minors in their early-teen years. Patient, family, and detransitioner reports indicate that many affirmative care clinics perform brief psychiatric evaluations and fail to inquire about the influence of past processes and events on the development of a trans identity. (Levine et al., 2022). See paragraph 207 for a more recent reference to rushed care without meeting the requirement for a comprehensive psychiatric evaluation.

B. Informed Consent.

202. Neither Dr. Janssen nor Dr. Adkins question whether adolescents can provide informed consent; even more concerning, Dr. Turban's report does not even include the word "consent." They appear unaware of the longstanding international ethical unease about youthful gender dysphoria because of seven unanswered questions. One of these questions is whether these often highly psychiatric symptomatic youth are competent to make decisions about their future bodies. (Vrouenraets et al., 2015). One aspect of our recent widely read article on the subject focused on whether any adolescent has lived long enough to provide an ethical and legal informed consent for puberty blockers, cross-sex hormones, or mastectomies. (Levine et al., 2022). For purposes of affirmative care, adolescence begins at Tanner stage 2 of pubertal development, which can be attained in many children at age 9. Clinicians continue to discuss and study whether a young patient is cognitively and emotionally able to process the meaning of the social, biological, sexual, interpersonal, and psychological consequences of each step in affirmative care. (Levine, 2018; Vrouenraets et al., 2022). Forty therapists, for example, resigned from Tavistock clinic, the world's largest transgender youth clinic, because of what has been done to these children in the name of helping them. (Biggs, 2022). When thinking about this issue, it is useful for all adults concerned to recall being a child or adolescent and to consider their experience with their children's maturity at

ages 9 to 18. Judgment improves over time, and in no other arena are children and teens given responsibility to make such life changing decisions.

203. Dr. Adkins acknowledges that the Endocrine Society Guidelines require "informed consent" from patients but fails to mention how informed consent is obtained from minors. (Adkins, p. 10.) Similarly, Dr. Janssen mentions that the WPATH standards of care require clinicians to assess whether a patient has the requisite "capacity for decision-making." (Janssen, p. 12-13.) Both reports brush over the fact that legally informed consent from those under 18 must be provided by parents or guardians. Adolescents may only assent, not consent. Dr. Adkins and Dr. Janssen rely on the Endocrine Society Guidelines, which require the physician to assess the adolescent's decision-making capacity prior to prescribing puberty blockers and hormones, as if the clinician knows how to do this, and as if a 14-year-old can comprehend, let alone make a wise decision about, future sterility, sexual dysfunction, and impaired physical health.

204. Clinicians who perceive that an adolescent can give informed consent ignore an important question: does the co-existence of psychopathology limit the patient's ability to carefully think through the requested treatment? (Vrouenraets et al., 2015.) Experienced mental health professionals wonder whether adolescents' urgency for hormones or surgery—what affirmative doctors may justify as medically necessary—is a sign of the inability to consider all the necessary pros and cons of the treatments. It is imperative that clinicians understand the possible relationships between these young persons' psychopathy and gender dysphoria. Affirmative care advocates expect that their treatment will lessen the intensity of, and possibly even eradicate, the psychopathy because the depression, anxiety, social avoidance, etc. are responses to the gender dysphoria itself. Thus, we read claims of improvements after each element of affirmative care. (Note what the systematic reviews have said about this evidence.) Since the majority of adult psychiatric problems have their origins in childhood, the possibility exists that gender dysphoria is actually created in some young

people's minds as a solution to preexisting psychiatric problems. Another explanation is that psychopathology indicates inadequate coping skills for dealing with life circumstances. These poor adaptive capacities will ultimately create ongoing young adult problems despite the treatment for the gender dysphoria. Finally, the poor outcomes of post-surgical patients may be due to long standing difficulties originally unrelated to gender dysphoria. Regardless of which explanation is correct in any patient, a more reasonable approach to caring for trans-identified youth is to address therapeutically the psychiatric symptoms apart from their gender distress. I see no evidence in Dr. Adkins' or Dr. Turban's reports that they have even considered this vital topic. Possibly more concerning is the fact that Dr. Janssen nods to the concept without analyzing its implications for his opinions.

205. Parental consent for medical and surgical care rests upon the clinicians' willingness to share what is known and uncertain about the benefits and harms of treatment over time. Doctors must not mislead these concerned adults into thinking there is no alternative to affirmative care. They should not frighten them into thinking that by delaying such care they are putting their child at risk of suicide. Many affirmative care clinicians, because they don't understand the vital differences between suicidality and suicide, provide unethical coercive guidance commonly summarized as, "Would you rather have a trans daughter than a dead son?"

206. Clinicians can only inform parents and adolescents about what they themselves understand about the science. (Levine et al., 2022). The issue of informed consent often rests upon whether clinicians rely upon the previous treatment patterns—fashion-based medicine—or whether they base their thinking on evidence-based medicine.

207. International interest in the necessary components of informed consent can be seen from the reception that our March 2022 article has had. As of May 13, 2023, the paper has been downloaded across the world 61,138 times. We presume that Drs. Adkins, Turban, and Janssen have

read this paper. If they have not, one can only wonder just how aware they are about the scientific dialogue occurring on gender dysphoria. If they have read it, they have chosen to ignore it, even as clinicians all over the world have been recommending it to others at a startling pace.

208. It is my recurrent experience from case reviews, detransitioners' accounts, and communication with distressed parents and my own patients, that many of the hormone providers and surgeons rely heavily on the mental health professional's referral of the patient as the basis for the next affirmative care element. Clinicians are incorrectly assuming that medical and surgical interventions are clinically and ethically justified ("medically necessary") because a mental health professional cleared the patient for the intervention. The clinicians briefly review the possible medical or surgical complications of the intervention—hormones or surgery— they are providing. They typically do not know the mental health professional's degree, years of experience, or processes that led to the referral. The Endocrine Society's and WPATH's psychiatric evaluation policies sound substantial, but the devil is in the details of how they are carried out. (Edwards-Lepper & Anderson, 2021). In guidelines, this is described as requiring an interdisciplinary team of clinicians. Ideally, this team meets to discuss each case in depth so that the endocrinologist, the surgeon, and the MHPs share in person what is known about the patient. On February 9, 2023, such a high throughput process with minimal psychiatric evaluation at a gender clinic in Missouri was called out by a whistle blower in an affidavit, alleging multiple ethical violations. Missouri's attorney general and senator announced separate investigations.[15]

209. For years, affirmative care specialists have been promulgating their conviction that even a young child knows what gender he or she will always have. They have assured themselves that once cross-sex behavior patterns are consonant with a child's expressed interest in being a

[15] Missouri Independent (2023). *Missouri agencies launch investigation into health center for transgender youth*. https://missouriindependent.com/2023/02/09/missouri-agencies-launch-investigation-into-health-center-for-transgender-youth/.

member of the opposite sex, their current identity is fixed for life. Such ideas are clearly incorrect, but they have pervaded advocates' writings for decades.

210. Beginning on page 15 of his report, Dr. Antommaria discusses informed consent. The counter to Dr. Antommaria's assertions can be found in the paper entitled "Reconsidering Informed Consent for Trans-identified Children, Adolescents and Young Adults." (Levine et al., 2022). As noted above, it has been received with unprecedented readership throughout the world in only one year and is in the top 5% of all scientific articles published since 2012. To date, it has been downloaded approximately a thousand times per week. Our two subsequent publications are following similar patterns.

211. Affirmative Care advocates have always recognized that informed consent was legally and ethically required. The issues are the following: (1) what informed consent consists of, (2) how it is obtained, (3) what information is provided to the patient, (4) whether an ill-informed physician can conduct a legal and ethical consent process, and (5) whether a minor can consent. Contrary to Dr. Antommaria's assertions, it has not been proven that youth are mature enough to provide informed consent. One may wonder how this could be convincingly, scientifically proven. Detransitioners, who are surfacing at a new great rate, now say that they were too young to assent to treatment and could not grasp that their other psychological problems should have been discussed in psychotherapy before they assented to affirmative care. There remains considerable uncertainty among parents, patients, and mental health professionals about the cognitive maturational capacity of youth to assent. One must remember that in some settings, nine, ten, and eleven-year-olds are being treated with puberty blockers. Block has estimated that there are 18,000 children in the U.S. on these drugs. (Block 2023.) The research on the ability to consent was done by those in the forefront of affirmative care and was initiated because clinicians feel ethically uneasy about this care. There is simply no way to prove this is ethical because a passionate 14-year-old knows what will

make her happy in the future. (Vrouenraets, et al., 2020, 2021). Doctors may not be capable of leading a proper informed consent process because they do not have sufficient knowledge of the dangers of the medical treatments. If the clinician is unaware of the elevated suicide rates after gender conforming surgeries and hormonal treatment, if they are unaware of the premature mortality of adult trans persons, and if they do not recognize the multidimensional problems described by advocates within the trans communities, then they cannot help parents to consider the immediate benefits and the long terms risks involved in affirmative care. This problem may be an artifact of being a pediatric-centered professional. The study of adults may not seem that relevant to those who care for these children.

C. The Diagnosis of Gender Dysphoria

212. Dr. Antommaria and Dr. Janssen rely on the DSM-5 and DSM-5-TR (collectively "DSM") to support the assertion that gender dysphoria is a medical diagnosis. (Antommaria, p. 18; Janssen, p. 7). However, DSM contains no diagnosis of migraine headaches, thyrotoxicosis, or any other problem that has been historically labelled as medical and treated with medications and surgery. In fact, DSM contains a list of psychiatric disorders, which are patterns of dysfunction without known anatomic or fundamental physiological disruption. Treatments for these conditions target mood, thinking, or anxiety responses to living one's life with its contradictions, disappointments, and possibilities. These conditions are ideally treated by psychotherapy alone or with a combination of psychotherapy and medication.

213. Gender dysphoria is in the DSM and gender incongruence is in the ICD-11 system of classification. In the ICD-11, both sexual dysfunction and gender incongruence are in a special section called Factors Relating to Sexual Health. In the DSM, gender dysphoria is in its own section. These special sections came about for social and political reasons (Reed et al., 2016) —to aid in these patients' low self-esteem and to decrease societal discrimination. If gender dysphoria and gender

incongruence were internationally recognized to be a medical diagnosis, it would not have a presence in the DSM and would be listed in the ICD-11 section for medical illnesses.

214. In fact, the move to depathologize gender dysphoria and gender incongruence created a paradox that has been somewhat resolved by these special sections. Those who view gender dysphoria as just another aspect of human diversity are faced with the problem that medical treatments to better align the body with the mind require a diagnosis of disease for insurance coverage. Insisting these treatments are not cosmetic, advocates settled on getting insurance coverage and keeping it a psychiatric diagnosis but in a special section. This is a political compromise on the part of the advocates for medical and surgical treatments of gender dysphoria. This was the acknowledged debate when the diagnosis of gender dysphoria was retained in DSM-5.

215. Looking deeply into the vital issue of causation, all sexual behavior and sexual identities are created by an interaction of biological, psychological developmental, interpersonal, and cultural influences. Having a biological influence manifested by a child's temperament is not the same as being caused by biology. Advocates have been looking for a hypothesized biological cause in hormone profiles, brain structure, and genetic profiles. Short of finding convincing evidence, they simply declare it is biologically caused. Obviously, there is an important distinction between influenced and caused. The declaration that gender dysphoria or gender incongruence is a medical diagnosis defies its history in DSM versions since transsexualism first was classified more than a half century ago.

216. The use of puberty blockers (PB) and cross sex hormones (CSH), which of course change normal anatomy and physiology, must be ethically justified to privilege respect for patient autonomy over the primary, time-honored principle dating to 2,500 years ago: Above All Do No Harm. Four comforting but false beliefs justify calling gender dysphoria a medical diagnosis: (1) A prenatal process created GD, whenever it is expressed in the lifecycle; (2) Any trans identity is

unchangeable, immutable; (3) The incongruity between the sex of the body and one's gender identity will cause lifelong suffering if not addressed with PB, CSH, and surgery; and (4) There are no alternative treatments that can help.

217. Calling gender dysphoria a medical diagnosis is a rhetorical device to lessen the ethical concern of doing harm in the long run. Said more plainly, calling gender dysphoria a medical diagnosis is a rationalization. It makes the doctor feel better about any potential danger, such as causing sterility.

218. While patients' histories of their symptoms is inherent in all medical treatment, the point is that patients self-report their gender dysphoria and its duration, and the physician bases his or her diagnosis on that self-report. The idea that the diagnosis is based on the physician's perceptions—a qualified person making the diagnosis—is a transparent slight-of-hand for the fact that doctors have no way of ascertaining the truthfulness of the self-report. In medicine, patient history is the beginning of a process that is followed by a physical, laboratory, and radiologic examination before a diagnosis is made. With gender dysphoria, the process begins and ends with the patient's history.

D. Strength of Evidence

219. The evaluation of guidelines, such as those published by WPATH, is an esoteric skill set of those with an erudite knowledge. (Dahlen et al., 2021). Gordon Guyatt, Professor in the Department of Health Research Methods at McMasters University, is one such highly qualified evaluator. He invented the Grading of Recommendations, Assessment, Development, and Evaluations (GRADE) system. GRADE is a transparent framework for developing and presenting summaries of evidence and provides a systematic approach for making clinical practice recommendations. With over 100 adopting organizations worldwide, it is the most widely used tool for grading the quality of evidence. (Guyatt et al., 2008). Guyatt found serious problems with the

Endocrine Society's guidelines. He also noted that WPATH did not reveal how many systematic reviews of evidence were undertaken and what their findings were. Scientific reviews require transparency. Another reviewer of WPATH 8th version, Helfand (quoted extensively in Block, 2023), noted that there were several instances in which the strength of evidence presented to justify a recommendation was "at odds with what their own systematic reviewers found." Helfand also noted that WPATH's recommendations did not distinguish when one was based on systematic review of evidence and when it was based on consensus. (Block, 2023). Rafferty, the author of the AAP's 2018 guidance recommending social transition and affirmative care for children, and puberty blockers for older children at Tanner 2, stated that "their process doesn't quite fit the definition of a systemic review." (Block, 2023).

220. In paragraph 64 of his report, Dr. Antommaria indicates that "gender-affirming medical care under clinical practice guidelines, like the Endocrine Society's, is evidence based." Dr. Janssen makes a similar claim, citing WPATH SOC 8 in paragraph 33 of his report. Of course, the guidelines are "evidence based," but the Endocrine Society itself admits the evidence basis is of low quality—as have multiple other reviews of the evidence. (Cass, COHERE, Brignardello-Peterson & Wiercioch, and SBU). WPATH SOC 7 and 8 have been reviewed in the same low evidence basis. (Dahlen et al., 2021, Block, 2023). Moreover, all nine of the authors of the Endocrine Society's guidelines are professionals who prescribe or recommend hormones or provide surgery for trans youth. (Hembree et al., 2017). That is a far cry from the 70% standard for the GRADE field. The bias is: one finds for the procedures that one performs.

221. In paragraph 22 of his report, Dr. Antommaria states that randomized trials of individuals with gender dysphoria are, at times, "unethical." But the reason he asserts that the randomized trials are unethical is that he and others in the U.S. believe the treatments are superior to no treatment or psychotherapy. He ignores the utter lack of knowledge about the long-term outcomes

and the indicators of other adult transgender people's problems. The failure to do rigorous studies following de Vries, whose replication failed (Carmichael, 2020), is part of the problem today.

E. Low Regret Rates

222. In paragraph 56 of this report, Dr. Antommaria, like WPATH, asserts that the regret rate for adult gender-diverse patients who received affirmative care is 1.1%. He does not explain how regret is being defined to obtain this figure. (Hall et al., 2021). Regret, of course, is a common, if not universal, human experience. Transgender adolescents are not exceptions. Regret and acceptance of affirmative care can co-exist. It is not an either/or phenomenon. Regret does not preclude experiencing benefits from changing one's appearance. (Chen et al., 2023). Aesthetic benefits typically appear first. Regret's complexity can be seen in the observation that some detransitioners say that they do not have regret for having originally transitioned, but once they presented themselves as a trans person, regret eventually led to detransition. (MacKinnon, et al., 2022).

223. Though Dr. Antommaria's and Dr. Turban's reports touch on the topic of regret, they fail to adequately consider (or to consider at all) the interplay between regret and infertility secondary to gender affirming care. Transgender-identifying adolescents are generally not concerned about their future infertility. Regret is likely to appear 10 to 15 years later. Many of these teens are inexperienced with partner sex and say that they are not interested in it anyway. Later, as sexual dysfunction because of hormones, surgery, or anxiety about physical intimacy becomes a recurrent experience, regret appears. Isolation from family over time, the inability to find a stable relationship, the experience of discrimination, their need for ongoing medical care, and their coping with substance use to quell anxiety and depression—matters that they may have been warned about—begin to create waves of regret. Some eventually express regret over not having had a chance to explore their array of concerns in psychotherapy before they transitioned. (Littman, 2021).

224. Regret rates less than 1%, as quoted by Dr. Turban, defy credulity. Typical of other advocates for affirmative care, rates of regret < 2% are repeatedly quoted without discussion of how regret was defined and what percentage of the original populations were lost to follow up. These figures do not encompass patients of any age outside of medical systems who identify as trans and then return to a sex-gender compatible state. Dr. Turban's influence of external factors seems to think that external influences have no intrapsychic manifestations. This comes about because Dr. Turban does not recognize, or at least acknowledge, that trans adolescents and adults are ambivalent about their trans processes even if they are not perceived to be so by advocates.

225. There must be a hierarchy of intensity of regret related to the situations patients ultimately find themselves in. Suicide and suicide attempts must be considered as a possible manifestation of regret. After having undergone mastectomies or genital reconstruction, detransitioners rank high on the list of regret whether they consult a surgeon to see if their anatomy can be restored or an endocrinologist to administer their gonadal hormones. (Littman, 2021).

226. Lower on this hierarchy are those who recognize they are disappointed with their cross-gender lives for various reasons, whether they take steps to detransition or not. Detransitioners, and those who are resigned to making the best of their circumstances, are often angry at themselves for their naïve adolescent certainty and at their professionals' unconcerned compliance with their requests. (Littman, 2021). Lesser adaptive challenges occur to those who detransition after estrogen or testosterone has created new permanent features. (Boyd et al., 2022). Estrogen-induced larger breasts can be surgically removed, but it is not clear to what extent the long-term use of estrogen threatens sexual and testicular reproductive function. Testosterone-induced low register voices stay largely in the male range, facial hair does not disappear, and lactation is not possible when mastectomies are repaired with implants.

227. Those who detransition before taking hormones may have the least problematic new adaptations, but this too creates concerns. Years of binding may reshape breasts, for instance. Parents who objected to transition typically rejoice when an offspring detransitions. Parents who supported the transition may go through a period of embarrassment, grief, and guilt. While Dr. Antommaria's figure about regret could not possibly adequately summarize the phenomena, it does make affirmative care advocates comfortable.

XII. THE MOST RECENT SYSTEMATIC REVIEW PUBLISHED IN THE FIELD HIGHLIGHTS MANY OF THE POINTS MADE ABOVE

228. In closing this report, I would like to summarize a recently published article in detail because it highlights many of the points I have been making.

229. On April 17, 2023, a systemic review of the hormonal treatment for children with gender dysphoria was published by an eight-person team of scientists with appointments in various departments: epidemiology, pediatrics, gastroenterology, health technology, clinical science, women's and children's health, psychiatry and neurochemistry, and neuroscience and physiology. (Landen et al, 2023). It is likely that this report was one of the bases for Sweden's new national health policy, which makes psychotherapy (instead of hormonal treatment) the initial treatment approach for transgender-identified children and adolescents. Sweden now allows hormonal treatment to be only offered in research protocols. The article contains five tables, the last of which describes how future research should be conducted and reported. This table indirectly demonstrates the profound methodological problems with the current studies and gives guidance to the Karolinska Institute in Stockholm, at which future adolescents may be enrolled in protocols.

230. This project assessed psychosocial effects, bone health, body composition and metabolisms, and therapy persistence in children less than age 18 years of age who were treated with puberty blockers. The study initially identified 9,934 English language articles on the topic, but as is

usual for such processes, selected 24 studies from 2014 onward for intense scrutiny. The GRADE system, which provides four levels of evidence (very low, low, moderate, high), was used to analyze the 24 studies. Puberty blockers (PB) were typically administered to patients between 11- and 15-years-old, but the actual age range spanned from 9 to 18.6 years.

231. Six studies focused on psychosocial and mental health parameters. Global function was evaluated for 113 patients, but the certainty of the evidence "[could not] be assessed." When suicidal ideation was evaluated for 28 patients, there was no change noted and the certainty of evidence "[could not] be assessed." Similar conclusions about the certainty of evidence were found when assessing gender dysphoria, depression, anxiety, cognition, and quality of life. Each of the six studies were downgraded because of selection bias, lack of precision in measurement, absence of long-term follow-up, and inability to separate effects of the hormone from psychotherapeutic effects. One study of 20 patients on cognitive effects found no differences between the treated and untreated patients but had no pre- and post-treatment measurements. This missing method could have shown the variable effects from patient to patient — positive, negative, or no change. Mean data obscures this important information. (Landen et al, 2023).

232. The conclusion based on six longitudinal studies on bone density, only one of which was prospective, was graded "low certainty." Three studies found that before the start of PBs, bone density was lower than age mates. Bone mineralization increased less than age mate controls while on PBs, but the absolute density remained unchanged after two to three years. Even after five-plus years of cross sex hormones, the lumbar spine scores were significantly lower than before PBs were started, while other volume and femoral neck scores had normalized. A separate study of female to males on testosterone for 1-2 years failed to regain scores registered at the start of PBs. When bone geometry was studied, those treated at the onset of puberty resembled the values of their **experienced**

gender, whereas those who started PBs later in puberty remained consonant with their **biological sex**. (Landen et al, 2023).

233. Puberty blockers arrest the puberty growth spurt and lead to increased fat mass and decreased lean body mass.

234. Obesity at age 22 was more prevalent in the transgender populations.

235. From the abstract review of almost 10,000 studies, no randomized controlled studies were identified. In general, the 24 identified studies lacked control groups and intra-individual analyses, had high attrition rates (lost to follow-up or missing data), and failed to assess long term outcomes. No data were presented that dealt with those who stopped PB. The authors noted that their conclusions were consistent with the UK systemic review. The Swedish review concluded that the effects on psychosocial and somatic health are "unknown". (Landen et al, 2023).

236. Given these and similar findings from other systemic reviews free from commercial bias, such as the other recent one from McMasters University (Brignardello-Peterson & Wiercioch, 2022), it is my opinion that the terms "experimental," "unproven," or "dangerously uncertain" are justified when considering the absence of long term follow up data and the deficiencies within the current literature.

237. Given the considerable risk of harms, which include premature death (Jackson et al, 2023) and other less obvious problems discussed in this report, the question of whether minors may provide consent for medical and surgical treatments quickly arises. Others have asked, with life experiences being limited, brain development being incomplete, and psychiatric co-morbidities being present, whether any adolescent can legally give informed consent for medicalization. This is why parents are legally required to provide consent and the minor only assents. However, they cannot be expected to understand the limitations of the science pointed out by the Swedish systemic review.

My concern is that the American affirmative care clinicians and institutions that support such care also simply do not understand the limitations of science in this politicized arena.

238. When the frequently encountered psychiatric co-morbidities of trans youth are entered into consideration—autism, depression, social avoidance, anxiety states, eating disorders, suicidality, and self-harming patterns—it seems prudent not to assume that a young person has the capacity to think through the momentousness of the decision. We might expect U.S. physicians, who know the nature of scientific uncertainty, to be concerned with this haunting question of decision-making capacity, as have the Europeans. (Vrouenraets, et al, 2020.)

I declare, pursuant to 28 U.S.C. § 1746, under penalty of perjury that the foregoing is true and correct. Executed this 18th day of May, 2023.

Stephen B. Levine, M.D.

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Exhibit “A”

Brief Introduction

Dr. Levine is Clinical Professor of Psychiatry at Case Western Reserve University School of Medicine. He is the author or coauthor of numerous books on topics relating to human sexuality and related relationship and mental health issues. Dr. Levine has been teaching, providing clinical care, and writing since 1973, and has generated original research, invited papers, commentaries, chapters, and book reviews. He has served as a journal manuscript and book prospectus reviewer for many years. Dr. Levine has been co-director of the Center for Marital and Sexual Health/ Levine, Risen & Associates, Inc. in Beachwood, Ohio from 1992 to the present. He received a lifetime achievement Masters and Johnson's Award from the Society for Sex Therapy and Research in March 2005.

Personal Information

Date of birth 1/14/42

Medical license no. Ohio 35-03-0234-L

Board Certification 6/76 American Board of Neurology and Psychiatry

Education

1963 BA Washington and Jefferson College

1967 MD Case Western Reserve University School of Medicine

1967-68 internship in Internal Medicine University Hospitals of Cleveland

1968-70 Research associate, National Institute of Arthritis and Metabolic Diseases, Epidemiology Field Studies Unit, Phoenix, Arizona, United States Public Health Service

1970-73 Psychiatric Residency, University Hospitals of Cleveland

1974-77 Robert Wood Johnson Foundation Clinical Scholar

Appointments at Case Western Reserve University School of Medicine

1973- Assistant Professor of Psychiatry

1979- Associate Professor

1982- Awarded tenure

1985- Full Professor

1993- Clinical Professor

Honors

Summa Cum Laude, Washington & Jefferson

Teaching Excellence Award-1990 and 2010 (Residency program)

Visiting Professorships

- Stanford University-Pfizer Professorship program (3 days)–1995
- St. Elizabeth's Hospital, Washington, DC –1998
- St. Elizabeth's Hospital, Washington, DC--2002

Named to America's Top Doctors consecutively since 2001

Invitations to present various Grand Rounds at Departments of Psychiatry and Continuing Education Lectures and Workshops

Masters and Johnson Lifetime Achievement Award from the Society of Sex Therapy and Research, April 2005 along with Candace Risen and Stanley Althof

2006 SSTAR Book Award for The Handbook of Clinical Sexuality for Mental Health Professionals: Exceptional Merit

2018—Albert Marquis Lifetime Achievement Award from Marquis Who's Who. (Exceling in one's field for at least twenty years)

Professional Societies

1971- American Psychiatric Association; fellow; #19909

2005- American Psychiatric Association, Distinguished Life Fellow

1973- Cleveland Psychiatric Society

1973- Cleveland Medical Library Association

- 1985 - Life Fellow
- 2003 - Distinguished Life Fellow

1974-Society for Sex Therapy and Research

- 1987-89-President

1983- International Academy of Sex Research

1983- Harry Benjamin International Gender Dysphoria Association

- 1997-8 Chairman, Standards of Care Committee

1994- 1999 Society for Scientific Study of Sex

Community Boards

1999-2002 Case Western Reserve University Medical Alumni Association

1996-2001 Bellefaire Jewish Children's Bureau

1999-2001 Physicians' Advisory Committee, The Gathering Place (cancer rehabilitation)

Editorial Boards

1978-80 Book Review Editor Journal Sex and Marital Therapy

Manuscript Reviewer for:

a. Archives of Sexual Behavior
b. Annals of Internal Medicine
c. British Journal of Obstetrics and Gynecology
d. JAMA
e. Diabetes Care
f. American Journal of Psychiatry
g. Maturitas
h. Psychosomatic Medicine
i. Sexuality and Disability
j. Journal of Nervous and Mental Diseases
k. Journal of Neuropsychiatry and Clinical Neurosciences
l. Neurology
m. Journal Sex and Marital Therapy
n. Journal Sex Education and Therapy
o. Social Behavior and Personality: an international journal (New Zealand)
p. International Journal of Psychoanalysis
q. International Journal of Transgenderism
r. Journal of Urology
s. Journal of Sexual Medicine
t. Current Psychiatry
u. International Journal of Impotence Research
v. Postgraduate medical journal
w. Academic Psychiatry

Prospectus Reviewer

a. Guilford

b. Oxford University Press

c. Brunner/Routledge

d. Routledge

Administrative Responsibilities

Principal Investigator of approximately 70 separate studies involving pharmacological interventions for sexual dysfunction since 1989.

Co-leader of case conferences at DELRLLC.com

Expert testimony at trial or by deposition within the last 4 years

Provided expert testimony for Massachusetts Dept. of Corrections in its defense of a lawsuit brought by prisoner Katheena Soneeya, including by deposition in October 2018, and in- court testimony in 2019.

Provided expert testimony by deposition and at trial in *In the Interests of the Younger Children* (Dallas, TX), 2019.

Testified in an administrative hearing in *In the matter of Rhys & Lynn Crawford* (Washington State), March 2021.

Testified multiple times in juvenile court in *In the matter of Asha Kerwin* (Tucson, Arizona), 2021.

Provided expert testimony by deposition in *Kadel et al v. Folwell et al.* (North Carolina), 2021.

Consultancies

Massachusetts Department of Corrections—evaluation of 12 transsexual prisoners and the development of a Gender Identity Disorders Program for the state prison system. Monthly consultation with the GID treatment team since February 2009 and the GID policy committee since February 2010.

California Department of Corrections and Rehabilitation; 2012-2015; education, inmate evaluation, commentary on inmate circumstances, suggestions on future policies.

Virginia Department of Corrections –evaluation of an inmate. New

Jersey Department of Corrections—evaluation of an inmate. Idaho

Department of Corrections—workshop 2016.

Grant Support/Research Studies

TAP–studies of Apomorphine sublingual in treatment of erectile dysfunction.

Pfizer–Sertraline for premature ejaculation.

Pfizer–Viagra and depression; Viagra and female sexual dysfunction; Viagra as a treatment for SSRI-induced erectile dysfunction.

NIH- Systemic lupus erythematosis and sexuality in women.

Sihler Mental Health Foundation

a. Program for Professionals
b. Setting up of Center for Marital and Sexual Health
c. Clomipramine and Premature ejaculation
d. Follow-up study of clergy accused of sexual impropriety
e. Establishment of services for women with breast cancer

Alza–controlled study of a novel SSRI for rapid ejaculation. Pfizer–

Viagra and self-esteem.

Pfizer- double-blind placebo control studies of a compound for premature ejaculation.

Johnson & Johnson – controlled studies of Dapoxetine for rapid ejaculation.

Proctor and Gamble: multiple studies to test testosterone patch for post menopausal sexual dysfunction for women on and off estrogen replacement.

Lilly-Icos—study of Cialis for erectile dysfunction. VIVUS

– study for premenopausal women with FSAD.

Palatin Technologies- studies of bremelanotide in female sexual dysfunction—first intranasal then subcutaneous administration.

Medtap – interview validation questionnaire studies.

HRA- quantitative debriefing study for Female partners os men with premature ejaculation, Validation of a New Distress Measure for FSD.

Boehringer-Ingelheim- double blind and open label studies of a prosexual agent for hypoactive female sexual desire disorder.

Biosante- studies of testosterone gel administration for post menopausal women with HSDD.

J&J a single-blind, multi-center, in home use study to evaluate sexual enhancement effects of a product in females.

UBC-Content validity study of an electronic FSEP-R and FSDS-DAO and usability of study PRO measures in premenopausal women with FSAD, HSDD or Mixed FSAD/HSDD.

National registry trial for women with HSDD.

Endoceutics—two studies of DHEA for vaginal atrophy and dryness in post menopausal women.

Palatin—study of SQ Bremelanotide for HSDD and FSAD.

Trimel- a double-blind, placebo controlled study for women with acquired female orgasmic disorder.

S1 Biopharma- a phase 1-B non-blinded study of safety, tolerability and efficacy of Lorexys in premenopausal women with HSDD.

HRA – qualitative and cognitive interview study for men experiencing PE.

Publications

A) Books

1) Pariser SR, Levine SB, McDowell M (eds.), Clinical Sexuality, Marcel Dekker, New York, 1985

2) Sex Is Not Simple, Ohio Psychological Publishing Company, 1988; Reissued in paperback as: Solving Common Sexual Problems: Toward a Problem Free Sexual Life, Jason Aronson, Livingston, NJ. 1997

3) Sexual Life: A Clinician's Guide. Plenum Publishing Corporation. New York, 1992

4) Sexuality in Midlife. Plenum Publishing Corporation. New York, 1998

5) Editor, Clinical Sexuality. Psychiatric Clinics of North America, March, 1995.

6) Editor, (Candace Risen and Stanley Althof, associate editors) Handbook of Clinical Sexuality for Mental Health Professionals. Routledge, New York, 2003

1. 2006 SSTAR Book Award: Exceptional Merit

7) Demystifying Love: Plain Talk For The Mental Health Professional. Routledge, New York, 2006

8) Senior editor, (Candace B. Risen and Stanley E. Althof, Associate editors), Handbook of Clinical Sexuality for Mental Health Professionals, 2nd edition. Routledge, New York, 2010.

9) Barriers to Loving: A Clinician's Perspective. Routledge, New York, 2014.

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EXHIBIT 6

IN THE UNITED STATES DISTRICT COURT
FOR THE MIDDLE DISTRICT OF TENNESSEE
NASHVILLE DIVISION

L.W. et al., *by and through her parents and next friends,* *Samantha Williams and Brian Williams*, Plaintiffs, v. JONATHAN SKRMETTI et al., Defendants.	)	No. 3:23-cv-00376 JUDGE RICHARDSON

EXPERT DECLARATION OF DR. SVEN ROMÁN

Background And Qualifications

1. I am a Swedish child and adolescent clinical psychiatrist and have been practicing medicine since 2000, with my focus on child and adolescent psychiatry since 2004. As discussed more completely below, I have personally witnessed the rise of a new class of gender dysphoria patients in Sweden, which now dominate the population of these patients in Sweden. I was educated in medicine at Karolinska Institutet (which would be translated to English as Karolinska Institute), which is the most well-known and prestigious international medical training institute in Sweden. Karolinska children's hospital, called Astrid Lindgren's Children's Hospital, has also played a significant role in the ongoing conversation about treatment of minors with gender dysphoria, as it has handled significant numbers of child and adult patients with this condition. I have been treating patients with a variety of psychiatric disorders, both in an in-patient and out-patient setting, since 2004. I meet with and treat patients suffering from virtually the entire range of disorders identified in the DSM-5. I have participated in approximately 600 to 700 neuropsychiatric investigations and evaluations.

2. In the course of my work, I have met with approximately 30 children who have been identified or self-identified as suffering from gender dysphoria. In some cases, I have met with these children after active medical intervention has begun (puberty blockers and cross-sex hormones). Surgical intervention in minor children in Sweden is extremely rare and there are very few such cases and therefore I have not encountered one. Other patients with gender dysphoria I have met with have presented to me prior to medical intervention. For the reasons I give below, I have not referred patients to gender clinics for medical intervention because (1) I have consistently believed that there was a lack of evidence to support such medical interventions and (2) because in my experience all such patients I have met with have other

psychiatric conditions in addition to their professed gender dysphoria. Treatment of these other conditions has been shown to also resolve gender dysphoria in many such cases. Through my involvement with GENID, discussed below, I have learned that parents report that children frequently desist from their gender dysphoria when they receive psychotherapy or other interventions to address psychiatric comorbidities. Teenagers routinely experience mild body dysmorphia (unhappiness with their physical appearance) and sometimes psychotherapy and the maturation process are all a child needs to resolve what the child may call gender dysphoria.

3. I have written on a variety of medical subjects for major Swedish newspapers and have published articles in the medical press in Sweden. On the subject of gender dysphoria, several of the articles have been translated into English and have been widely disseminated internationally. I have also written or co-authored two articles on this subject in the foreign medical journals The American Journal of Psychiatry and Dagens Medicin in Norway. My list of publications is attached to my CV, which is Exhibit A to this declaration.

4. I have spoken about childhood gender dysphoria in several recognized Swedish podcasts, on Finnish public service radio, in the French daily newspaper Le Figaro, and on 21 May a documentary will be broadcast on French TV channel M6, including footage of my lecture in the Swedish Parliament on 16 September 2021. Since 2019, I have held five lectures and one hearing to members of the Swedish Parliament by invitation, including two lectures in 2019 and 2021 on the subject of gender dysphoria in children.

5. My opinions in this declaration are based on my clinical experience, as well as my review of the literature both in Sweden and the rest of the world, though I will focus on the Swedish experience and the resulting systematic review of the Swedish National Health Service. The systematic review published just last month by Dr. Michael Landén and his colleagues

conclusively establishes that there is insufficient evidence to support hormonal interventions in gender dysphoric youth. I am being compensated at my customary consulting rate of 160 euros / hour. My compensation does not depend on the content of my testimony.

The Rise Of Gender Dysphoria In Sweden

6. In Sweden, the Gender Identity Challenge (GENID) association was formed in 2018 by parents of trans children and also trans young adults. The parents and former patients in the association were distressed that children had received irreversible pharmacological and surgical treatment and were unsure whether the benefits outweighed the risks. They approached journalists, authorities and doctors and wrote opinion pieces. It was their hard work that paved the way for a public debate on the subject to start in spring 2019.

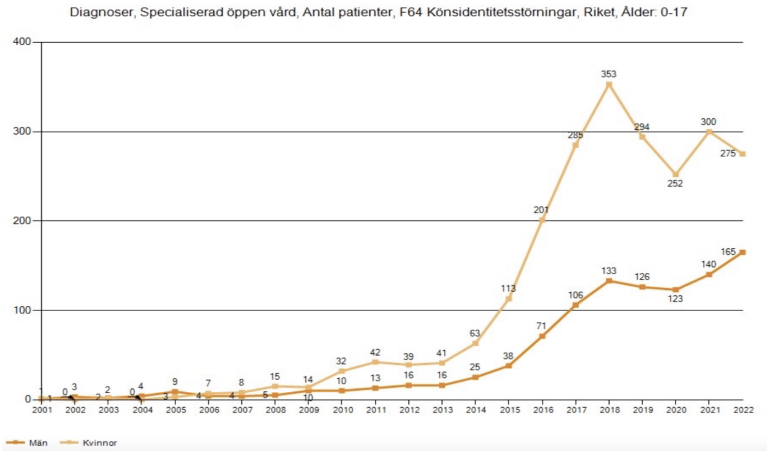
7. It was an opinion piece and a TV program that started that public conversation. The article was published on March 13, 2019 in Sweden's second largest morning newspaper, Svenska Dagbladet.[1] It was signed by seven people, including the internationally renowned professor of child and adolescent psychiatry, Christopher Gillberg, and four other professors. Dr. Gillberg is perhaps the most famous Swedish child psychiatrist living today and his opinion carried very much weight with the national health authorities. Dr. Gillberg gave testimony to the UK high court in its judicial inquiry into the Tavistock gender clinic which was heavily relied upon by that body to conclude that hormonal interventions are not appropriate for children.

8. The TV program I mentioned was broadcast on 3 April 2019 in the investigative, and in Sweden very well-known, program Uppdrag Granskning (Mission Review) and was called "The trans train and teenage girls."

[1] Gillberg, Christopher, et al. (March 13, 2019), The gender change in children is a great experiment. Swedish daily newspaper. https://www.svd.se/konsbytena-pa-barn-ar-ett-stort-experiment

9. For my part, I began my participation in the debate when I was quoted in August 2019 in an editorial in Sweden's largest daily newspaper Dagens Nyheter and within just over a month published two debate articles, one in Dagens Nyheter and one in the medical journal Dagens Medicin.[2,3]

10. The development of gender dysphoria diagnoses in Sweden is astonishing and is what gave rise, in part, to concerns raised by GENID and others. Gender dysphoria was extremely uncommon in the early 2000s. In 2001, a total of 2 children (age group 0-17 years) were diagnosed with gender dysphoria, in 2021 the number was 440, a 220-fold increase.[4] A total of 12 people under 25 were diagnosed with gender dysphoria in 2001, by 2021 the figure was 1,865. It is my understanding that Sweden has the highest rate of gender dysphoria in children (patients per 100,000 population) in the entire world. More recent data from our government shows the trend potentially leveling out for girls after GENID, Dr. Gillberg, and others began raising concerns, though the COVID pandemic and its restrictions may have caused an increase among boys.



[2] https://www.dn.se/asikt/konsdysfori-sprids-som-en-epidemi-pa-natet/

[3] https://www.dagensmedicin.se/opinion/debatt/stoppa-omedelbart-all-behandling-av-konsdysfori-for-barn-och-unga-vuxna/

[4] https://sdb.socialstyrelsen.se/if_paro/val.aspx Swedish National Board of Health and Welfare

11. The increase in the diagnosis of childhood gender dysphoria was moderate until 2007, the year the iPhone was introduced (I touch later in this expert opinion on why gender dysphoria, like many psychiatric diagnoses, is often socially contagious), and then the increase accelerated to become very high from 2014 onwards, when social media had become ubiquitous among adolescents.

12. The differences between boys and girls seen above is not unexpected in my experience as a psychiatrist. What is surprising is the significant increase in the number of diagnoses in both sexes.

13. Sweden has long been very accepting with regard to sexual and gender diversity. In 2018, a law was proposed to lower the age of eligibility for surgical care from age 18 to 15, remove the requirement for parental consent, and lower the legal age for change of gender to age 12. A series of cases of regret and suicide following medical transition were reported in the media. For example, Richard Orange, *Teenage transgender row splits Sweden as dysphoria diagnoses soar by 1,500%*, The Observer 22 Feb 2020, reported on the suicide of a 32-year old trans woman.

14. Due to the accumulating data on remorse and suicide, the Swedish Agency for Health Technology Assessment and Assessment of Social Services (SBU) conducted a systematic inventory of the research. On December 20, 2019, the SBU published the systematic scoping review "Gender dysphoria in children and adolescents: an inventory of the literature."[5] The survey showed that the scientific support for medical treatment of gender dysphoria in children was non-existent or extremely weak. I quote the conclusions below.

- We have not found any scientific studies which explains the increase in incidence in children and adolescents who seek the heath care because of gender dysphoria.

[5] https://www.sbu.se/en/publications/sbu-bereder/gender-dysphoria-in-children-and-adolescents-an-inventory-of-the-literature/

- We have not found any studies on changes in prevalence of gender dysphoria over calendar time, nor any studies on factors that can affect the societal acceptance of seeking for gender dysphoria.
- There are few studies on gender affirming surgery in general in children and adolescents and only single studies on gender affirming genital surgery.
- Studies on long-term effects of gender affirming treatment in children and adolescents are few, especially for the groups that have appeared during the recent decade.
- The scientific activity in the field seems high. A large part of the identified studies are published during 2018 and 2019.
- Almost all identified studies are observational, some with controls and some with evaluation before and after gender affirming treatment. No relevant randomised controlled trials in children and adolescents were found.
- We have not found any composed national information from Sweden on:
  – the proportion of those who seek health care for gender dysphoria that get a formal diagnosis
  – the proportion starting endocrine treatment to delay puberty
  – the proportion starting gender affirming hormonal treatment
  – the proportion subjected to different gender affirming surgery

15. From June 2020 to March 2021, four events in Finland, the Netherlands and the UK also influenced attitudes towards the treatment of gender dysphoria in Sweden.

16. In June 2020, the Finnish Ministry of Health, under the leadership of the Nordic region's leading pediatric gender dysphoria researcher, Rittakertu Kaltiala, issued new guidelines: psychological treatment should be the first line of treatment for everyone with gender dysphoria, both children and adults.[6]

17. Annelou de Vries, who is behind the protocol used by all guidelines, "The Dutch protocol," writes in the September 2020 issue of the American College of Pediatricians' journal *Pediatrics*: the protocol is incorrectly applied to the ROGD group, they should be treated primarily with psychiatric care. "ROGD" is an acronym for Rapid Onset Gender Dysphoria, the

[6] Kaltiala-Heino, R., Sumia, M., Työläjärvi, M. et al. Two years of gender identity service for minors: overrepresentation of natal girls with severe problems in adolescent development. Child Adolesc Psychiatry Ment Health 9, 9 (2015). https://doi.org/10.1186/s13034-015-0042-y

new group of children with gender dysphoria characterized by onset in adolescence, the majority are born female and often have one or more psychiatric syndromes.[7]

18. On December 1, 2020, 23-year-old Keira Bell - a detransitioner who was given puberty blockers at age 16, treated with testosterone at 17, and underwent a mastectomy by surgeons when she was 20 - won a Supreme Court case against the Tavistock Clinic in London. As a result, no children under 16 would receive gender reassignment treatment at that clinic without judicial approval.[8] Tavistock's gender clinic has subsequently been closed as a result of an interim review by Dr. Hilary Cass.

19. The English National Health Service, NHS, published on March 11, 2021 an Evidence review: *Gonadotrophin releasing hormone analogues for children and adolescents with gender dysphoria.* It concludes that there is a lack of evidence for the medical treatment of minors.[9]

20. A major shift towards a more restrictive approach to the treatment of children with gender dysphoria took place in March 2021, when Karolinska University Hospital, inspired by the international events of the last 10 months, issued a new policy statement.[10] The hospital runs the leading pediatric gender clinic in all of Sweden, Astrid Lindgren's Children's Hospital. The new policy stated that the Swedish evidence review "showed a lack of evidence for both the long-term consequences of the treatments, and the reasons for the large influx of patients

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[7] de Vries ALC. Challenges in Timing Puberty Suppression for Gender-Nonconforming Adolescents. Pediatrics. 2020 Oct;146(4):e2020010611. doi: 10.1542/peds.2020-010611. Epub 2020 Sep 21. https://pubmed.ncbi.nlm.nih.gov/32958612/

[8] Carl-Michael Edenborg, "Ångrade könstransition - stämde kliniken" (Regretted gender transition - sued the clinic). Svenska Dagbladet, May 28, 2021. https://www.svd.se/fallet-bell-angrade-konstransition--stamde-kliniken

[9] National Institute for Health and Care Excellence (NICE). Evidence review: Gonadotrophin releasing hormone analogues for children and adolescents with gender dysphoria. NICE Publishers;NHS England; NHS Improvement. 11 March, 2021. https://cass.independent-review.uk/wp-content/uploads/2022/09/20220726_Evidence-review_GnRH-analogues_For-upload_Final.pdf

[10] https://segm.org/sites/default/files/Karolinska%20_Policy_Statement_English.pdf

in recent years." The Astrid Lindgren's Children's Hospital further stated that "These treatments are potentially fraught with extensive and irreversible adverse consequences such as cardiovascular disease, osteoporosis, infertility, increased cancer risk, and thrombosis." In a dramatic reversal of its policy, the Children's Hospital announced that "In light of the above, and based on the precautionary principle, which should always be applied, it has been decided that hormonal treatments (i.e., puberty blocking and cross-sex hormones) will not be initiated in gender dysphoric patients under the age of 16." Further, the clinic announced that patients ages 16–18 would receive such treatments only within research settings (clinical trials monitored by the appropriate Swedish research ethics board). The Karolinska Hospitals new policy became effective April 1, 2021.

21. An article from August 31, 2021 in the medical journal Läkartidningen shows that 5 of the 6 gender dysphoria clinics in Sweden are following the new policy of Astrid Lindgren's Children's Hospital, Umeå in northern Sweden is the single clinic that continues with prior practice.[11]

22. On November 24, 2021, the investigative TV program Uppdrag Granskning broadcast the third episode in 2.5 years about young transgender people.[12] The report shows that about 440 children have received puberty blockers over the past 5 years and that in Stockholm there have been reports of 13 children who have had severe side effects, one of whom has a skeleton like an 80-90 year old. The underreporting of side effects is potentially high.

[11] Katrin Trysell, "De flesta har skärpt rutiner för ny hormonbehandling hos minderåriga" (Most have tightened procedures for new hormone therapy for minors). Läkartidningen, August 31, 2021. https://lakartidningen.se/aktuellt/nyheter/2021/08/de-flesta-har-skarpt-rutiner-for-ny-hormonbehandling-hos-minderariga/

[12] https://www.svtplay.se/video/33313874/uppdrag-granskning/uppdrag-granskning-transbarnen?info=visa

23. On February 8, 2022, the newspaper Svenska Dagbladet published Professor Mikael Landén's article "Withdraw the proposal on gender identity".[13] Dr. Landén is considered one of the leading psychiatrists on the issue of gender dysphoria and has been treating patients in this area since at least the early 2000s. The Swedish government has proposed a new law that from 2024 makes it possible to choose your own gender without testing your gender identity. For children from the age of 12, it is proposed that parents make the application. Landén's objections: It is impossible to determine this for oneself or as a parent of one's child; the state must keep track of the real gender; a simple search of employers, authorities and private individuals reveals those individuals who at some point in their lives have had a gender identity crisis, which is intrusive; the proposal risks causing irreparable damage to children.

24. A quote from Mikael Landén's article: “I think the government has confused the individual's right to personal identity with the right to control the behavior and thoughts of others. That we have the right to live and express ourselves as we wish does not mean that we have the right to control how others categorize us. If I - as a man - were to exercise my right to change my legal gender to female, the legal gender will be wrong. With the government's proposal, I can still force those around me to incorrectly categorize me as a woman when I apply for a job, end up in prison, compete in wrestling or choose a locker room at Friskis & Svettis (a fitness center). Regulating the behavior and expression of others in this way is an infringement of human rights, not an enhancement of them.”

25. Another quote from the article by Mikael Landén, the conclusion on the right of children to change their gender identity: “The issues become even more problematic when it comes to children. Exploring different identities as a teenager is a natural developmental step towards

[13] https://www.svd.se/dra-tillbaka-forslaget-om-konstillhorighet

adulthood. Identity formation options vary with the zeitgeist. While young people in the eighties wondered whether they were a synthesizer or a punk, young people today are asked to consider whether they are male or female. Even though this is not a real choice - gender is natural - some young people will still experiment with gender expression and explore what applies to them, what is known as an identity crisis. Personal identity is formed in several stages and reassessed over time. The search for identity is not a single irreversible event. We don't see many 55-year-old punks on the streets, even though their identification was very strong when they were young." Finally, the last paragraph of Mikael Landén's article: "Changing legal gender during what may be a temporary identity crisis risks putting people on an irreversible path towards medical treatments that can lead to sterility and bodily harm."

The Majority Of Gender Dysphoria Patients Today

26. Our experiences of gender dysphoria in Sweden are similar to those of the rest of the Western world. The new group with gender dysphoria, which began to seriously increase in numbers in 2014, differs significantly from the group of people with gender dysphoria on which the DSM-5 diagnostic manual is based. DSM-5 was published in 2013 and the preceding work took place the year before that.[14] The criteria are based on mainly men, onset in early childhood or early adulthood and a gender dysphoria based on social roles or behaviour. In the new group, a clear majority are of the female sex, gender dysphoria set on at puberty and is based on gender identity. Since the new group differs so much from the group on which DSM-5 is based, many in the Swedish medical community now strongly question the reliability of the diagnosis.

[14] American Psychiatric Association (2013) Diagnostic and Statistical Manual of Mental Disorders. Fifth edition. Arlington, VA. American Psychiatric Publishing.

27. In psychiatry, it is very common for syndromes to be socially transmitted, especially among teenage and young adult females. Those who have similar problems are in contact or socialize and in these subcultures there can be a kind of competition to go the furthest. One example is anorexia, and experience has shown that it is often directly counterproductive to admit these patients to inpatient care, because then these girls and young women are inspired by the other anorexia patients, and a very destructive desire to extremes. Another example of social contagion is self-harm. It emerged as an epidemic in the early 1990s and has since escalated. Even for this group of patients, inpatient care is often counterproductive. It is not uncommon for patients with self-harm to post pictures and videos of self-harm on social media and, while in hospital, to contact like-minded people and ask when they will be admitted to the clinic.

28. My view is that gender dysphoria in children and young adults is largely explained as a social contagion. A slight increase in prevalence started in 2007, when the first smartphone was launched. However, it took a few years before the majority of teenagers had a smartphone, and this coincides quite well with the sharp increase in the diagnosis of gender dysphoria in young people. American journalist Abigail Schrier's book *Irreversible Damage: The Transgender Craze Seducing Our Daughters* (2020) provides a vivid and detailed account of the social contagion of gender dysphoria.[15] In the 1990s and even in the 2000s, teenage girls had greater social contact in the non-virtual world, but since the 2010s, many only have social contact via social media on smartphones/computers.

29. The fact that gender dysphoria is socially contagious is also illustrated by the fact that the gender dysphoria diagnosis among children in Sweden decreased in 2019 and 2020, when the public debate was initiated. But when Sweden from spring 2020 to 2021 had restrictions due to

[15] Schrier, A. Irreversible Damage: The Transgender Craze Seducing Our Daughters. (2020). Regnery Pubishing.

the COVID-19 pandemic, including distance learning in upper secondary schools and universities and less incidence of organized sport, many teenagers and young adults became socially isolated and then the trend reversed and the number of gender dysphoria diagnoses for children increasing again.

30. The high comorbidity must also be considered. There is a possibility that the majority of patients in the new group have autism or autism-like conditions. In their teens, people with autism have even more concerns about their body and identity than other adolescents. Other comorbidity in gender dysphoria is self-harming behavior, eating disorder, mental trauma, depression and emotional instability. All of the above conditions are subject to evidence-based treatment. Gender dysphoria completely lacks evidence-based treatment for children, and probably also for adults 18 to 25 years. The Table below, from the Socialstyrelsen report in 2020 shows the high rates of comorbidity in girls ages 13-17.

Table 1. Prevalence of various psychiatric diagnoses (primary diagnosis in the open and inpatient care) among persons diagnosed with gender dysphoria (F64) and the population in 2016–2018, by age and registered sex.

Women (%)		Age (years)				
		13-17	18-24	25-29	30-44	45-64
With Gender Dysphoria	F1 Harmful use / dependence	1.5	4.4	4.3	2.6	2.9
	F2 schizophrenia etc.	0.4	1.0	1.4	1.1	4.3
	F30-31 Bipolar Disease	0.4	2.6	5.2	5.6	2.9
	F32-39 Depression	28.9	25.0	13.4	12.7	11.9
	F4 Anxiety disorders	32.4	28.5	23.3	19.8	13.3
	F60-61 Personality Syndrome	0.0	4.0	6.7	4.4	2.9
	F84 Autism	15.2	14.7	11.1	8.7	4.3
	F9 ADHD etc.	19.4	18.4	14.6	12.8	5.7
	X60-84, Y10-34 Self-harm	7.8	6.6	4.4	2.0	1.9
General Population	F1 Harmful use / dependence	0.7	1.8	1.2	0.9	0.9
	F2 schizophrenia etc.	0.0	0.2	0.3	0.4	0.7
	F30-31 Bipolar Disease	0.1	0.6	0.9	0.9	0.7
	F32-39 Depression	2.8	3.7	2.7	2.3	1.8
	F4 Anxiety disorders	4.2	6.4	4.9	4.4	3.2
	F60-61 Personality Syndrome	0.0	0.7	0.9	0.6	0.3
	F84 Autism	1.3	1.2	0.7	0.4	0.1
	F9 ADHD etc.	4.4	4.0	2.4	1.5	0.7
	X60-84, Y10-34 Self-harm	0.9	1.2	0.8	0.5	0.4

31. Similar patterns are seen in boys.

Men (%)	Age (years)					
		13-17	18-24	25-29	30-44	45-64
With Gender Dysphoria	F1 Harmful use / dependence	4.4	6.3	6.0	4.1	6.2
	F2 schizophrenia etc.	0.7	1.3	1.6	2.4	4.1
	F30-31 Bipolar Disease	0.0	1.3	2.7	2.8	2.8
	F32-39 Depression	13.8	18.2	19.2	14.9	10.0
	F4 Anxiety disorders	21.0	20.9	21.3	17.1	15.1
	F60-61 Personality Syndrome	1.5	3.6	3.5	3.7	3.9
	F84 Autism	12.3	16.3	12.7	9.4	4.4
	F9 ADHD etc.	13.0	13.5	10.2	8.8	6.2
	X60-84, Y10-34 Self-harm	4.4	4.6	2.3	2.3	1.3
General population	F1 Harmful use / dependence	0.8	2.3	2.1	1.8	1.8
	F2 schizophrenia etc.	0.1	0.4	0.6	0.7	0.8
	F30-31 Bipolar Disease	0.0	0.2	0.4	0.5	0.5
	F32-39 Depression	1.1	2.0	1.9	1.5	1.2
	F4 Anxiety disorders	1.7	3.0	2.9	2.5	1.8
	F60-61 Personality Syndrome	0.0	0.1	0.2	0.2	0.1
	F84 Autism	2.4	1.6	0.9	0.5	0.2
	F9 ADHD etc.	7.7	4.1	2.4	1.6	0.7
	X60-84, Y10-34 Self-harm	0.5	0.9	0.8	0.5	0.4

32. The DSM-5 diagnostic manual states that if a patient has multiple psychiatric conditions, the main problem must be defined. In the case of gender dysphoria, an alternative condition is often the main problem. When adequately treating the main problem, other conditions often disappear, which can thus be regarded as secondary to the main problem.

33. It is my experience and the opinion of many psychiatrists in Sweden that psychosocial treatment of gender dysphoria for children and young adults should always be tried first. As discussed below, after concerns began to be raised in 2018, the Swedish national health service and government initiated a comprehensive review that has resulted in essentially a ban on puberty blockers, cross-sex hormones, and surgeries in children. I say "essentially" a ban because there is the possibility of truly exceptional cases and for research. One example would

be someone who has already begun on these therapies and needed to be given some time to continue until it was appropriate to stop.

34. The Swedish Agency for Health Technology Assessment and Assessment of Social Services (SBU) published a pre-print on February 22, 2022, *Hormone treatment of children and adolescents with gender dysphoria, a systematic review and evaluation of medical aspects*. It was published as an accepted and reviewed article in *Acta Pædiatrica* on April 17, 2023, I receite the conclusions of the study below.[16]

National Health Response To Concerns About Quality Of Evidence

35. Sweden's national health care policy regarding trans issues has developed quite similarly to that of the UK. Twenty years ago, Swedish health care policy permitted otherwise eligible minors to receive puberty-blockers beginning at age 14 and cross-sex hormones at age 16. At that time, only small numbers of minors sought medical transition services. An explosion of referrals ensued in 2013–2014. As reported above, Sweden's Board of Health and Welfare ("Socialstyrelsen") reported that, in 2018, the number of diagnoses of gender dysphoria was 15 times higher than 2008 among girls ages 13–17. (Swedish Socialstyrelsen Support 2022 at 15.)

36. On December 16, 2022, The National Board of Health and Welfare published the updated national guidelines Care of children and adolescents with gender dysphoria.

37. They concluded: "Caution in the use of hormonal and surgical treatment. At group level (i.e. for the group of adolescents with gender dysphoria, as a whole), the National Board of Health and Welfare currently assesses that the risks of puberty blockers and gender-affirming treatment are likely to outweigh the expected benefits of these treatments."[17] Like others, the

[16] https://onlinelibrary.wiley.com/doi/10.1111/apa.16791
[17] https://www.socialstyrelsen.se/globalassets/sharepoint-dokument/artikelkatalog/kunskapsstod/2023-1-8330.pdf

National Board of Health and Welfare says now that hormonal and surgical treatment in minors can only occur in exceptional cases.

38. SBU did its work, Karolinska made its decision, and the government changed its recommendations. Recently, as mentioned, that work was the subject of peer review and published in a premier academic journal. Dr. Michael Landén is the last (most important) author. This comprehensive and now peer-reviewed article accurately addresses the state of scientific research and shows conclusively that there is no demonstrated (as of yet) benefit to these therapies. This study is so important that I quote the entire abstract in the following paragraphs.

Aim. The aim of this systematic review was to assess the effects on psychosocial and mental health, cognition, body composition, and metabolic markers of hormone treatment in children with gender dysphoria.

Methods. Systematic review essentially follows PRISMA. We searched PubMed, EMBASE and thirteen other databases until 9 November 2021 for English-language studies of hormone therapy in children with gender dysphoria. Of 9934 potential studies identified with abstracts reviewed, 195 were assessed in full text, and 24 were relevant.

Results. In 21 studies, adolescents were given gonadotropin-releasing hormone analogues (GnRHa) treatment. In three studies, cross-sex hormone treatment (CSHT) was given without previous GnRHa treatment. No randomized controlled trials were identified. The few longitudinal observational studies were hampered by small numbers and high attrition rates. Hence, the long-term effects of hormone therapy on psychosocial health could not be evaluated. Concerning bone health, GnRHa treatment delays bone maturation and bone mineral density gain, which, however, was found to partially recover during CSHT when studied at age 22 years.

Conclusion. Evidence to assess the effects of hormone treatment on the above fields in children with gender dysphoria is insufficient. To improve future research, we present the GENDHOR checklist, a checklist for studies in gender dysphoria.

39. Adolescence is the most transformative time in a person's life. We now know that the brain undergoes a major change. It matures at different rates, and myelination - the formation of a fatty sheath around the projections of each neuron - occurs from back to front. The frontal lobe matures last, at 25-30 years of age. This is where overall thinking and judgment are located. A teenager can therefore not understand the consequences of an irreversible sex change treatment. It is my opinion that the irreversible measure of sterilization should not be carried out until the age of 25, and it is therefore appropriate to have the same age limit for gender reassignment treatment for gender dysphoria.

I swear under penalty of perjury that the foregoing is true and correct to the best of my knowledge.

Sven Román

Dr. Sven Román

19 May 2023

Sven Róman C.V.

Work experience
2015 03 -
Specialist doctor, sometimes also senior doctor
Sven Román AB (limited company)

Work as a senior physician and psychiatrist consultant at BUP's outpatient care via a staffing agency:
March 2015 - June 2018, BUP Mora
August 2018 - June 2019, BUP Västervik
July - September 2019, BUP Skövde
Nov - Dec 2019, BUP Östersund
Nov - Dec 2018 and May - June 2019, PR Vård, paediatric clinic in Stockholm.
Feb - June 2020, BUP Örebro
June - Dec 2020, BUP Umeå
Jan 2021, BUP Avesta
Feb - June 2021, BUP Falun
Aug - Oct 2021, BUP Motala
Nov - Dec 2021, BUP Mora
Jan 2022, BUP Avesta
Feb - Sep 2022, BUP Mjölby (of which a few weeks Motala)
Oct - Dec 2022, BUP Umeå
Jan - Feb 2023 BUP Malmö, Psykiatripartners
April - June 2023, BUP Umeå

2012 12 - 2015 02
Senior physician
BUP clinic in Stockholm County Council, Unit for young people with psychosis/bipolar disorder.
Consultations based on referrals from primarily outpatient care (carried out more than 100
complete assessments) and usual outpatient work with patients enrolled in a county-wide specialized clinic.

2010 09 - 2012 10
Senior physician
BUP clinic in Stockholm County Council, Unit North
Usual duties as senior physician in BUP's inpatient care.

2010 05 - 2010 08
Acting chief physician
BUP clinic in Stockholm County Council, Unit for young people with psychosis/bipolar disorder and consultant psychiatrist Lövsta school home (locked institutional accommodation for children based on a decision by social services) och Högantorps skolhem
Usual duties as chief physician at the BUP clinic and consultant psychiatrist at two SiS institutions.

2006 11 - 2012 11
Trade union representative
BUP in Stockholm County
Trade union representative in SLSO's (Stockholm County Healthcare Services)doctors' association Nov 2006 - autumn 2012
SACO (the Swedish Confederation of Professional Associations representative in Samverkan at the BUP division during the same period and at the BUP clinic from Aug 2010 - autumn 2012.
2004 03 - 2010 09

Resident doctor in child and adolescent psychiatry
Usual duties as a resident doctor in the above-mentioned speciality.
2002 09 - 2004 03

Internship doctor
S:t Görans Hospital, Stockholm
Normal duties as an intern physician.
2002 01 - 2002 08

Junior doctor with medical degree but without internship service
Children's Hospital, Huddinge Hospital
Normal junior doctor duties at a paediatric clinic.
2000 06 - 2001 07

Junior doctor at the end of his/her medical training, without a medical degree
Dalens Hospital, Stockholm
Ordinary junior doctors work in a geriatric ward during the summers of 2000 and 2001.

1997 06 - 1999 07
Assistant nurse
Danderyd Hospital
Ordinary assistant nurse work during summers and weekends 1997 - 1999

1984 06 - 1985 01
Health care assistant
Huddinge hospital and Danderyd hospital
Ordinary work as a health care assistant in the dialysis department and internal medicine department

Education and training
2010 -
Specialist training: participation in BUP congresses, pharmacological training, international congresses (e.g. I was at AACAP, the world congress of the American Association of Child Psychiatrists, in San Diego in October 2014), etc. Every year I

participate in several congresses and "training courses", trying to have at least 10 such days/year.

2006 01 - 2008 09
Basic training in psychotherapy
BUP, Region Stockholm

2004 03 - 2010 09
Specialist degree, child and adolescent psychiatry
BUP, Region Stockholm

2002 09 - 2004 04
Medical licence
Internship, S:t Göran's Hospital, Stockholm

2002 09 - 2002 09
Supervisor for leadership training
Karolinska Institutet, Solna

1996 09 - 2002 01
Medical degree
Karolinska Institutet, Solna

1989 01 - 1990 06
Music programme, folk high school (classical singing)
S:t Sigfrid, Växjö
1987 09 - 1988 12

Music programme, folk high school (classical singing)
Kapellsberg Folk High School, Härnösand
1986 09 - 1987 06

Musicology
Stockholm university town
1981 08 - 1984 06

Natural science upper secondary school
Södra Latins gymnasium, Stockholm

Articles

1. G. Berglund, G., Sturm, H., Raita, J. & Román, S. (2009) Förslag om en kvalitetssäkrad BUP-vård. *Läkartidningen, 2009-06-04.* XXX Title in English: Proposal on quality assurance in child and adolescent psychiatry. Link to the article: https://lakartidningen.se/debatt-och-brev/2009/06/forslag-om-en-kvalitetssakrad-bup-vard/
2. Kritik mot barnpsykiatrin missar målet. *Dagens Medicin. June 30, 2010.* Title in English: Criticism of child psychiatry misses the mark. Link to the article: https://www.dagensmedicin.se/opinion/debatt/kritik-mot-barnpsykiatrin-missar-malet/

3. Román, S. Tvångsåtgärder vanligare hos flickor och unga kvinnor. (2016). *Läkartidningen. 2016/113:DYUH.* Title in English: Coercive measures more common in girls and young women. Link to the article: https://lakartidningen.se/opinion/debatt/2016/04/tvangsatgarder-vanligare-bland-flickor-och-unga-kvinnor/
4. Dags att lägga ned de krisande landstingen? *Dagens Samhälle. Feb 22, 2017.* Title in English: Time to close down the struggling county councils? Link to the article: https://www.dagenssamhalle.se/samhalle-och-valfard/sjukvard/dags-att-lagga-ned-de-krisande-landstingen/
5. One of two main authors of an article with a total of 19 signatures. Många med psykisk ohälsa får inte rätt behandling. *Svenska Dagbladet. June 21, 2017.* Title in English: Many people with mental illness do not get the right treatment. Link to the article: https://www.svd.se/a/rqPgm/manga-med-psykisk-ohalsa-far-inte-ratt-behandling
6. Undermåliga adhd-utredningar hos barn- och ungdomspsykiatrin. *Dagens Samhälle. October 27, 2017.* Title in English: Substandard adhd investigations in child and adolescent psychiatry. Link to the article: https://www.dagenssamhalle.se/samhalle-och-valfard/sjukvard/undermaliga-adhd-utredningar-hos-bup/
7. One of 34 signatures. Nätläkare orsakar ohejdbar kostnadsökning. *Svenska Dagbladet. Feb 21, 2018.* Title in English: Online doctors cause unprecedented cost increases. Link to the article: https://www.svd.se/a/ngv7Gn/natlakare-orsakar-ohejdbar-kostnadsokning
8. One of 30 signatures. Risk att suicidala ges dödshjälp med ny modell. *Svenska Dagbladet. Feb 22, 2018.* Title in English: Suicidal people at risk of euthanasia under new model. Link to the article: https://www.svd.se/a/kaQ0Ev/risk-att-suicidala-ges-dodshjalp-med-ny-modell
9. Stora problem med dödshjälp – men de rapporteras inte. *Dagens Samhälle. Feb 21, 2018.* Title in English: Major problems with euthanasia - but not reported. Link to the article: https://www.dagenssamhalle.se/samhalle-och-valfard/sjukvard/stora-problem-med-dodshjalp--men-de-rapporteras-inte/
10. Exemplet Nederländerna visar att dödshjälp innebär att vi hamnar på ett sluttande plan. *Dagens Nyheter. June 17, 2018.* Title in English: The example of the Netherlands shows that euthanasia is a slippery slope. Link to the article: https://www.dn.se/asikt/exemplet-nederlanderna-visar-att-dodshjalp-innebar-att-vi-hamnar-pa-ett-sluttande-plan/
11. Införande av dödshjälp vore att gå i skandalläkaren Macchiarinis fotspår. *Dagens Nyheter. Aug 14, 2018.* Title in English: Introducing euthanasia would follow in the footsteps of scandalous doctor Macchiarini. Link to the article: https://www.dn.se/asikt/inforande-av-dodshjalp-vore-att-ga-i-skandallakaren-macchiarinis-fotspar/
12. Skolan bär ett tungt ansvar för adhd-diagnoserna. *Dagens Samhälle. April 1, 2019.* Title in English: Schools bear a heavy responsibility for ADHD diagnoses. Link to the article: https://www.dagenssamhalle.se/opinion/debatt/skolan-bar-ett-tungt-ansvar-for-adhd-diagnoserna/
13. Aktiv dödshjälp kan aldrig bli säker. *Dagens Nyheter. April 8, 2019.* Title in English: Active euthanasia can never be safe. Link to the article: https://www.dn.se/asikt/aktiv-dodshjalp-kan-aldrig-bli-saker/

14. Förbättrad vård viktigare än dödshjälp. *Dagens Nyheter. April 9, 2019.* Title in English: Improved care more important than euthanasia. Link to the article: https://www.dn.se/asikt/forbattrad-vard-viktigare-an-dodshjalp/
15. Together with a co-author. Rätten till sin död blir lätt en plikt att dö. *Dagens Medicin. Juli 25, 2019.* Title in English: The right to die easily becomes a duty to die. Link to the article: https://www.dagensmedicin.se/opinion/debatt/ratten-till-sin-dod-blir-latt-en-plikt-att-do/
16. Together with a co-author. Dödshjälp prioriteras framför andra alternativ. *Dagens Medicin. Aug 7, 2019.* Title in English: Euthanasia prioritized over other options. Link to the article: https://www.dagensmedicin.se/opinion/debatt/dodshjalp-prioriteras-framfor-andra-alternativ/
17. Together with a co-author. Dödshjälp har aldrig kunnat begränsas. *Dagens Medicin. Aug 13, 2019.* Title in English: Euthanasia has never been restricted. Link to the article: https://www.dagensmedicin.se/opinion/debatt/dodshjalp-har-aldrig-kunnat-begransas/
18. One of 8 signatures. Erfarenhet och forskning talar emot dödshjälp. *Dagens Medicin. Aug 14, 2019.* Title in English: Experience and research against euthanasia. Link to the article: https://www.dagensmedicin.se/opinion/debatt/erfarenhet-och-forskning-talar-emot-dodshjalp/
19. Könsdysfori sprids som en epidemi på nätet. *Dagens Nyheter. Sep,13, 2019.* Title in English: Gender dysphoria spreads like an epidemic online. Link to the article: https://www.dn.se/asikt/konsdysfori-sprids-som-en-epidemi-pa-natet/ Link to an English version of the article: https://www.ihmistenkirjo.net/blog/psychiatrist-gender-dysphoria-spreads-like-an-epidemic-online
20. Stoppa omedelbart all behandling av könsdysfori för barn och unga vuxna. *Dagens Medicin. Oct 8, 2019.* Title in English: Immediately stop all treatment of gender dysphoria for children and young adults. Link to the article: https://www.dagensmedicin.se/opinion/debatt/stoppa-omedelbart-all-behandling-av-konsdysfori-for-barn-och-unga-vuxna/
21. Svens, K. & Román, S. (2019). Off label-förskrivning av hormoner vid könsdysfori bör utredas. *Läkartidningen. 2019,116:FTYW.* Title in English: Off-label prescribing of hormones for gender dysphoria should be investigated. Link to the article: https://lakartidningen.se/opinion/debatt/2019/10/allvarliga-risker-med-langvarig-konskontrar-hormonbehandling/ Link to an English version of the article: https://www.ihmistenkirjo.net/blog/lkartidningen-off-label-prescribing-of-hormones-in-gender-dysphoria-should-be-investigated
22. One of 8 signatures. Utredare förvanskar om könsdysfori. *Svenska Dagbladet. Oct 22, 2019.* Title in English: Investigator misrepresents gender dysphoria. Link to the article: https://www.svd.se/a/K3kxR7/utredare-forvanskar-om-konsdysfori
23. One of 8 signatures. Allvarliga invändningar förblir obesvarade. *Svenska Dagbladet. Oct 22, 2019.* Title in English: Serious concerns remain unanswered. Link to the article: https://www.svd.se/a/3J7Wzv/allvarliga-invandningar-forblir-obesvarade
24. One of 19 signatures. Allvarliga invändningar förblir obesvarade. *Svenska Dagbladet. Nov 12, 2019.* Title in English: Adults also have the right to safe

treatment for gender dysphoria. Link to the article: https://www.svd.se/a/AdBM7x/aven-vuxna-har-ratt-till-saker-vard-vid-konsdysfori

25. One of two main authors of an article with a total of 16 signatures. Dödshjälp är det ultimata sättet att spara resurser. *Dagens Samhälle. Nov 27, 2019.* Title in English: Euthanasia is the ultimate way to save resources. Link to the article: https://www.dagenssamhalle.se/opinion/debatt/dodshjalp-ar-det-ultimata-sattet-att-spara-resurser/
26. Du vill kväsa debatten om antidepressiva. *Aftonbladet. Jan 29, 2020.* Title in English: You want to stifle the debate on antidepressants. Link to the article: https://www.aftonbladet.se/debatt/a/LAgB14/du-vill-kvasa-debatten-om-antidepressiva
27. Staten måste utreda hur skandalen med de apatiska barnen kunde ske. *Götebrogs-Posten. Feb 13, 2020.* Title in English: State must investigate how the apathetic children scandal happened. Link to the article: https://www.gp.se/debatt/staten-måste-utreda-hur-skandalen-med-de-apatiska-barnen-kunde-ske-1.23849279
28. One of 10 signatures. Forsvarlig behandlingstilbud til barn og unge med kjønnsdysfori?. *Dagens Medisin, Norway. Feb 19, 2020.* Title in English: Appropriate treatment for children and young people with gender dysphoria? Link to the article: https://www.dagensmedisin.no/debatt-og-kronikk/forsvarlig-behandlingstilbud-til-barn-og-unge-med-kjonnsdysfori/361774
29. Min slutsats om de apatiska barnen står på stadig grund. *Göteborgs-Posten, Feb 28, 2020.* Title in English: My conclusion on apathetic children is firmly grounded. Link to the article: https://www.gp.se/debatt/min-slutsats-om-de-apatiska-barnen-står-på-stadig-grund-1.24657443
30. Malone, W & Román, S. (2020). Letters to the Editor. Calling Into Question Whether Gender-Affirming Surgery Relieves Psychological Distress. *The American Journal of Psychiatry. 177(8), 766-767.* Link to the article: https://ajp.psychiatryonline.org/doi/10.1176/appi.ajp.2020.19111149
31. One of 26 signatures. Avgörande kunskap saknas kring dödshjälp. *Svenska Dagbladet. Oct 31, 2020.* Title in English: Crucial knowledge missing on euthanasia. Link to the article: https://www.svd.se/a/6zzWk8/avgorande-kunskap-saknas-kring-dodshjalp
32. One of 19 signatures. Frågor om dödshjälp lämnas obesvarade. *Svenska Dagbladet. Nov 9, 2020.* Title in English: Questions on euthanasia left unanswered. Link to the article: https://www.svd.se/a/1BBlxq/fragor-om-dodshjalp-lamnas-obesvarade

Lectures and hearings for Members of Parliament in the Parliament building

1. Könsdysfori ur ett psykiatriskt och medicinskt perspektiv. Sveriges största medicinska skandal i modern tid? October 16, 2019. Title in English: Gender dysphoria from a psychiatric and medical perspective. Sweden's biggest medical scandal in modern times?
2. Varför dödshjälp inte bör tillåtas. November 28, 2019. Title in English: Why euthanasia should not be allowed.
3. Dødshjelp i Norden? Etikk, klinikk og politikk. November 18, 2020. Title in English: Presentation of the Oregon model and the chapter Psychiatry and euthanasia authored by Sven Román from the Nordic anthology Dødshjelp i Norden? Ethics, clinics and politics.

4. Irreversibel skada eller evidensbaserad. September 16, 2021. Title in English: Irreversible damage or evidence-based treatment? (On gender dysphoria treatment for children and young adults.)
5. Livshjälp. December 7, 2022. Title in English: Life support (about euthanasia).
6. Hearing with MEPs on the treatment of children and young adults with gender dysphoria and in particular on the proposed law to change legal gender from the age of 16. March 7, 2023.

Other media appearances

1. Swedish public television, local news for Stockholm: 50 läkare saknas inom barnpsykiatrin (50 doctors are missing in child psychiatry). April 2, 2008.
2. Swedish public television, the documentary program Dokumentär Inifrån (Documents from Within): Vem kan hjälpa mitt barn? (Who can help my child?) November 12, 2015.
3. Special Nest online magazine: Överläkare fördjupar kritik mot BUP:s metoder (Consultant physician deepens criticism of BUP's methods). December 14, 2015. Link to the article: https://www.specialnest.se/landsting/overlakare-fordjupar-kritik-mot-bups-metoder
4. Swedish public service radio, Kropp & själ (Body & Soul): Hur mår psykiatrin? (How is psychiatry doing. Nov 1, 2016. Linc to the program: https://sverigesradio.se/avsnitt/800449
5. Evening newspaper Aftonbladet: Hemliga läkare fick 13 miljoner av läkemedelsindustrin (Secret doctors received 13 million from the pharmaceutical industry). March 22, 2017. Link to the article: https://www.aftonbladet.se/nyheter/a/vJn5m/hemliga-lakare-fick-13miljoner-av-lakemedelsindustrin
6. Daily newspaper Dagens Nyheter: Psykiater larmar om felaktiga diagnoser på barn (Psychiatrist raises alarm over misdiagnosis of children). Oct 21, 2017. Linc to the article: https://www.dn.se/nyheter/sverige/psykiater-larmar-om-felaktiga-diagnoser-pa-barn/
7. Focus magazine: Få tillförlitliga studier som visar på effekten av medicinerna (Few reliable studies on the effectiveness of drugs (on ADHD drugs)). Oct 30, 2017. Linc to the article: https://www.fokus.se/inrikes/fa-tillforlitliga-studier-som-visar-pa-effekten-av-medicinerna/
8. Swedish public service radio: Barnpsykiater: För många får diagnoser (Child psychiatrist: Too many people get diagnosed!). June 7, 2018. Linc to the program: https://sverigesradio.se/artikel/6967615
9. The daily Newspaper Sydsvenskan and Norra Skåne: Ledare: Vem bestämmer över din död? (Editorial: Who decides on your death?). April 10, 2019. Linc to the article: https://www.nsk.se/ledare/vem-bestammer-over-din-dod/
10. The medical trade union magazine 'Sjukhusläkaren': Dödshjälp: Den känsliga frågan (Euthanasia: The sensitive issue). June 3, 2019. Linc to the article: https://www.sjukhuslakaren.se/dodshjalp-den-kansliga-fragan/
11. Editorial: Farligt rättighetstänkande bakom tonåringars ”könskorrigeringar” (Dangerous rights-based thinking behind teenagers' 'gender reassignment'). Aug 27, 2019. Linc to the article: https://www.dn.se/ledare/hanne-kjoller-farligt-rattighetstankande-bakom-tonaringars-konskorrigeringar/

12. Filter magazine: Ohörda rop (Unheard cries, on so-called apathetic children seeking asylum). Sep 23, 2019. Linc to the article: https://magasinetfilter.se/granskning/apatiska-barn-ohorda-rop/
13. Swedish public service radio, Studio Ett: “Jag var så himla rädd” ("I was so scared"). Sep 25, 2019. Linc to the program: https://sverigesradio.se/artikel/7306372
14. TV channel TV4, Malou after ten: Vi i vården har bidragit till grav barnmisshandel i 5 års tid (We in healthcare have contributed to serious child abuse for 15 years). Oct 1, 2019. Linc to the program: https://www.tv4.se/klipp/va/12502429/vi-i-varden-har-bidragit-till-grav-barnmisshandel-under-15-ars-tid
15. News in TT that all media forwarded, including Läkartidningen: Läkare vill att råd om apatiska barn ses över (Doctors want advice on apathetic children to be reviewed). Oct 7, 2019. Linc to the article: https://lakartidningen.se/aktuellt/nyheter/2019/10/lakare-vill-att-rad-om-apatiska-barn-ses-over/
16. Daily newspaper Svenska Dagbladet editorial podcast: Könsdysfori och undflyende politiker (Gender dysphoria and elusive politicians?). Oct 9, 2019. Linc to the program: https://www.svd.se/a/kJ1mkX/konsdysfori-och-undflyende-politiker
17. Article and feature in web TV for the Christian newspaper Dagen: Överläkare Sven Román: Behandlingar av könsdysfori är en epidemi (Consultant Sven Román: Treatment of gender dysphoria is an epidemic). Oct 18, 2019. Link to the article and TV report: https://www.dagen.se/nyheter/2019/10/18/overlakare-sven-roman-behandlingar-av-konsdysfori-ar-en-epidemi/
18. Political podcast God Ton: Överläkare Sven Román om könsdysfori och apatiska flyktingbarn (Consultant Sven Román on gender dysphoria and apathetic refugee children). Oct 25, 2019. Linc to the program: https://poddtoppen.se/podcast/1372019059/god-ton/60-overlakare-sven-roman-om-konsbyten-och-apatiska-flyktingbarn
19. Swedish public service radio, educational radio, “Ministry of Education”: Skolan och adhd-diagnoserna (Schools and ADHD diagnoses). Nov 8, 2019. Linc to the program: https://urplay.se/program/212743-skolministeriet-skolan-och-adhd-diagnoserna
20. Danish public service TV DR1 on the so-called apathetic asylum-seeking children, the program 21 Sunday. Nov 24, 2019.
21. Finnish public service broadcaster YLE: Slaget efter tolv - dagens debatt: Unga med könsdysfori (The battle after twelve - today's debate: Young people with gender dysphoria). Dec 9, 2019. Linc to the program: https://arenan.yle.fi/poddar/1-50351504
22. Daily newspaper Svenska Dagbladet editorial podcast: "Life Overtakes Me" – apatiska flyktingbarn på bio ("Life Overtakes Me" - apathetic refugee children at the cinema). Feb 6, 2020. Linc to the program: https://www.svd.se/a/g7O5Jk/life-overtakes-me-apatiska-flyktingbarn-pa-bio
23. Swedish public service radio: Barnpsykiatriker: “De har utrett på löpande band" (Child psychiatrist: "They have been investigating on an assembly line"). Feb 19, 2020. Linc to the programme: https://sverigesradio.se/artikel/barnpsykiatriker-de-har-utrett-pa-lopande-band

24. Swedish public service radio, the investigative program Kaliber: Barnen och diagnoserna (The children and the diagnoses). May 11, 2020. Linc to the program: https://sverigesradio.se/avsnitt/1495660
25. Report in the French newspaper Le Figaro: Face à la vague des transgenres, la Suède commence à douter (Faced with the transgender wave, Sweden is beginning to have doubts). June 14, 2021. Linc to the article: https://www.lefigaro.fr/international/face-a-la-vague-des-transgenres-la-suede-commence-a-douter-20210614
26. On Sunday, May 21 2023 at 21:00, French TV channel M6 will broadcast a documentary on children and young adults with gender dysphoria, including a segment from Sven Román's lecture in the Swedish Parliament building on September 16, 2021.

Medical involvement

1. Since 2018 member of the Network against inappropriate governance of health care.
2. Since 2018 member of Nordic network against euthanasia.
3. Founded 2019 a Nordic network critical of the treatment of children and young adults with gender dysphoria.
4. Since 2019 member of a network that aims to help patients reduce or stop taking psychotropic drugs
5. Since 2020, I belong to the Advisory Board of SEGM, Society for Evidence Based Gender Medicine.
6. Since 2020, I have been a board member of GENID, Gender Identity Challenge Sweden, a network of parents, relatives and healthcare professionals who work to ensure that the care of children and young people with gender dysphoria is based on openness, caution and science.

EXHIBIT 7

IN THE UNITED STATES DISTRICT COURT
FOR THE MIDDLE DISTRICT OF TENNESSEE
NASHVILLE DIVISION

L.W., *by and through her parents and next friends, Samantha Williams and Brian Williams*, et al. *Plaintiffs,* v. JONATHAN SKRMETTI, *in his official capacity as the Tennessee Attorney General and Reporter*, et al., *Defendants.*	)	No. 3:23-cv-00376 JUDGE RICHARDSON JUDGE NEWBERN

EXPERT DECLARATION OF
MICHAEL K. LAIDLAW, M.D.

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EXPERT REPORT OF MICHAEL K. LAIDLAW, M.D.

I, Michael K. Laidlaw, M.D., hereby declare as follows:

1. I am over the age of eighteen and submit this expert declaration based on my personal knowledge and experience.

2. I am a board-certified endocrinologist. I received my medical degree from the University of Southern California in 2001. I completed my residency in internal medicine at Los Angeles County/University of Southern California Medical Center in 2004. I also completed a fellowship in endocrinology, diabetes and metabolism at Los Angeles County/University of Southern California Medical Center in 2006.

3. The information provided regarding my professional background is detailed in my curriculum vitae. A true and correct copy of my curriculum vitae is attached as Exhibit A.

4. In my clinical practice as an endocrinologist, I evaluate and treat patients with hormonal and/or gland disorders. Hormone and gland disorders can cause or be associated with psychiatric symptoms, such as depression, anxiety, and other psychiatric symptoms. Therefore, I frequently assess and treat patients demonstrating psychiatric symptoms and determine whether their psychiatric symptoms are being caused by a hormonal issue, gland issue, or something else.

5. I have been retained by Defendants in the above-captioned lawsuit to provide an expert opinion on the efficacy and safety of sex reassignment treatment.

6. If called to testify in this matter, I would testify truthfully and based on my expert opinion. The opinions and conclusions I express herein are based on a reasonable degree of scientific certainty.

7. I am being compensated at an hourly rate of $450 per hour plus expenses for my time spent preparing this declaration, and to prepare for and provide testimony in this matter. I am being compensated at an hourly rate of $650 for testimony at depositions or trial. My compensation does not depend on the outcome of this litigation, the opinions I express, or the testimony I may provide.

8. My opinions contained in this report are based on: (1) my clinical experience as an endocrinologist in particular dealing with hormone excess, hormone deficiency, and hormone balance; (2) my clinical experience evaluating individuals who have or have had gender

incongruence including a detransitioner; (3) my knowledge of research and studies regarding the treatment of gender dysphoria, including for minors and adults; and (4) my first-hand personal experience in human research as a physician, having been involved in two studies, one involving magnesium and bone density and the other involving ultrasound use for detecting recurrent thyroid cancer.[1] I frequently review medical studies conducted by others and have experience assessing the strengths and weaknesses of such studies.

9. I was provided with and reviewed the following case-specific materials: The complaints of the plaintiffs and the United States, the various declarations submitted by the Plaintiffs, the expert declarations submitted by Dr. Adkins, Dr. Janssen, Dr. Turban, and Dr. Antommaria, medical records produced by plaintiffs for L.W., John Doe, and Ryan Roe, [2] and Tennessee Senate Bill 1, codified at Tenn. Code Ann. § 68-33-101, *et seq.*

10. A true and correct copy of my CV is attached to this declaration. In the previous four years, I have provided expert testimony in the following cases: United States District Court for the Northern District of Florida Tallahassee Division, *AUGUST DEKKER, et al., Plaintiffs, v. SIMONE MARSTILLER, et al., Defendants*, Case No. 4:22-cv-00325-RHMAF, 2022-2023; United States District Court for the Western District of Washington, *C. P., by and through his parents, Patricia Pritchard and Nolle Pritchard, and PATRICIA PRITCHARD, Plaintiff, vs. BLUE CROSS BLUE SHIELD OF ILLINOIS*, Defendants, Case No. 3:20-cv-06145-RJB, 2022; District Court of Travis County, Texas, 459th Judicial District, *PFLAG, INC., ET AL., Plaintiffs, v. GREG ABBOTT, ET AL., Defendants*, Case No. D-1-GN-22-002569, 2022; Superior Court of the State of California, County of Tulare, *JULIANA PAOLI v. JOSEPH HUDSON* et al., Case No. 279126, 2021; United States District Court for the District of Arizona, *DH and John Doe, Plaintiffs, vs. Jami Snyder, Director of the Arizona Health Care Cost Containment System, in her official capacity, Defendant*, Case No. 4:20-cv-00335-SHR, 2020; Supreme Court of British Columbia, File No. S2011599, Vancouver Registry. Between *A.M. Plaintiff and Dr. F and Daniel McKee Defendants*, 11/23/20 & 11/25/20; and Court of Appeal File No. CA45940, Vancouver Registry,

1 For the latter study I helped to design an Institutional Review Board ("IRB") approved protocol. Furthermore, I received certification in the required course "Understanding the Fundamentals: Responsibilities and Requirements for the Protection of Human Subjects in Research" at the University of Southern California in 2003.

2 John Doe and Ryan Roe are using pseudonyms for the purpose of this case.

B.C. Canada, Supreme Court File No. E190334, between *A.B. Respondent/Claimant, and C.D. Appellant/Respondent, and E.F. Respondent/Respondent*, 24 Jun 2019.

11. In my professional opinion, treatment interventions on behalf of children and adults diagnosed with gender dysphoria must be held to the same scientific standards as other medical treatments. These interventions must be optimal, efficacious, and safe. Any treatment which alters biological development in children should be used with extreme caution. Except in the case of a fatal injury or disease, the minor will become an adult and present to the adult physician. The adult physician must be able to have a thorough understanding of any condition which alters the biological development of children and, in the case of the endocrinologist, be knowledgeable about the long-term effects of hormones on the human body, particularly when the hormones are being used in ways that alter development.

12. The following expresses my expert opinion regarding minors who present with a disparity between their biological sex and internal feeling about their gender, specifically with regard to the use of social transition, medications which block normal pubertal development, the applications of hormones of the opposite sex, and surgical procedures that alter the genitalia and/or breasts for those individuals.

I. Background

A. Biological Sex in Contrast to Gender Identity

13. A recognition and understanding of biological sex is critical to my practice as an endocrinologist because the endocrine physiology of men and women, boys and girls, differ.

14. Biological sex is the objective physical condition of having organs and body parts which correspond to a binary sex. There are only two physical sexes, male and female. The male is identified as having organs and tissues such as the penis, testicles, and scrotum. The female sex is identified by having organs and tissues such as the labia, vagina, uterus, and ovaries. Biological sex is easily identified by physical observation such that adults and even young children can identify the biological sex of a newborn baby.

15. It is also noteworthy that the physical organs described above as representing biological sex have a physical genetic correlate. In other words, it is a well-established scientific fact that two X chromosomes identify the cells correlating to a female person, and an X and a Y chromosome correlate to a male person.

The Diagnostic and Statistical Manual of Mental Disorders (DSM-5 TR) states "sex and sexual refer to the biological indicators of male and female (understood in the context of reproductive capacity), such as in sex chromosomes, gonads, sex hormones, and non-ambiguous internal and external genitalia." Note that gender identity is not a component of biological sex as defined by the DSM 5.

16. Gender identity in the DSM 5 is defined separately: "Gender identity is a category of social identity and refers to an individual's identification as male, female, or, occasionally, some category other than male or female." (DSM 5-TR). So, we can see that gender identity is not a physical entity but is described as a social identity. It is a subjective identification known only once a patient makes it known. It cannot be identified by any physical means, cannot be confirmed by any outside observer, and can change over time.

17. Gender identity is a psychological concept. It has no correlate in the human body. In the letter to the editor I wrote with my colleagues, we wrote in our critique of the Endocrine Society Guidelines that "There are no laboratory, imaging, or other objective tests to diagnose a 'true transgender' child." (Laidlaw et al., 2019).

18. For example, one cannot do imaging of the human brain to find the gender identity. Likewise, there is no other imaging, laboratory tests, biopsy of tissue, autopsy of the brain, genetic testing, or other biological markers that can identify gender identity. There is no known gene that maps to gender identity or to gender dysphoria. In other words, there is no objective physical measure to identify either gender identity or gender dysphoria.

19. This is in contrast to endocrine disorders which have a measurable physical change in either hormone levels or gland structure that can be confirmed by physical testing. Therefore, gender dysphoria is a purely psychological phenomenon and not an endocrine disorder. But as my colleagues and I wrote in our letter to the editor, it becomes an endocrine condition through gender affirmative therapy: "Childhood gender dysphoria (GD) is not an endocrine condition, but it becomes one through iatrogenic puberty blockade (PB) and high-dose cross-sex (HDCS) hormones. The consequences of this gender-affirmative therapy (GAT) are not trivial and include potential sterility, sexual dysfunction, thromboembolic and cardiovascular disease, and malignancy." (Laidlaw et al. 2019).

20. Importantly, none of the plaintiffs have presented any evidence that a brain scan, blood tests, biopsy or other biological tests or markers were performed to confirm the gender identity.

21. Furthermore, no genetic studies have ever identified a transgender gene or genes. And none of the three minor plaintiffs have presented evidence of genetic testing that was performed to verify the gender identity.

22. Dr. Adkins wrote, "'Biological sex, biological male or female: These terms refer to physical aspects of maleness and femaleness. As these may not be in line with each other (e.g., a person with XY chromosomes may have female-appearing genitalia), the terms biological sex and biological male or female are imprecise and should be avoided.'" (Adkins dec, p. 4 FN 1 citing Hembree et al., 2017). However, sex is clearly identified in 99.98% of cases by chromosomal analysis (Sax, 2002). Sex is also clearly recognized at birth in 99.98% of cases (Id.). Therefore, sex is a clear provable objective reality that can be identified through advanced testing such as karyotyping, or simple genital identification at birth by any layperson. The other 0.02% of cases have some disorder of sexual development (DSD). DSDs do not represent an additional sex or sexes, but simply a disorder on the way to binary sex development (Chan et al., 2021). Importantly, none of the plaintiffs have been diagnosed with a disorder of sexual development.

23. Dr. Janssen states, "The lack of evidence demonstrating that gender identity can be altered, either for transgender or for non-transgender individuals, underscores the innate nature and immutability of gender identity." (Janssen decl, p. 6). But he offers no explanation as to what sort of testing procedures are performed to confirm an immutable gender identity.

B. Human Sexual Development

1. Embryologic development

24. Another confirmation that there are only two biological sexes comes from what is known about embryologic development and fertilization. The biologic development of the human person begins with a gamete from a female termed an ovum or egg and a gamete from a biological male which is termed sperm. The fertilization of the egg by the sperm begins the process of human biological development. The cells of the fertilized ovum then multiply, and the person undergoes the incredible changes of embryologic development.

25. It is noteworthy that the male sperm comes from the biological male and the female egg comes from the biological female. There is no other third or fourth or fifth type of gamete that

exists to begin the development of the human person. This is consistent with the binary nature of human sex (Alberts et al., 2002).

26. The sex binary of the human embryo is further developed between roughly weeks 8 to 12 of human development. There are two primitive structures present within the developing embryo called the Wolffian duct and Mullerian ducts (Larsen et al., 2003). The Wolffian ducts develop into substructures of the genitalia including the vas deferens and epididymis which belong exclusively to the male sex. For the female, the Mullerian ducts go on to form the uterus, fallopian tubes, cervix and upper one third of the vagina which belong exclusively to the female sex (Id.)

27. Significantly once the male structures are developed from Wolffian ducts, the Mullerian ducts are obliterated. This means that throughout the rest of embryological development the Mullerian ducts will not form into biological female structures. Likewise, in the female, the Wolffian ducts are destroyed by week 12 and will not form male structures at any point in the future (Id.).

28. Thus, we can see in very early development that the sex binary is imprinted physically not only in the chromosomes, but also on the very organs that the body produces. Additionally, the potential to develop organs of the opposite sex is eliminated. Thus, in the human being there are only two physical tracts that one may progress along, the one being male and the other being female (Wilson and Bruno, 2022).

2. Pubertal Development

29. As mentioned previously, at the time of birth an infant's sex is easily identified through observation of the genitalia. Corresponding internal structures could also be confirmed through imaging if needed.

30. In early childhood, some low level of sex hormones is produced by the sex glands. The male testes produce testosterone. The female ovaries produce primarily the hormone estrogen. These sex glands remain quiescent for the most part, producing low levels of sex hormones until the time of pubertal development.

31. Puberty is an essential part of human development. Its purpose is to achieve full adult sexual function and reproductive capacity.

32. Puberty is a time of development of the sex organs, body, and brain. There are well known changes in physical characteristics of the male such as growth of facial hair, deepening of the voice, and increasing size of the testicles and penis. Importantly the testicles will develop sperm

under the influence of testosterone and become capable of ejaculation. Because of these changes, the male will become capable of fertilizing an egg. The inability to produce sperm sufficient to fertilize an egg is termed infertility.

33. For the female, pubertal development includes changes such as breast development, widening of the pelvis, and menstruation. The female will also begin the process of ovulation which is a part of the menstrual cycle and involves the release of an egg or eggs from the ovary. Once the eggs are released in a manner in which they can become fertilized by human sperm then the female is termed fertile. The inability to release ovum that can be fertilized is infertility (Kuohong and Hornstein, 2021).

3. Tanner stages of development

34. From a medical perspective it is important to know the stage of pubertal development of the developing adolescent. This can be determined through a physical examination of the body. The female will have changes in breast characteristics and pubic hair development. Similarly, the male will have changes in testicular size and pubic hair development. These findings can be compared to the Tanner staging system which will allow the stage of puberty to be known.

35. Tanner stages are divided into five. Stage 1 is the pre-pubertal state before pubertal development of the child begins. Stage 5 is full adult sexual maturity. Stages 2 through 4 are various phases of pubertal development (Greenspan and Gardner, 2004).

36. Awareness of the Tanner stage of the developing adolescent is also useful to assess for maturation of sex organ development leading to fertility. For girls, the first menstruation (menarche) occurs about two years after Tanner stage 2 and will typically be at Tanner stage 4 or possibly 3 (Emmanuel and Boker, 2022). The first appearance of sperm (spermarche) will typically be Tanner stages 4 (Id.). If puberty is blocked or disrupted before reaching these critical stages, the sex glands will be locked in a premature state and incapable of fertility.

4. Biological Sex Cannot Be Changed

37. It is not possible for a person to change from one biological sex to the other, and there is no technology that allows a biological male to become a biological female or vice-versa. It is not technologically possible at this time to change sex chromosomes; these will remain in every cell throughout life. It is not technologically possible to transform sex glands from one to the other. In other words, there are no hormones or other means currently known to change an ovary into a testicle or a testicle into an ovary.

38. Furthermore, as noted earlier, several of the sex specific structures (such as the epididymis of the male or uterus of the female) are produced early in embryological development from around weeks 8 to 12. The primitive ducts which lead to these organs of the opposite sex are obliterated. There is no known way to resuscitate these ducts and continue development of opposite sex structures.

39. It is also not possible to produce gametes of the opposite sex. In other words, there is not any known way to induce the testicles to produce eggs. Nor is there any known way to induce the ovaries to produce sperm. Therefore, creating conditions for a biological female to create sperm capable of fertilizing another ovum is impossible. The induction of opposite sex fertility is impossible.

40. In fact, as I will discuss, gender affirming therapy actually leads to infertility and potential sterilization.

C. Endocrine Disorders

41. Before discussing gender dysphoria and gender affirmative therapy from the perspective of an endocrinologist, it is helpful to discuss the background of endocrine diseases. This background demonstrates the difference in gender dysphoria, which is a psychological diagnosis, and other conditions treated by endocrinologists, which are physical diagnoses.

42. Endocrinology is the study of glands and hormones. Endocrine disorders can be divided into three main types: those that involve hormone excess, those that involve hormone deficiency, and those that involve structural abnormalities of the glands such as cancers.

43. It is important for the endocrinologist to determine the cause of hormone gland excess or deficiency in order to devise an appropriate treatment plan. The plan will generally be to help bring the hormones back into balance and thus bring the patient back to health.

44. To give an example of hormone excess, hyperthyroidism is a term which means overactivity of the thyroid gland. In this condition excess thyroid hormone is produced by the thyroid gland. This results in various physical and psychological changes for the afflicted patient. Examples of physical changes can include tachycardia or fast heart rate, hand tremors, and weight loss. Examples of psychological symptoms include anxiety, panic attacks, and sometimes even psychosis.

45. An endocrinologist can recognize thyroid hormone excess in part by signs and symptoms but can also confirm the diagnosis with laboratory testing that shows the thyroid

hormones to be out of balance. Once this is determined and the degree of excess is known, then treatments can be given to bring these levels back into balance to benefit the patient's health and to prevent other disease effects caused by excess hormone.

46. To give another example, consider a deficiency of insulin. Insulin is a hormone which regulates blood glucose levels. If there is damage to the pancreas such that insulin levels are very low, then blood glucose levels will rise. If the glucose levels rise to a certain abnormally high level, then this is considered diabetes. In the case of type 1 diabetes, insulin levels are abnormally low and therefore blood glucose levels are abnormally high leading to a variety of signs and symptoms. For example, the patient may have extreme thirst, frequent urination, muscle wasting, and weight loss. They may often experience lethargy and weakness.

47. In this case laboratory tests of glucose and insulin levels can confirm the diagnosis. Once diabetes is confirmed, the patient is then treated with insulin to help restore glucose balance in the body and prevent long-term complications of diabetes.

48. To give an example of a structural abnormality, a patient may have a lump on the thyroid gland in the neck. This may be further examined by an imaging test such as an ultrasound. A needle biopsy can be performed so that the cells can be examined under a microscope. A trained medical professional such as a pathologist can then examine the cells to determine if they are benign or cancerous. In the case of a thyroid cancer, a surgical procedure known as a thyroidectomy may be performed to remove the diseased thyroid gland in order to treat the cancer.

49. Noteworthy in the preceding three examples is that all three disease conditions are diagnosed by physical observations. In other words, a laboratory test of a hormone, an imaging test of an organ, an examination of cells under a microscope, or all three may be employed in the diagnosis of endocrine disease.

D. Gender Dysphoria is a Psychological Diagnosis

50. Gender dysphoria, on the other hand, is not an endocrine diagnosis, it is in fact a psychological diagnosis. It is recognized as a persistent state of distress that stems from the feeling that one's gender identity does not align with their physical sex (DSM-5 TR). It is diagnosed purely by psychological methods of behavioral observation and questioning. The criterion for diagnosis is found in the Diagnostic and Statistical Manual of Mental Disorders (DSM-5 TR).

51. Drs. Adkins, Antommaria, and Janssen advocate for the use of Endocrine Society's Guideline (ESG) on gender dysphoria. The guidelines discuss the importance of a psychological

evaluation by a qualified clinician. The guidelines state "GD/gender incongruence may be accompanied with psychological or psychiatric problems (43–51). It is therefore necessary that clinicians who prescribe hormones and are involved in diagnosis and psychosocial assessment meet the following criteria: (1) are competent in using the DSM and/or the ICD for diagnostic purposes, (2) are able to diagnose GD/gender incongruence and make a distinction between GD/gender incongruence and conditions that have similar features (e.g., body dysmorphic disorder), (3) are trained in diagnosing psychiatric conditions, (4) undertake or refer for appropriate treatment, (5) are able to do a psychosocial assessment of the patient's understanding, mental health, and social conditions that can impact gender affirming hormone therapy, and (6) regularly attend relevant professional meetings." (Hembree et al., 2017).

52. Dr. Adkins states that "before any medical treatment is initiated," "mental health evaluations should be conducted" by a clinician trained "in child and adolescent gender development (as well as child and adolescent psychopathology)." (Adkins Decl, p. 11) It is not clear based on the records produced whether a qualified psychologist or psychiatrist has evaluated the three minor plaintiffs and has determined that they have met DSM-5 criteria for the diagnosis of gender dysphoria.

53. As a practicing endocrinologist and scientist, I have made a study of GD and its treatment for two reasons: 1) I want to be sure that my colleagues and I understand the science before we treat any patients with GD; and 2) I am concerned that the medical society that claims to speak for me and other endocrinologists has abandoned scientific principles in endorsing treatments for GD that have questionable scientific support. The opinions expressed in this report are the result of my own experience, studies, education, and review of the scientific literature related to GD.

II. Gender Affirmative Therapy

54. In the section that follows I discuss four interventions (social transition, blocking normal puberty, opposite sex hormones, and surgery) some clinicians are using to treat gender dysphoria. Each intervention can lead to iatrogenic harms to the patient. The term "iatrogenic" is used in medicine to describe harms or newly created medical conditions that are the result of a treatment. These harms will be described in detail below. I speak of these harms because it is important to understand that once a patient begins gender affirmative therapy (GAT) it is more

likely the patient will continue on to surgery (de Vries et al., 2014). Thus, GAT interrupts the natural desistance process and instead places the patient on a lifetime regimen of hormonal and surgical care. A good understanding of these harms is also critical to my practice as an endocrinologist, because if I did not understand these harms, I could not advise patients of the risks associated with GAT.

55. There are three general approaches to treating gender dysphoria in minors (Zucker, 2020). One is psychosocial treatment that helps the young person align their internal sense of gender with their physical sex. Another would be to "watch and wait" and allow time and maturity to help the young person align sex and gender through natural desistance, while providing psychological support and therapy as needed and addressing comorbidities. The third option, which is the focus of that which follows, is referred to as gender affirmative therapy.

56. Gender affirmative therapy of adults and minors consists of psychosocial, medical, and surgical interventions that attempt to psychologically and medically alter the patient so that they come to believe they may become similar to the physical sex which aligns with their gender identity (but not their biological sex) and thereby reduce gender dysphoria. GAT consists of four main parts: 1) social transition, 2) blocking normal puberty or menstruation, 3) high dose opposite sex hormones, and 4) surgery of the genitalia and breasts.

57. The application of this medical therapy to minors[3] is a fairly new intervention and is associated with a number of harms both known and unknown. GAT suffers from a lack of a

3. "[T]he US Department of Health and the Food and Drug Administration reference approximate age ranges for these phases of life, which consist of the following: (1) infancy, between birth and 2 years of age; (2) childhood, from 2 to 12 years of age; and (3) adolescence, from 12 to 21 years of age. Additionally, *Bright Futures* guidelines from the American Academy of Pediatrics identify adolescence as 11 to 21 years of age, dividing the group into early (ages 11–14 years), middle (ages 15–17 years), and late (ages 18–21 years) adolescence. The American Academy of Pediatrics has previously published a statement on the age limit of pediatrics in 1988, which was reaffirmed in 2012 and identified the upper age limit as 21 years with a note that exceptions could be made when the pediatrician and family agree to an older age, particularly in the case of a child with special health care needs. Recent research has begun to shed more light on the progression of mental and emotional development as children progress through the adolescent years into young adulthood. It is increasingly clear that the age of 21 years is an arbitrary demarcation line for adolescence because there is increasing evidence that brain development has not reliably reached adult levels of functioning until well into the third decade of life." (Hardin, 2017) (footnotes omitted).

quality evidence-base, poorly performed studies, and ongoing unethical human experimentation. As discussed below, in my professional opinion as an endocrinologist, no child should be given these treatments.

A. Social transition

58. The first stage of gender affirmative therapy is termed social transition. Social transition is a psychological intervention. The child may be encouraged to adopt the type of clothing and mannerisms or behaviors which are stereotypical of the opposite sex within a culture. For example, in the United States a boy might wear his hair long and wear dresses in order to socially transition. A girl may cut her hair short and wear clothes from the boys' section of a department store.

59. Social transition of the child has been noted by expert researcher in the field of child gender dysphoria, Ken Zucker, to itself be a form of iatrogenic harm (Zucker, 2020). This is because the social transition process may solidify the young person's belief that they are in fact the sex opposite of their biological sex. The 2017 Endocrine Society Guidelines state that "[s]ocial transition is associated with the persistence of GD/gender incongruence as a child progresses into adolescence." (Hembree et al., 2017). A recent study also supports the contention that children who undergo social transition are more likely to have their gender dysphoria persist into adolescence. In the 2022 article "Gender Identity 5 Years After Social Transition", which studied 317 socially transitioned youths, the authors found that "most participants were living as binary transgender youth (94.0%)." (Olson et al., 2022).

60. From an endocrine point of view, it is understandable that a child having the outward appearance of the opposite sex, would believe that he or she is destined to go through puberty of the opposite sex as they have only a poor understanding of the internal structures of the body, the function of the sex glands, the role of the sex glands in fertility, and so forth.

61. Therefore, it would be quite frightening for a boy who believes he is a girl to be turning into a man with all of the adult features that accompany manhood. Vice versa, the girl who has become convinced that she is a boy will be frightened by the physical changes brought on by womanhood.

62. In fact, it would appear children and adolescents who have gone through a social transition may be anticipating a sort of disease state in the future by the hormone changes that will occur as a normal and natural part of human development. Until relatively recently in human history, it has not been possible to interfere with puberty through pharmaceutical means.

B. Medications which Block Pubertal Development

1. Background

63. A second stage of gender affirmative therapy may involve blocking normal pubertal development. This may be done with puberty blocking medications (PB) that act directly on the pituitary to cause the endocrine condition known as hypogonadotropic hypogonadism (HH).

64. To understand what is occurring in this process, it is helpful to be aware of normal hormone function during pubertal development. There is a small pea-sized gland in the brain called the pituitary. It is sometimes referred to as the "master gland" as it controls the function of several other glands. One key function, for our purposes, is the control of the sex glands. There are two specific hormones produced by the pituitary referred to as luteinizing hormone (LH) and follicle stimulating hormone (FSH). These are responsible for sex hormone production and fertility. The LH and FSH act as signals to tell the sex glands to begin or to continue their function.

65. In the adult male, the production of LH will cause adult levels of testosterone to be produced by the testicles. In the adult female, the production of LH will cause adult levels of estrogen to be produced by the ovaries.

66. In early childhood, prior to the beginning of puberty, the pituitary function with respect to the sex glands is quiescent. However, during pubertal development LH will signal the testicle to increase testosterone production and this carries the boy through the stages of pubertal development into manhood. Likewise for the female, the interaction of LH with the ovaries increases estrogen production and carries the girl through the stages of development into womanhood.

67. Hypogonadotropic hypogonadism is a medical condition in which the pituitary does not send the hormonal signals (LH and FSH) to the sex glands. Therefore, the sex glands are unable to make their sex specific hormones of testosterone or estrogen.

68. If this condition occurs during puberty, the effect will be to stop pubertal development. This is a disease state which is diagnosed and treated by the endocrinologist.

69. Medications such as GnRH analogues (sometimes called puberty blockers) act on the pituitary gland to lower the pituitary release of LH and FSH levels dramatically. The result is a blockage of the signaling of the pituitary to the testicles or ovaries and therefore underproduction of the sex hormones. This will stop normal menstrual function for the female and halt further pubertal development. For the male this will halt further pubertal development. If the male had already reached spermarche, then production of new sperm will stop.

2. GnRH Agonist Medication Effects Vary by Use Case

70. There are a variety of uses for GnRH agonists. The use and outcome can be very different for different applications.

71. For example, the medication called Lupron, a GnRH agonist, was developed to treat prostate cancer. The idea being that blocking pituitary hormones will block the adult male's release of testosterone from the testicles. Since testosterone will promote the growth of prostate cancer, the idea is to lower testosterone levels to a very low amount and therefore prevent the growth and spread of prostate cancer. This is a labeled use of the medication. In other words, there is FDA approval for this use.

72. Another labeled use of GnRH agonist medication is for the treatment of central precocious puberty. In the disease state of central precocious puberty, pituitary signaling is activated at an abnormally young age, say age four, to begin pubertal development. A GnRH agonist may be used to halt puberty which has begun at an abnormally early time. Here, the action of the medication on the pituitary will disrupt the signaling to the sex glands, stop early sex hormone production, and, therefore, stop abnormal pubertal development.

73. Then, at a more normal time of pubertal development, say age 11, the medication is stopped and puberty is allowed to proceed. The end result is to restore normal sex gland function and timing of puberty. This is a labeled use for a GnRH agonist medication.

74. What about the use of GnRH analogue medications such as Lupron in gender affirmative therapy? In these cases, we have physiologically normal children who are just beginning puberty or are somewhere in the process of pubertal development. They have healthy pituitary glands and sex organs. However, a puberty blocking medication is administered to stop normal pubertal development.

75. In this case the condition of hypogonadotropic hypogonadism described above (a medical disease) is induced by medication and is an iatrogenic effect of treating the psychological

condition of gender dysphoria. GnRH analogue medications have not been FDA approved for this use. The use of GnRH analogue medication for this purpose in adolescents is experimental as there have been no randomized controlled trials for this specific use case.

76. Dr. Adkins states that "[i]n the case of puberty blocking medication, once stopped, a patient's endogenous puberty resumes." (Adkins decl., p. 13). However, she does not provide any evidence to support her claim.

77. Dr. Adkins asserts there is "over 40 years of data on the impact of pubertal suppression treatment on children who undergo precocious puberty that we can apply to the transgender population." (Adkins dec., p. 15). But she fails to acknowledge that use of GnRHa for treatment of precocious puberty is very different from the non-FDA approved use case of administering GnRHa to stop appropriately timed puberty in children with gender dysphoria.

78. Dr. Adkins further states, "Pubertal suppression medication is also used in adolescents and adults undergoing chemotherapy to preserve fertility and in patients with hormone sensitive cancers." (Adkins decl, p. 15). The use of GnRHa in conjunction with chemotherapy for a life-threatening cancer treatment is very different than its use in GAT. Such treatment for cancer is based on an objective and verifiable physical examination, typically the biopsy of a cancerous tumor. Again, no such objective validation of an immutable gender identity exists; therefore, the underlying diagnosis is uncertain, and her comparison is faulty.

79. In my opinion, there is not sufficient evidence to conclude that the use of puberty blockers to block natural puberty is safe when administered as part of gender affirming therapy, or that its effects are reversible.

3. Hypogonadotropic Hypogonadism

80. As described above, hypogonadotropic hypogonadism is a condition in which the pituitary fails to send signals to the gonads thereby preventing the testicle of the male from making testosterone or the ovary of the female from making estrogen.

81. As an endocrinologist I frequently evaluate patients to ascertain if they have the condition of hypogonadotropic hypogonadism. This is done by a laboratory evaluation. If the patient has this condition, I then determine the cause and the proper treatment.

82. The primary hormone of the pituitary which is abnormal in this condition is called luteinizing hormone or LH. In order to diagnose the condition, a laboratory test with reference ranges based on the person's sex and age is used to evaluate the blood sample.

83. For example, figure 1 shows the normal laboratory reference range for LH over the course of a month in an adult pre-menopausal female (0.5-76.3 mIU/mL) (Quest LH, 2023). A very low level of LH (red) with low estrogen levels indicates hypogonadotropic hypogonadism[4].

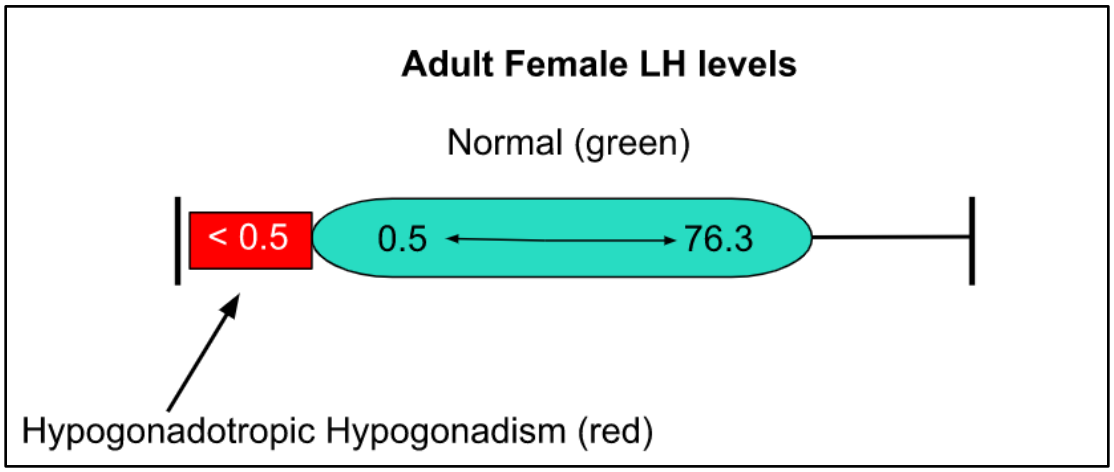

Figure 1.

84. As one can see, in hypogonadotropic hypogonadism the level of LH is below the reference range. In the female, this causes the cessation of estrogen production, and in the male it causes cessation of testosterone production. In adolescents of either sex, this will stop further pubertal development. For females in mid-puberty or beyond, this condition will also stop normal menstrual cycles and ovulation. For the male in mid-puberty or beyond, it will cause the cessation of normal sperm production.

85. As an endocrinologist, I would confirm the condition of hypogonadotropic hypogonadism based on laboratory results and then treat this medical condition.

86. What occurs to pituitary hormones and the sex hormones[5] when administering a GnRH analogue medication such as Lupron? The effect is identical to figure 1. Over time, the result of the medication is to cause very low LH levels (red) leading to low sex hormone levels thereby medically inducing the condition of hypogonadotropic hypogonadism.

87. In gender affirmative therapy, the medical condition of hypogonadotropic hypogonadism is being deliberately created by the use of medications called GnRH analogues, one of which is called Lupron.

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4 Levels will be similarly low for adolescents, though the normal reference range is different.
5 The primary sex hormones being estrogen for females and testosterone for males.

4. Adverse Health Consequences of Blocking Normal Puberty

a. Infertility

88. There are a number of serious health consequences that occur as the result of blocking normal puberty. The first problem is infertility.

89. Dr. Adkins states, "Pubertal suppression on its own has no impact on fertility." (Adkins decl., p. 19). That statement is incorrect. As I explain below, GnRHa have profound implications for fertility.

90. The Endocrine Society Guidelines recommend beginning puberty blockers as early as Tanner stage 2. As discussed earlier, this is the very beginning of puberty. Fertility development happens later generally in Tanner stage 4. One can see that if the developing person is blocked at Tanner stage 2 or 3 as advocated by the guidelines, this is prior to becoming fertile. The gonads will remain in an immature, undeveloped state.

91. If they remain blocked in an early pubertal stage then even the addition of opposite sex hormones will not allow for the development of fertility. In fact, high dose opposite sex hormones may permanently damage the immature sex organs leading to sterilization. Certainly, the removal of the gonads by surgery will ensure sterilization.

92. In a Dutch study by de Vries et al. that included seventy adolescents who took puberty blockers, all seventy decided to go on to hormones of the opposite sex (de Vries, et al. 2011). In a follow-up study by de Vries et al., the overwhelming majority went on to have sex reassignment surgery by either vaginoplasty for males or hysterectomy with ovariectomy for females (de Vries, et al. 2014). These surgeries resulted in sterilization. This is why puberty blockers, rather than being a "pause" to consider aspects of mental health, are instead a pathway towards future sterilizing surgeries and potentially sterilizing hormonal treatments.

93. Dr. Antommaria writes, "The [Endocrine Society] guideline recommends that the informed consent process for puberty blockers and sex hormones include a discussion of the implications for fertility and options for fertility preservation." (Antommaria decl, p. 17). However, even though procedures to preserve fertility are available, studies show that less than 5% of adolescents in North America receiving GAT even attempt fertility preservation (FP) that might be beneficial for those in late pubertal stages (Tanner 4 and 5) (Nahata, 2017). Moreover, for those in early pubertal stages (Tanner 2 and 3), "ovarian tissue cryopreservation is still

considered experimental in most centers and testicular tissue cryopreservation remains entirely experimental. These experimental forms of FP would be the only options in children [with puberty] blocked prior to spermarche and menarche and are high in cost and limited to specialized centers. Even with FP there is no guarantee of having a child. (Laidlaw, Cretella, et al., 2019).

94. Dr. Antommaria attempts to suggest that the risks associated with puberty blockers for treatment of gender dysphoria are comparable to the risks associated with using puberty blockers to treat precocious puberty (Antommaria decl., p. 19). But this assertion fails to recognize the very different effects of PB medication in early childhood versus during adolescence.

95. As an example, if a four-year-old child is diagnosed with precocious puberty, the abnormally early puberty may be halted by GnRH analogues (puberty blocking medication). The child will at a later time have the puberty blocker discontinued and at that point normal pubertal development will be allowed to proceed. Therefore, when they are no longer taking the medication, they will gain natural fertility.

96. In contrast, puberty blocking medication given to minors as a part of GAT occurs during natural puberty which is precisely the time that the adolescent person will gain reproductive function. The effects of puberty blocker (PB) on the adolescent are to prevent sperm production in the male and ovulation in the female which produces the infertile condition. Importantly, so long as the minor continues PB they will remain infertile. Should they continue on to opposite sex hormones as part of GAT, then they will remain infertile. There is the additional possibility that cytotoxic effects of high dose opposite sex hormones will damage the immature gonads leading to permanent sterility.

b. Sexual Dysfunction

97. Another problem I would expect to find in youths who have HH and puberty stopped at an early stage is sexual dysfunction. The child will continue their chronological age progression toward adulthood and yet remain with undeveloped genitalia. This will lead to sexual dysfunction including potential erectile dysfunction and inability to ejaculate and orgasm for the male. For the female with undeveloped genitalia potential sexual dysfunction may include painful intercourse and impairment of orgasm.

98. The impairment of sexual function was evident in the TLC reality show "I am Jazz". In the show, Jazz, who was identified male at birth, had been given puberty blockers at an early pubertal stage. In an episode where Jazz visits a surgeon and has a discussion about sexual

function, Jazz states: “I haven’t experienced any sexual sensation.” Regarding orgasm, Jazz says: “I don’t know, I haven’t experienced it”[6] (TLC, accessed 2022).

c. Negative Effects of Hypogonadotropic Hypogonadism on Bone Density

99. Puberty is a time of rapid bone development. This time period is critical in attaining what we call peak bone density or the maximum bone density that one will acquire in their lifetime (Elhakeem, 2019).

100. Any abnormal lowering of sex hormones occurring during this critical time will stop the rapid accumulation of bone and therefore lower ultimate adult bone density. If a person does not achieve peak bone density, they would be expected to be at future risk for osteoporosis and the potential for debilitating spine and hip fractures as adults. Hip fractures for the older patient very significantly increase the risk of major morbidity and death (Bentler, 2009). Allowing a "pause" in puberty for any period of time leads to an inability to attain peak bone density.

101. DEXA scans are used to evaluate changes in bone density and to help evaluate risk for future fractures. In my practice I order and interpret DEXA scans for this purpose.

102. The Z-score of a DEXA scan is used to compare a patient's bone density to the same population based on age and sex. For example, a person who has a bone density similar to the average of the population would be at the 50th percentile. Those who have greater relative bone density would be above the 50th percentile. Those who have lower bone density would have a Z score below the 50th percentile.

103. Puberty blockers used in adolescence to cause HH will inhibit the normal accrual of bone density. This can be evaluated by DEXA scan. In a study in the UK, 44 patients aged 12-15 with gender dysphoria were given puberty blockers and tests of bone density were done at baseline, 12 months, 24 months and 36 months (Carmichael, 2021).

104. Figure 2 shows the Z-scores of the average age matched population percentile which is 50%. It shows the average baseline (before puberty blockers) Z-score percentile for the study participants. It also shows the bone density percentile at 12, 24, and 36 months. One can see that the average baseline z score was about 32% compared to peers of similar age and sex. At 12 months this had decreased to about 15%, and by 24 months it had declined further to about 5% compared to their peers and remained at this low level.

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6 Jazz's age is somewhere in the mid-teens during this episode.

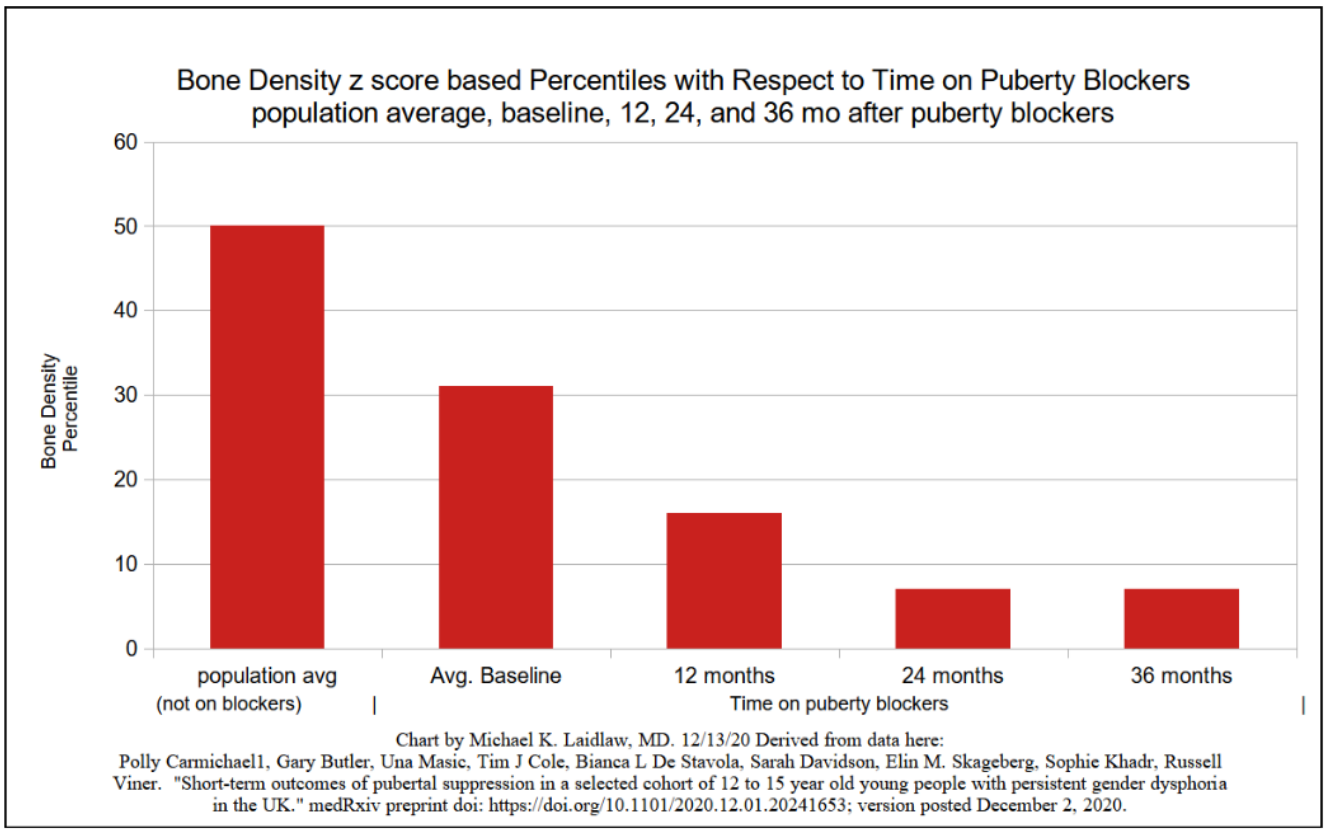

Figure 2

105. This is the same pattern of diminishing bone density compared to their peers that one would see in hypogonadotropic hypogonadism due to a pituitary injury. However, in these cases hypogonadotropic hypogonadism was caused by GnRH analogues (puberty blocking medication) that lead to greatly diminished bone density compared to their peers of the same age.

106. In natal females, hypogonadotropic hypogonadism leads to amenorrhea, meaning the absence of menstrual periods. Amenorrhea is detrimental to bone health: "In addition to this[7] important long-term consequence of amenorrhea, other problems, such as premature bone demineralization or inadequate bone formation, are likely to put amenorrheic women at high risk for osteoporosis and fracture" (Santoro, 2011).

7 "This" refers to cardiovascular disease: "Diagnosis and treatment of amenorrheic states is of increasing clinical importance because lifetime menstrual irregularities are known to be predictive of subsequent CVD in women."

107. Dr. Adkins states, "Pubertal suppression can be initiated up to mid-puberty and works by pausing endogenous puberty at the stage it has reached when the treatment begins. This has the impact of limiting the influence of a person's endogenous hormones on the body." (Adkins decl, p. 9). In actuality, allowing a "pause" in puberty for any period of time leads to an inability to attain peak bone density and puts the patient at future risk for osteoporosis and serious fractures as I have described.

108. Another consideration is the effects of HH in adolescents and late teens on the maturation of the human brain. Much of what happens is unknown. However, "sex hormones including estrogen, progesterone, and testosterone can influence the development and maturation of the adolescent brain." (Arain, 2013). Therefore, there are unknown, but likely negative, consequences to blocking normal puberty with respect to brain development.

d. Psychosocial Development

109. A third major problem with blocking normal puberty involves psychosocial development. Adolescence is a critical time of physical, mental, and emotional changes for the adolescent. It is important that they develop socially in conjunction with their peers.

110. While I am not a psychologist, I am familiar with and rely upon the literature in this area for the rationale of the treatment of precocious puberty[8]. It is generally accepted in endocrinology that there are psychological benefits to adolescents who go through puberty around the same time as their peers, and this is why puberty blockers (GnRH analogues) in central precocious puberty are sometimes used to delay a child's abnormally early pubertal development to a more age-appropriate time.

111. The development of the adolescent along with their peers is also well recognized in the psychological literature: "For decades, scholars have pointed to peer relationships as one of the most important features of adolescence." (Brown, 2009). If one is left behind for several years under the impression that they are awaiting opposite sex puberty, they will miss important opportunities for socialization and psychological development. Psychosocial development will be necessarily stunted as they are not developing with their peers. This is a permanent harm as the time cannot be regained.

[8] "The other concern often used as a rationale for treatment is negative psychosocial consequences of precocious puberty, particularly in girls" [emphasis added] (Eugster, 2019).

112. Aside from the multiple serious problems that are iatrogenically acquired by blocking normal puberty, there appear to be independent risks of the puberty blocking medication themselves. For example, one can read the labeling of a common puberty blocking medication called Lupron Depot-Ped and find under psychiatric disorders: "emotional lability, such as crying, irritability, impatience, anger, and aggression. Depression, including rare reports of suicidal ideation and attempt. Many, but not all, of these patients had a history of psychiatric illness or other comorbidities with an increased risk of depression" (Lupron, 2022). This is particularly concerning given the high rate of psychiatric comorbidity with gender dysphoria (Kaltiala-Heino, 2015).

5. The Effect of Puberty Blockers on Desistance

113. As stated earlier, a very high proportion of minors diagnosed with gender dysphoria will eventually desist or come to accept their physical sex. Puberty blockers have been shown to dramatically alter natural desistance.

114. In a Dutch study that included seventy adolescents who took puberty blockers, all seventy decided to go on to hormones of the opposite sex (de Vries, et al. 2011). In a follow-up study, the overwhelming majority went on to have sex reassignment surgery by either vaginoplasty for males or hysterectomy with ovariectomy for females (de Vries, et al. 2014). These surgeries resulted in sterilization. This is why puberty blockers, rather than being a "pause" to consider aspects of mental health, are instead a pathway towards future sterilizing surgeries.[9]

C. Opposite Sex Hormones

115. The third stage of gender affirmative therapy involves using hormones of the opposite sex (also called cross sex hormones) at high doses to attempt to create secondary sex characteristics in the person's body.

116. In GAT, what is termed "cross sex hormones" is the use of hormones of the opposite sex to attempt to create secondary sex characteristics. To do so, very high doses of these hormones are administered. When hormone levels climb above normal levels they are termed supraphysiologic.

1. Testosterone

9 The surgeries were consequential in another important way. One person who had a vaginoplasty died of post-surgical complications of necrotizing fasciitis, which is a rapidly progressive and very severe infection of the soft tissues beneath the skin and which has a high mortality (Id.).

117. Testosterone is an anabolic steroid of high potency. It is classified as a Schedule 3 controlled substance by the DEA: "Substances in this schedule have a potential for abuse less than substances in Schedules I or II and abuse may lead to moderate or low physical dependence or high psychological dependence" (DEA, 2022). A licensed physician with a valid DEA registration is required to prescribe testosterone.

118. I prescribe testosterone to men for testosterone deficiency. The state of testosterone deficiency can cause various problems including problems of mood, sexual function, libido, and bone density. Prescription testosterone is given to correct the abnormally low levels and bring them back into balance. The dose of testosterone must be carefully considered and monitored to avoid excess levels in the male as there are a number of serious concerns when prescribing testosterone. The use of high dose testosterone in females is experimental.

119. Let's contrast the FDA approved use of testosterone in males versus its experimental use in females. Testosterone is FDA approved for use in adult men as well as the pediatric male population aged 12 and older (Actavis, 2018). There is no FDA approved usage of testosterone for women or pediatric aged females.[10] The prescribing indications for adult males and pediatric males are identical and are to treat the conditions of low testosterone caused by either primary hypogonadism or secondary hypogonadism (Id.). The intent of testosterone for women and pediatric aged females in GAT is to cause severe hyperandrogenism. In this case the purpose, effects, and ultimate outcome of the FDA approved usage of testosterone for males versus the experimental use for females in GAT are very different. Therefore the low-quality evidence guidelines of the Endocrine Society/WPATH are not an acceptable substitute for proper scientific studies including randomized controlled trials (Malone et al., 2021; Hembree et al., 2017).

120. Regarding the potential for abuse, the labeling reads "Testosterone has been subject to abuse, typically at doses higher than recommended for the approved indication...Anabolic androgenic steroid abuse can lead to serious cardiovascular and psychiatric adverse reactions...Abuse and misuse of testosterone are seen in male and female adults and adolescents...There have been reports of misuse by men taking higher doses of legally obtained

10 "Testosterone Cypionate Injection, USP is indicated for replacement therapy in the male in conditions associated with symptoms of deficiency or absence of endogenous testosterone" (Actavis, 2018).

testosterone than prescribed and continuing testosterone despite adverse events or against medical advice." (Actavis Pharma, 2018)

121. Adverse events with respect to the nervous system include: "Increased or decreased libido, headache, anxiety, depression, and generalized paresthesia." (Actavis Pharm, 2018)

122. With regard to ultimate height, "[t]he following adverse reactions have been reported in male and female adolescents: premature closure of bony epiphyses with termination of growth" (Actavis Pharma, Inc., 2018). What this means is that testosterone applied to the adolescent will cause premature closure of the growth plates, stopping further gains in height in the growing individual, and ultimately making the person shorter than they otherwise would have been.

123. With respect to the cardiovascular system of men using ordinary doses, "Long-term clinical safety trials have not been conducted to assess the cardiovascular outcomes of testosterone replacement therapy in men" (Actavis Pharma, 2018). No clinical safety trials have been performed for women or adolescent girls to my knowledge.

124. "There have been postmarketing reports of venous thromboembolic events [blood clots], including deep vein thrombosis (DVT) [blood clot of the extremity such as the leg] and pulmonary embolism (PE) [blood clot of the lung which may be deadly], in patients using testosterone products, such as testosterone cypionate" (Actavis Pharma, 2018).

125. A very recently published study of adverse drug reactions (ADRs) as part of gender affirming hormone therapies in France states that "[o]ur data show a previously unreported, non-negligible proportion of cases indicating cardiovascular ADRs in transgender men younger than 40 years… In transgender men taking testosterone enanthate, all reported ADRs were cardiovascular events, with pulmonary embolism in 50% of cases" (Yelehe et al., 2022).

126. There are also serious concerns regarding liver dysfunction: "Prolonged use of high doses of androgens ... has been associated with development of hepatic adenomas [benign tumors], hepatocellular carcinoma [cancer], and peliosis hepatis [generation of blood-filled cavities in the liver that may rupture] —all potentially life-threatening complications" (Actavis Pharma, 2018).

a. Hyperandrogenism

127. Hyperandrogenism is a medical condition of elevated blood androgens such as testosterone. As an endocrinologist I frequently evaluate patients to determine if they have the

condition of hyperandrogenism. Hyperandrogenism in the female or male is harmful and can lead to various maladies.

128. In order to diagnose hyperandrogenism, a laboratory blood test of testosterone is done. In hyperandrogenism, one will find testosterone levels elevated above the reference range.

129. For example for females aged 18 or older, the normal reference range is 2-45 ng/dL (Quest testosterone, 2023).[11] However, in female disease conditions these levels can be much higher. Levels above this normal reference range are considered hyperandrogenism (figure 3).

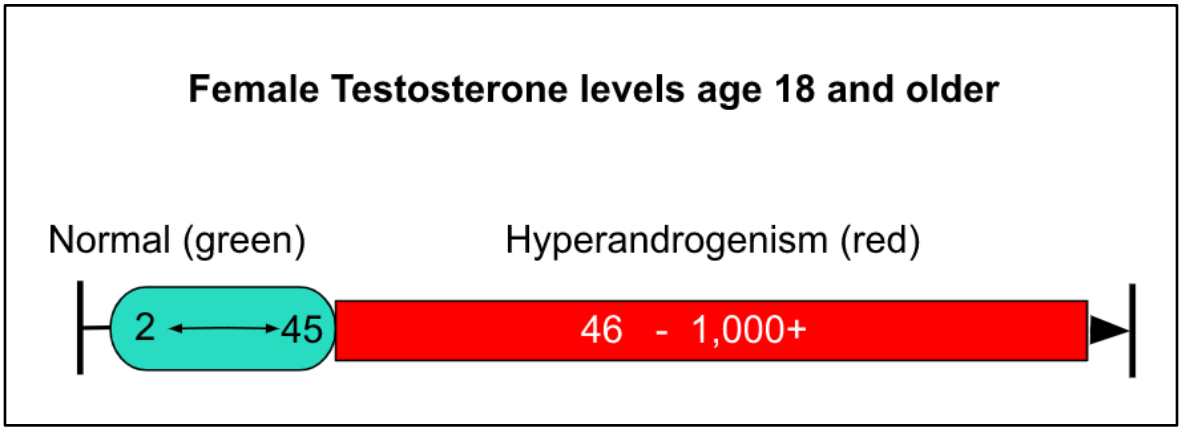

Figure 3

130. For example, in polycystic ovarian syndrome levels may range from 50 to 150 ng/dL.

131. I frequently diagnose and treat the hyperandrogen condition called polycystic ovarian syndrome (PCOS). These patients have elevated testosterone levels. These levels are mildly to moderately elevated and may range from 50-150. Hyperandrogenism found in PCOS has been associated with insulin resistance (Dunaif, 1989), metabolic syndrome (Apridonidze, 2005) and diabetes (Joham, 2014).

132. I also evaluate patients to rule out rare androgen producing tumors that generate very high levels of testosterone. These rare endocrine tumors can cause severely elevated testosterone levels in the 300-1000 range. Once the cause of a hyperandrogen condition is

11 For females aged 11-17 the reference range is <= 40 and below this age group, the range is even lower.

identified, treatments may be put in place to help bring the testosterone levels down to the normal reference range.

133. Recommendations from the Endocrine Society's clinical guidelines related to GAT are to ultimately raise female levels of testosterone to 320 to 1000 ng/dL[12] which is on the same order as dangerous endocrine tumors for women as described above (Hembree, 2017). A simple calculation shows this level for the adult may be anywhere from 6 to 100 times higher than native female testosterone levels. In doing so they are inducing severe hyperandrogenism. These extraordinarily high levels of testosterone are associated with multiple risks to the physical and mental health of the patient.

134. The following chart shows testosterone levels in the normal adult female range (blue), PCOS (gray), endocrine tumors (red), and gender affirmative therapy (orange) as part of female to male (FtM) transition (figure 4).

12 In the Endocrine Society's Guidelines there is no grading of evidence for the rationale of using such high supraphysiologic doses of opposite sex hormones for the female or male. There seems to be an underlying assumption that because the person believes to be the opposite sex then they acquire the sex specific laboratory ranges of the opposite sex. "The root cause of this flaw in thinking about diagnostic ranges was exemplified in a response letter by Rosenthal et al claiming that gender identity determines the ideal physiologic range of cross-sex hormone levels (5). Thus, a psychological construct, the 'gender identity', is imagined to affect physical reality and change a person's sex-specific laboratory reference ranges. This is clearly not the case, otherwise there would be no serious complications of high-dose androgen treatment in transgender males" (Laidlaw et al., 2021).

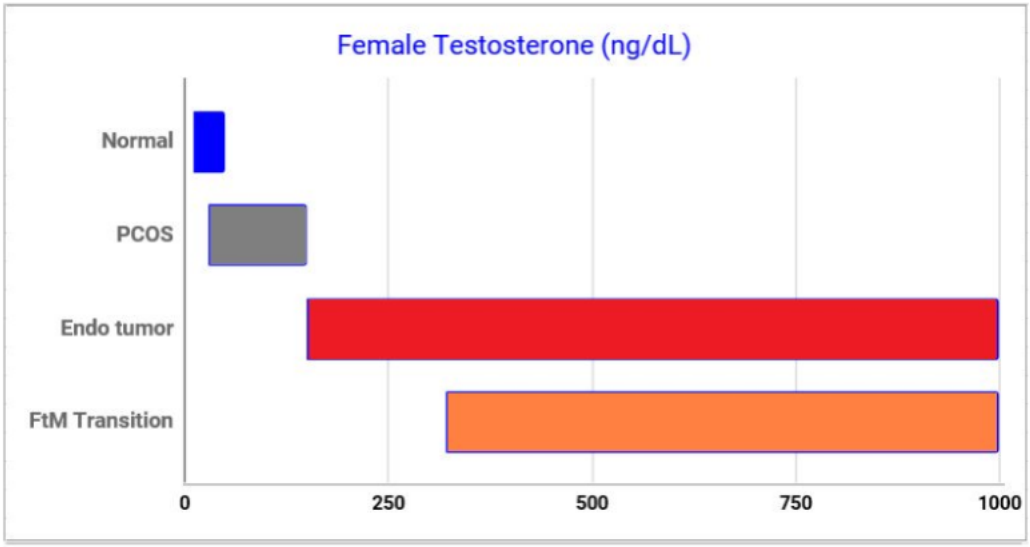

Image by Michael K Laidlaw. MD. Approximate total testosterone in ng/dL based on laboratory, etc. FtM transition from 2017 Endo Society Guidelines on Gender Dysphoria. With PCOS testosterone levels may be as high as 150. With endocrine tumors testosterone may be in the 150-1000 range. The recommendations of the Endocrine Society/WPATH are to bring levels into the 300-1000 range which is 6-100 times higher than normal endogenous adult female levels.

Figure 4.

b. Medical Problems Related to Hyperandrogenism

135. With respect to cardiovascular risk, "[s]tudies of transgender males taking testosterone have shown up to a nearly 5-fold increased risk of myocardial infarction relative to females not receiving testosterone" (Laidlaw et al.,2021; Alzahrani et al., 2019).

136. Permanent physical effects of testosterone therapy involve irreversible changes to the vocal cords. Abnormal amounts of hair growth which may occur on the face, chest, abdomen, back and other areas is known as hirsutism. Should the female eventually regret her decision to take testosterone, this body hair can be very difficult to remove. Male pattern balding of the scalp may also occur. I would expect these changes to occur to the plaintiffs taking testosterone to induce hyperandrogenism. Common sense suggests that changes of voice and hair growth could be psychologically troubling should a patient decide to detranstition and attempt to reintegrate into society as female.

137. Changes to the genitourinary system due to hyperandrogenism include polycystic ovaries, clitoromegaly and atrophy of the lining of the uterus and vagina (Hembree, 2017). The breasts have been shown to have an increase in fibrous breast tissue and a decrease in normal

glandular tissue (Grynberg et al., 2010). Potential cancer risks from high dose testosterone include ovarian and breast cancer (Hembree, 2017). I would expect some or all of these effects and risks to occur to the plaintiffs taking testosterone to induce hyperandrogenism.

138. Dr. Adkins states that "Though some effects of hormone therapy can be irreversible depending on the duration of the treatment, such as facial hair growth in patients on testosterone, many others are reversible once the treatment is stopped." (Adkins decl, p. 13). This is clearly misleading, as effects such as hirsutism, deepening of the voice, and clitoromegaly are permanent. The effects on fertility of starting an adolescent on puberty blockers in early puberty (Tanner stage 2 or 3) and then adding opposite sex hormones are unknown, but opposite sex hormones are likely cytotoxic to the immature gonads.

139. According to research, anabolic steroid abuse[13] has been shown to predispose individuals towards mood disorders, psychosis, and psychiatric disorders. The "most prominent psychiatric features associated with AAS [anabolic androgenic steroids, i.e. testosterone] abuse are manic-like presentations defined by irritability, aggressiveness, euphoria, grandiose beliefs, hyperactivity, and reckless or dangerous behavior. Other psychiatric presentations include the development of acute psychoses, exacerbation of tics and depression, and the development of acute confusional/delirious states" (Hall, 2005). Moreover, "[s]tudies... of medium steroid use (between 300 and 1000 mg/week of any AAS) and high use (more than 1000 mg/week of any AAS) have demonstrated that 23% of subjects using these doses of steroids met the DSM-III-R criteria for a major mood syndrome (mania, hypomania, and major depression) and that 3.4% — 12% developed psychotic symptoms" (Hall, 2005).

c. Erythrocytosis as a Result of Hyperandrogenism

140. I regularly monitor patients who are receiving testosterone to evaluate for erythrocytosis. Erythrocytosis is a condition of high red blood cell counts. Prolonged hyperandrogenism such as occurs with the use of testosterone at supraphysiologic levels can cause erythrocytosis.

141. Males and females have different reference ranges for red blood cells (measured as hematocrit). For example the normal range of hematocrit for females over age 18 is 35.0-45.0%

13Anabolic steroid abuse involves the deliberate creation of hyperandrogenism in the body as a result of high doses of testosterone or other androgens.

and males 38.5-50.0% (Quest Hematocrit, 2023). Levels above this range signify erythrocytosis (see figure 5).

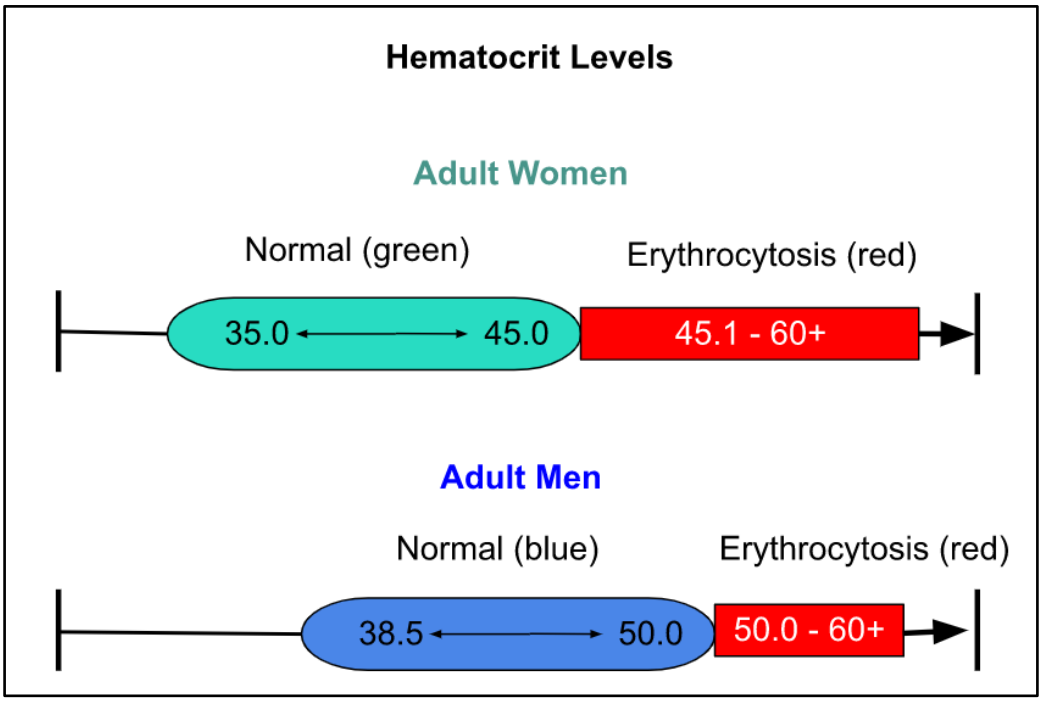

Figure 5.

142. As one can see, there is an overlap in the ranges of males and females such that levels between 45.1 and 50 are considered normal for the male. However for the female these levels are considered erythroctotic. Levels above 50 for the male are considered erythrocytosis and for the female severe erythrocytosis.

143. The Madsen study was a "20-year follow-up study in [1,073] adult trans men who started testosterone therapy and had monitoring of hematocrit at our center" (Madsen, 2021). In this study, 24% of trans men had hematocrit levels 50% at some time which would be considered severe erythrocytosis. Unfortunately, they did not examine the hematocrit range of 45-50. However one would presume that this would occur in at least the same percentage or higher as those who had developed severe erythrocytosis.

144. Any level of erythrocytosis in young women has been shown to be an independent risk factor for cardiovascular disease, coronary heart disease and death due to both (Gagnon, 1994).

2. Estrogen

145. Estrogen is the primary sex hormone of the female. Prescription estrogen may be used if a woman has low estrogen levels due to premature failure of her ovaries. Estrogen is prescribed to bring these levels back into a normal range for the patient's age. Another labeled use of estrogen is to treat menopausal symptoms. The use of estrogen to treat pediatric age males is experimental.

146. Hyperestogenemia is a condition of elevated blood estrogens such as estradiol. I regularly evaluate patients for hyperestrogenemia in my practice. Hyperestrogenemia in the male is harmful and can lead to various maladies.

147. In order to diagnose hyperestrogenemia, a laboratory blood test of estrogen is performed. In hyperestrogenemia, one will find estrogen levels elevated above the reference range.

148. For example, in an adult male the normal estrogen reference range is 60-190 pg/mL (Quest Estrogen, 2023). Levels above this range are consistent with hyperestrogenemia. See figure 6.

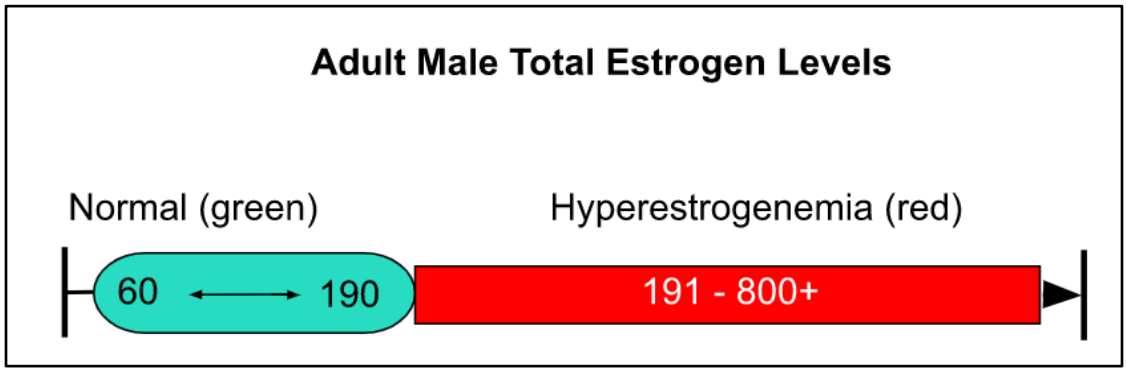

Figure 6.

149. There are medical conditions which can result in hyperestrogenemia. For example, "[t]he concentration of estrogen in cirrhotic patients is thought to increase by fourfold compared to individuals without cirrhosis" (Pagadala, 2023). Certain rare tumors for example of the adrenal gland can result in estrogen levels 3 to 10 fold higher than normal (Cavlan, 2010).

150. In gender affirmative therapy, the medical condition of hyperestrogenemia is being deliberately, medically induced by the off-label use of high doses of estrogen. Endocrine Society

guidelines recommend raising estradiol levels to 2 to 43 times above the normal range.[14] The high doses are used in an attempt to primarily affect an increase of male breast tissue development known as gynecomastia. Gynecomastia is the abnormal growth of breast tissue in the male. I evaluate and treat patients with gynceomastia. I have prescribed medication and have referred patients for surgery for this condition.

151. Other changes of secondary sex characteristics may develop because of hyperestrogenemia such as softening of the skin and changes in fat deposition and muscle development.

152. Long-term consequences of hyperestrogenemia include increased risk of myocardial infarction and death due to cardiovascular disease (Irwig, 2018). Also "[t]here is strong evidence that estrogen therapy for trans women increases their risk for venous thromboembolism[15] over 5 fold" (Irwig, 2018).

153. Breast cancer is a relatively uncommon problem of the male. However the risk of a male developing breast cancer has been shown to be 46 times higher with high dose estrogen (Christel et al., 2019).

154. Sexual dysfunction, including decreased sexual desire and decreased spontaneous erections, is another adverse effect of hyperestrogenemia (Hembree, 2017).

3. Opposite Sex Hormones and Infertility/Sterility

155. Dr. Adkins states, “Pubertal suppression on its own has no impact on fertility”, which, as discussed above, is incorrect. (Adkins decl., p. 19). Dr. Adkins further states, “Hormone therapy can impact fertility but many transgender individuals conceive children after undergoing hormone therapy.” (Id). Dr. Antommaria states, “While treatment for gender dysphoria with gender-affirming hormones may impair fertility, this is not universal and may also be reversible.” (Antommaria decl, p. 19). While the statements of Drs. Adkins and Antommaria may be true for patients who have not had normal puberty blocked (and were therefore able to complete sexual

14 Estradiol is a type of estrogen. Endocrine Society Guidelines recommend raising estradiol levels to 100-200 pg/mL (Hembree, 2017). The normal adult male estradiol range is 7.7-42.6 pg/mL (Labcorp Estadiol, 2023).

15 Venous thromboembolism is a blood clot that develops in a deep vein and “can cause serious illness, disability, and in some cases, death” (CDC, 2022).

development), this is not the case for patients whose normal pubertal development has been altered by puberty blockers and opposite sex hormones.

156. This is because the effects of starting an adolescent on puberty blockers in early puberty (Tanner stage 2 or 3) and then adding opposite sex hormones on ultimate fertility are unknown. There is no evidence so far as to whether, for example, a patient's testicles would continue to develop normally in order to produce an ejaculate with healthy, mature sperm capable of fertilization under those circumstances.

> Dr. Antommaria further states that "[t]ransgender men and women are also capable of producing eggs and sperm respectively both during and after the discontinuation of gender-affirming hormone treatment." (Antommaria decl., pp. 19-20). This is not the case for patients taking GnRH analogues because, as mentioned previously, these agents cause hypogonadotropic hypogonadism which, by definition, stops sperm production in men and ovulation in females. Similarly, high dose testosterone in natal females will stop normal pituitary communication with the ovary and will also stop or interfere with menstrual cycles and ovulation.

D. Surgeries

157. The fourth stage of gender affirmative therapy is surgical alterations of the body of various kinds in an attempt to somehow mimic features of the opposite sex. This is also important to note because transition surgeries, in particular mastectomies, are being performed on minors throughout the country.

158. Although endocrinologists do not typically perform surgery, we do refer patients for surgeries and need to be aware of the risks, benefits, complications, and long term outcomes.

159. Individual surgical procedures can be a complex topic. It is helpful to first step back and consider conceptually what any surgery can and cannot accomplish.

160. In its basic form surgery is subtractive. In other words, a portion of tissue, an organ or organs are removed in order to restore health. For example, a diseased gallbladder may be surgically removed to help the patient get back to wellness. An infected appendix may be surgically removed to prevent worsening infection or even death. In both of these cases an unhealthy body part is surgically removed in order to restore health.

161. In some cases a diseased tissue or organ is removed so that a foreign replacement part may be substituted for an unhealthy organ or tissue. For example, a diseased heart valve may

be replaced with a pig valve or a prosthetic heart valve. Another example is a failed liver may be replaced by liver transplant.

162. Though modern surgical techniques and procedures are astounding, there are very noteworthy limitations. Importantly, surgery cannot de novo create new organs. If a person's kidneys fail, the surgeon has no scientific method for creating a new set of kidneys that can be implanted or grown within the patient. This conceptual background is helpful when considering various gender affirming surgeries.

163. There are a variety of gender affirming surgeries for females. These may include mastectomies, metoidioplasty, and phalloplasty.

1. Mastectomy

164. Mastectomies are the surgical removal of the breasts. The procedure is used in GAT in an attempt to make the chest appear more masculine. The surgery results in a permanent loss of the ability to breastfeed and significant scarring of 7 to 10 inches. The scars are prone to widening and thickening due to the stresses of breathing and arm movement. Other potential complications include the loss of normal nipple sensation and difficulties with wound healing (American Cancer Society, 2022).

165. It is important to note that this operation cannot be reversed. The female will never regain healthy breasts capable of producing milk to feed a child (Mayo Clinic, Top Surgery, 2022).

166. Another important consideration is that compared to the removal of an unhealthy gallbladder or appendix, in the case of gender dysphoria the breasts are perfectly healthy and there is no organic disease process such as a cancer warranting their removal.

2. GAT Surgeries on the Male

167. GAT surgeries for the male include removal of the testicles alone to permanently lower testosterone levels. This is by nature a sterilizing procedure. Further surgeries may be done in an attempt to create a pseudo-vagina which is called vaginoplasty. In this procedure, the penis is surgically opened and the erectile tissue is removed. The skin is then closed and inverted into a newly created cavity in order to simulate a vagina. A dilator must be placed in the new cavity for some time so that it does not naturally close.

168. Potential surgical complications may include urethral strictures, infection, prolapse, fistulas and injury to the sensory nerves with partial or complete loss of erotic sensation (Mayo Clinic, Feminizing Surgery, 2022).

3. GAT Surgeries of the Female Pelvis and Genitalia

169. Other types of surgery for females include those of the genitalia and reproductive tract. For example, the ovaries, uterus, fallopian tubes, cervix and the vagina may be surgically removed. Removal of the ovaries results in sterilization.

170. Importantly, removing female body parts does not produce a male. Rather, the female has had sex specific organs permanently destroyed with no hope of replacement, while remaining biologically female.

171. There have also been attempts to create a pseudo-penis. This procedure is known as phalloplasty. It is not possible to de novo create a new human penis. Instead, a roll of skin and subcutaneous tissue is removed from one area of the body, say the thigh or the forearm, and transplanted to the pelvis. An attempt is made to extend the urethra or urinary tract for urination through the structure. This transplanted tissue lacks the structures inherent in the male penis which allow for erection, therefore erectile devices such as rods or inflatable devices are placed within the tube of transplanted tissue in order to simulate erection (Hembree, 2017). The labia may also be expanded to create a simulated scrotum containing prosthetic objects to provide the appearance of testicles.

172. Complications may include urinary stricture, problems with blood supply to the transplanted roll of tissue, large scarring to the forearm or thigh, infections including peritonitis, and possible injury to the sensory nerve of the clitoris (Mayo Clinic, Masculinizing Surgery, 2022). A recent systematic review and meta-analysis of 1731 patients who underwent phalloplasty found very high rates of complications (76.5%) including a urethral fistula rate of 34.1% and urethral stricture rate of 25.4% (Wang, 2022).

III. The Lack of Evidence Supporting Gender-Affirming Therapy

173. There is not a medical consensus supporting the use of puberty blockers and cross-sex hormones for the treatment of gender dysphoria. In my opinion, there is insufficient evidence to conclude that any benefit of such treatment would outweigh the harm, particularly given the evidence of a rapid rise in cases of youth gender dysphoria, the high rates of coexisting mental health comorbidities, and naturally high rates of desistance.

A. The WPATH and The Endocrine Society

174. WPATH's Standards of Care 7 were produced over a decade ago in 2011. They were prepared within their advocacy organization and are purported to be a "professional

consensus about the psychiatric, psychological, medical, and surgical management of gender dysphoria." (WPATH, 2022). However, the "professional consensus" exists only within the confines of its organization. Furthermore, their Standards of Care 7, unlike the Endocrine Society's guidelines, do not have a grading system for either the strength of their recommendations or the quality of the evidence presented.

175. Dr. Adkins references the Endocrine Society's 2017 guidelines to support the Assertion that ES has published "widely accepted guidelines for treating gender dysphoria." (Adkins decl, p. 6). However, the Endocrine Society never claimed that their guidelines were to be considered standard of care. Quite the opposite, the Endocrine Society states that their "guidelines cannot guarantee any specific outcome, nor do they establish a standard of care." (Hembree et al, 2017, p. 3895).

176. With respect to the makeup of authors of the ESG, nine out of ten authors were members of WPATH or worked on WPATH's scientific committees. Seven of those nine had at some time been in WPATH leadership including the WPATH presidency and board of directors.

177. In fact, with respect to the Endocrine Society's guidelines, the quality of evidence for the treatment of adolescents is rated "very low-quality evidence" and "low quality evidence". "The quality of evidence for [puberty blocking agents] is noted to be low. In fact, all of the evidence in the guidelines with regard to treating children/adolescents by [gender affirmative therapy] is low to very low because of the absence of proper studies." (Laidlaw et al., 2019).

178. Unlike some other recommendations for adolescent GAT, the Endocrine Society's guidelines do not include any grading of the quality of evidence specifically for their justification of laboratory ranges of testosterone or estrogen or for adolescent mastectomy or other surgeries.

179. Endocrinologists W. Malone and P. Hruz and colleagues have written critically of the Endocrine Society's (ES) guidelines: "Unlike standards of care, which should be authoritative, unbiased consensus positions designed to produce optimal outcomes, practice guidelines are suggestions or recommendations to improve care that, depending on their sponsor, may be biased. In addition, the ES claim of effectiveness of these interventions is at odds with several systematic reviews, including a recent Cochrane review of evidence, and a now corrected population-based study that found no evidence that hormones or surgery improve long-term psychological well-being. Lastly, the claim of relative safety of these interventions ignores the growing body of

evidence of adverse effects on bone growth, cardiovascular health, and fertility, as well as transition regret." (Malone et al., 2021) (footnotes omitted).

180. In June of 2022, the Endocrine Society published "Enhancing the Trustworthiness of the Endocrine Society's Clinical Practice Guidelines" (McCartney et al., 2022). They wrote "In an effort to enhance the trustworthiness of its clinical practice guidelines, the Endocrine Society has recently adopted new policies and more rigorous methodologies for its guideline program." (Id.) They relate that in 2019, the ECRI Guidelines Trust "asked the Society for permission to include its guidelines in the ECRI Guidelines Trust database". However, after an evaluation by ECRI, the guideline related to osteoporosis "was the only guideline for which all recommendations were based on verifiable systematic evidence review with explicit descriptions of search strategy, study selection, and evidence summaries" (Id.). Therefore, we can conclude that with regard to the recommendations from the ESG 2017 on Gender Dysphoria/Gender Incongruence not all recommendations were "based on verifiable systematic evidence review with explicit descriptions of search strategy, study selection, and evidence summaries". Furthermore, these ESG 2017 were highly subject to conflicts of interest. As related earlier, nine out of the 10 authors were members or worked on the scientific committees of the advocacy group WPATH. Additionally, the ESG 2017 document was endorsed by WPATH. The "Enhancing Trustworthiness" article recommends the opposite composition of authors for guidelines: "A majority (>50%) of non-Chair GDP members must be free of relevant C/DOI [conflict/duality of interest]" (McCartney et al., 2022).

181. Further problems with the Endocrine Society's guidelines are highlighted in a recent BMJ Investigation article. It reads "Guyatt, who co-developed GRADE, found 'serious problems' with the Endocrine Society guidelines, noting that the systematic reviews didn't look at the effect of the interventions on gender dysphoria itself, arguably 'the most important outcome.' He also noted that the Endocrine Society had at times paired strong recommendations—phrased as 'we recommend'—with weak evidence. In the adolescent section, the weaker phrasing 'we suggest' is used for pubertal hormone suppression when children 'first exhibit physical changes of puberty'; however, the stronger phrasing is used to 'recommend' GnRHa treatment. 'GRADE discourages strong recommendations with low or very low quality evidence except under very specific circumstances,' Guyatt told The BMJ. Those exceptions are 'very few and far between'" (Block, 2023).

182. In my opinion, neither WPATH7 nor the Endocrine Society's guidelines provide a standard of care that any physician should follow.

B. WPATH Standards of Care 8 is Flawed and Inherently Dangerous to Tennessee Youth

183. WPATH Standards of Care 8 (SOC 8) were published Sep. 6, 2022 (Coleman et al., 2022) and are endorsed by Dr. Adkins along with the Endocrine Society guidelines as "widely accepted" and "the best evidenced-based practice guidelines available for treating this condition." (Adkins decl, p. 6). However there are multiple serious problems with this document such that any clinician who follows its recommendations puts the youth of Tennessee at great risk.

184. In a correction to the SOC 8, all guidelines for minimum age of opposite sex hormones were removed (Correction IJTH, 2022). All guidelines for minimum age of surgery were also removed, meaning a minor of any age could be referred for any of the GAT surgeries listed previously (Id.).

185. The correction reads: "On page S258, the following text was removed:

'The following are suggested minimal ages when considering the factors unique to the adolescent treatment time frame for gender-affirming medical and surgical treatment for adolescents, who fulfil all of the other criteria listed above.

– Hormonal treatment: 14 years

– Chest masculinization: 15 years

– Breast augmentation, Facial Surgery: 16 years

– Metoidioplasty, Orchiectomy, Vaginoplasty,

– Hysterectomy, Fronto-orbital remodeling: 17 years

– Phalloplasty: 18 years'" (WPATH SOC 8 Correction, p. S261).

186. Of great concern is that the minimum age recommendations were retracted, it appears, in contradiction to the recommendation of their own expert consensus:

"On page S66, the following text was removed:

'Age recommendations for irreversible surgical procedures were determined by a review of existing literature and the expert consensus of mental health providers, medical providers, and surgeons highly experienced in providing care to TGD adolescents.'" [emphasis added] (WPATH SOC 8 Correction, p. S260).

> Naturally, to remove age limits for hormones and surgeries which have life altering physical consequences should be done with the primary goal of obtaining the best possible health outcome for each patient. This should also be done with solid research and long-term studies justifying these treatments for young, developing persons.
>
> However, WPATH's own statements show that liability and politics were their primary motivations. According to SOC8 author Dr. Tishleman the changes were made in order to help ensure that doctors would not be liable for malpractice suits if they deviated from their new standards (add ref). Additionally, WPATH's president said that to "propose" surgeries at newly set lower age recommendations would necessitate a "better political climate" (add ref).

187. Another concerning component of SOC 8 is a new chapter regarding eunuchs that gives recommendations for how to induce hypogonadism in men who have the eunuch "gender identity"[16] by either orchiectomy [testicle removal] or chemical castration such as with GnRH analogues (Coleman et al., 2022)[17].

188. The SOC8 also used an aberrant form of the GRADE approach for systematic reviews that removed the grading of quality of evidence (which should be categorized as very low,

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16 The notion that there is a "eunuch gender identity" further invalidates the gender identity as a serious biological property of human beings: "Many eunuch individuals see their status as eunuch as their distinct gender identity with no other gender or transgender affiliation" (Coleman et al., 2022, p. S88).

17 "Treatment options for eunuchs to consider include:
• Hormone suppression to explore the effects of androgen deficiency for eunuch individuals wishing to become asexual, nonsexual,
or androgynous;
• Orchiectomy [testicle removal] to stop testicular production
of testosterone;
• Orchiectomy with or without penectomy to
alter their body to match their self-image;
• Orchiectomy followed by hormone replacement with testosterone or estrogen. " (Id.)

low, moderate, and high quality).[18] Instead any recommendation of "recommend" is automatically assigned as high quality of evidence. SOC 8 also failed to provide evidence profile tables which should include “an explicit judgment of each factor that determines the quality of evidence for each outcome" (Guyatt et al., 2021).

189. Such a modification of GRADE is explicitly recommended against in the referenced GRADE document[19] and in so doing, in my opinion, invalidates all of the SOC 8 recommendations as being evidence-based.

190. For at least the reasons above, in my professional opinion WPATH SOC 8 represents a grave and immediate danger to minors, young adults, and adults and should not be followed by any physician, mental health care provider, or other medical professional.

C. Dr. Antommaria's Faulty Comparison of GAT to CPR

191. Dr. Antommaria states that "[g]uidelines issued by other professional associations concerning pediatric medical care rely on similar quality evidence" and uses as an example "the American Heart Association’s (AHA’s) guideline for Pediatric Basic and Advanced Life Support" (Antommaria, p. 14).

192. Dr. Antommaria fails to recognize that the purpose and use of hormones and surgeries in GAT is fundamentally different than cardiopulmonary resuscitation for life support. Dr. Antommaria also fails to distinguish the experimental use of sex hormones in GAT for adolescents compared to the FDA approved usage of sex hormones as hormone replacement for hormone deficiencies (See also II.C.1).

193. The purpose of the American Heart Association's guideline is to restore normal “blood flow to vital organs” in order to "increase the likelihood of return of spontaneous

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18 From SOC 8 "The [recommendation] statements were classified as:
• Strong recommendations (“we recommend”) are for
those interventions/therapy/strategies where:
• the evidence is of high quality" (Id., p. S250).

19 From the GRADE guidelines: "Some organizations have used modified versions of the GRADE approach. We recommend against such modifications because the elements of the GRADE process are interlinked because modifications may confuse some users of evidence summaries and guidelines, and because such changes compromise the goal of a single system with which clinicians, policy makers, and patients can become familiar" (Guyatt et al., 2011).

circulation" (Topjian et al., 2020). In contrast to the restoration of normal function by the application of CPR, the purpose of the WPATH/Endocrine Society guideline for GAT is to intentionally disrupt normal endocrine function by generating the abnormal medical conditions of hypogonadotropic hypogonadism, hyperandrogenism, and hyperestrogenemia. It also advocates for the removal of healthy organs such as breasts, testicles, ovaries, penises, vaginas and uteruses in order to render these organs non-functional.

194. The purpose of chest compressions and the requirements of high-quality CPR are no different for adults compared to children and adolescents. The purpose of both are to "restore blood flow" to vital organs such as the heart and brain.[20] Likewise, what constitutes high-quality CPR (components such as proper rate and depth of chest compressions and avoiding overventilation) are the same in adults as they are in children and adolescents. Because the mechanisms of cardiopulmonary function are similar in adults and children it is logically inferred that the techniques used for CPR in adults will be fairly similar and have relatively similar effects in children and adolescents. Therefore guidelines of lower quality evidence in children and adolescents for CPR are acceptable because the purpose, what constitutes high quality CPR, and the ultimate outcomes are similar for both.

D. Flawed studies based on the problematic 2015 US Transgender Survey

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20 Pediatic guideline:
"High-quality CPR generates blood flow to vital organs and increases the likelihood of return of spontaneous circulation (ROSC). The 5 main components of high-quality CPR are (1) adequate chest compression depth, (2) optimal chest compression rate, (3) minimizing interruptions in CPR (ie, maximizing chest compression fraction or the proportion of time that chest compressions are provided for cardiac arrest), (4) allowing full chest recoil between compressions, and (5) avoiding excessive ventilation.
" (Topjian et al., 2020).

Adult guideline:
"For any cardiac arrest, rescuers are instructed to call for help, perform CPR to restore coronary and cerebral blood flow" (Panchal et al., 2020).
"A number of key components have been defined for high-quality CPR, including minimizing interruptions in chest compressions, providing compressions of adequate rate and depth, avoiding leaning on the chest between compressions, and avoiding excessive ventilation" (Id.).

195. There is much additional evidence that questions the long-term benefits of opposite sex hormones and gender reassignment surgery and in fact suggests serious harms.

196. I've already discussed the negative long-term risks in the De Vries studies as a pathway to sterilization and other damages from hormones.

197. The Smith et al. study of 2005 contained initially "325 consecutive adolescent and adult applicants for sex reassignment". However only 222 started hormone therapy and 34 dropped out of treatment altogether. The study states that "Only data of the 162 adults were used to evaluate treatment" and not adolescents. So the study had a high drop-out rate and the limited remaining results were only applicable to adults.

198. With respect to the Turban et al. 2022 study, it was not a randomized controlled study nor a prospective observational study. Rather the study relied upon the 2015 US Transgender Survey (USTS), which has been severely criticized for its serious limitations and weaknesses.

199. D'Angelo et al. have written about the 2015 USTS survey as part of the criticism of another flawed study in the journal Pediatrics by Jack Turban in 2020 titled "Pubertal Suppression for Transgender Youth and Risk of Suicidal Ideation" (Turban, 2020). They write in their critique of the USTS that it is "a convenience sampling, a methodology which generates low-quality, unreliable data." (Bornstein, Jager, & Putnick, 2013). Specifically, the participants were recruited through transgender advocacy organizations and subjects were asked to 'pledge' to promote the survey among friends and family. This recruiting method yielded a large but highly skewed sample. Their analysis is compromised by serious methodological flaws, including the use of a biased data sample, reliance on survey questions with poor validity, and the omission of a key control variable, namely subjects' baseline mental health status." They also state that "[s]tigmatizing non-'affirmative' psychotherapy for GD [gender dysphoria] as 'conversion' will reduce access to treatment alternatives for patients seeking non-biomedical solutions to their distress." (D'Angelo et al., 2021).

200. Other published studies of GAT have been shown to have serious errors. For example, a major correction was issued by the American Journal of Psychiatry. The authors and editors of a 2020 study, titled "Reduction in mental health treatment utilization among transgender individuals after gender-affirming surgeries: a total population study" (Bränström study, 2020) retracted their original primary conclusion. Letters to the editor by twelve authors including myself led to a reanalysis of the data and a corrected conclusion stating that in fact the data showed no

improvement in mental health for transgender identified individuals after surgical treatment nor was there improvement with opposite sex hormones (“Correction”, 2020; Van Mol et al., 2020).

201. The initial reports of this study claimed that the authors found treatment benefits with surgery, and this was shared widely in the media. For example, ABC News posted an article titled "Transgender surgery linked with better long-term mental health, study shows" (Weitzer, 2019). An NBC news/Reuters headline reads "Sex-reassignment surgery yields long-term mental health benefits, study finds" (Reuters, 2019).

202. However, after twelve authors from around the world (including our team) investigated the study in detail, a number of serious errors were exposed leading to a retraction (Kalin, 2020; Anckarsäter et al., 2020).

203. In our letter to the editor which I co-wrote with former Chairman of Psychiatry at Johns Hopkins Medical School, Paul McHugh, MD, we noted key missing evidence in the original Branstrom report when compared to the previous body of knowledge yielded from the Swedish Dhejne study. We wrote that “[t]he study supports only weak conclusions about psychiatric medication usage and nothing decisive about suicidality. In overlooking so much available data, this study lacks the evidence to support its pro gender-affirmation surgery conclusion” (Van Mol, Laidlaw, et al., 2020).

204. In another letter, Professor Mikael Landen writes that “the authors miss the one conclusion that can be drawn: that the perioperative transition period seems to be associated with high risk for suicide attempt. Future research should use properly designed observational studies to answer the important question as to whether gender-affirming treatment affects psychiatric outcomes” (Landen, 2020).

205. In another letter to the editor, psychiatrist David Curtis noted that “[t]he study confirms the strong association between psychiatric morbidity and the experience of incongruity between gender identity and biological sex. However, the Branstrom study does not demonstrate that either hormonal treatment or surgery has any effect on this morbidity. It seems that the main message of this article is that the incidence of mental health problems and suicide attempts is especially high in the year after the completion of gender-affirming surgery” (Curtis, 2020).

206. In yet another critical letter, Dr. Agnes Wold states that "[w]hether these factors involve a causal relationship (i.e., that surgery actually worsens the poor mental health in individuals with gender dysphoria) cannot be determined from such a study. Nevertheless, the data

presented in the article do not support the conclusion that such surgery is beneficial to mental health in individuals with gender dysphoria" (Wold, 2020).

E. High Rates of Completed Suicide and Psychiatric Complications in GAT

207. The most comprehensive study of GAT of its kind is from Sweden in 2011. The authors examined data over a 30-year time period (Dhejne, 2011). The Dhejne team made extensive use of numerous Swedish database registries and examined data from 324 patients in Sweden over 30 years who had taken opposite sex hormones and had undergone sex reassignment surgery. They used population controls matched by birth year, birth sex, and reassigned sex. When followed out beyond ten years, the sex-reassigned group had nineteen times the rate of completed suicides and nearly three times the rate of all-cause mortality and inpatient psychiatric care compared to the general population of Sweden.

208. The recent study published by Chen and Olson-Kennedy et al. confirms the inherent danger of gender affirmative therapy found in the Dhejne study. The New England Journal of Medicine recently published "Psychosocial Functioning in Transgender Youth after 2 Years of Hormones" in which Dr. Johanna Olson-Kennedy is the principal investigator (Chen, Olson-Kennedy, et al., 2023). This arm of her study included 315 adolescents aged 12 to 20 years old who were taking high dose hormones of the opposite sex[21]. The study was not randomized and had

21 "[T]he US Department of Health and the Food and Drug Administration reference approximate age ranges for these phases of life, which consist of the following: (1) infancy, between birth and 2 years of age; (2) childhood, from 2 to 12 years of age; and (3) adolescence, from 12 to 21 years of age. Additionally, Bright Futures guidelines from the American Academy of Pediatrics identify adolescence as 11 to 21 years of age, dividing the group into early (ages 11–14 years), middle (ages 15–17 years), and late (ages 18–21 years) adolescence. The American Academy of Pediatrics has previously published a statement on the age limit of pediatrics in 1988, which was reaffirmed in 2012 and identified the upper age limit as 21 years with a note that exceptions could be made when the pediatrician and family agree to an older age, particularly in the case of a child with special health care needs. Recent research has begun to shed more light on the progression of mental and emotional development as children progress through the adolescent years into young adulthood. It is increasingly clear that the age of 21 years is an arbitrary demarcation line for adolescence because there is increasing evidence that brain development has not reliably reached adult levels of functioning until well into the third decade of life" (Hardin, 2017).

no control group. The authors report that 2 out 315 subjects died by suicide. The authors also report "The most common adverse event was suicidal ideation" in 11 subjects.

209. Unfortunately, unlike the Dhejne study, the Olson-Kennedy study provides little other useful data about outcomes such as psychiatric hospitalizations, suicide attempts, or rates of comorbid psychiatric illness. The death by suicide of 2 out of 315 subjects equates to approximately 317 suicide deaths per 100,000 patient-years. If we compare this figure to that of the UK's largest gender identity service, Tavistock, the "annual suicide rate is calculated as 13 per 100,000" patient-years (Biggs, 2021). The death-by-suicide rate was approximately 24 times higher in Dr. Olson-Kennedy's study compared to the much larger Tavistock Clinic. In fact, Professor Biggs reports that two of the four suicide deaths from the Tavistock data were of patients who were on the waiting list and "would not have obtained treatment" (Id.). This strongly suggests that the use of high dose opposite sex hormones in Dr. Olson-Kennedy's study was associated with a much higher death rate. NIH produced the consent forms related to this study pursuant to a FOIA request my colleague submitted. I have reviewed them. Unfortunately, of the many side effects of hormone therapy listed on the study's consent forms, death by suicide (or by any cause) is not listed and was not disclosed to participants.

210. These facts would be useful to know to determine how high-dose opposite hormones and gender affirmative therapy affect overall health and their association with death by suicide. All of the data collected to date in Dr. Olson-Kennedy's publicly funded study the "The Impact of Early Medical Treatment in Transgender Youth" should be released to the public so that other researchers and clinicians can determine how puberty blockers, opposite sex hormones, and mastectomy surgeries affect adolescent physical and mental health.

211. While it is true that patients suffering from gender dysphoria have higher rates of suicidal ideation and completed suicide than the general population, studies have not definitively shown that providing hormones reduces rates of suicide, and in fact those interventions may be associated with increased rates.

F. An Increase in Cases of Gender Dysphoria

212. Gender Dysphoria has been a relatively rare condition in children and adolescents. However there have been very significant increases in referrals for this condition noted around the globe.

213. For example, in the UK, "The number of referrals to GIDS [Gender Identity Development Service] has increased very significantly in recent years. In 2009, 97 children and young people were referred. In 2018 that number was 2519" (Bell v Tavistock Judgment, 2020). There is evidence that this increase may be in part due to social contagion and fueled by social media/internet use (Littman, 2018).

214. The French National Academy of Medicine wrote recently: "Parents addressing their children's questions about transgender identity or associated distress should remain vigilant regarding the addictive role of excessive engagement with social media, which is both harmful to the psychological development of young people and is responsible for a very significant part of the growing sense of gender incongruence" (SEGM, 2022).

215. In "a study of the Finnish gender identity service, '75% of adolescents [assessed] had been or were currently undergoing child and adolescent psychiatric treatment for reasons other than gender dysphoria' (Kaltiala-Heino, 2015). In fact, '68% had their first contact with psychiatric services due to other reasons than gender identity issues.' The same study also showed that 26% percent had an autistic spectrum disorder and that a disproportionate number of females (87%) were presenting to the gender clinics compared to the past" (Laidlaw in gdworkinggroup.org, 2018).

G. Desistance

216. Desistance is a term indicating that the child, adolescent, or adult who initially presented with gender incongruence has come to experience a realignment of their internal sense of gender and their physical body. "Children with [gender dysphoria] will outgrow this condition in 61% to 98% of cases by adulthood. There is currently no way to predict who will desist and who will remain dysphoric" (Laidlaw et al., 2019; Ristori & Steensma, 2016).

217. Because there is no physical marker to diagnose gender dysphoria, and because it is not possible to predict which child or adolescent will desist, it is not possible to know which young person will remain transgender identified as adults. Also, because the rate of desistance is so high, gender affirmative therapy will necessarily cause serious and irreversible harm to many children and adolescents who would naturally outgrow the condition if not affirmed.

218. Dr. Turban states "Once a transgender youth begins puberty, it is rare for them to later identify as cisgender." (Turban decl, p. 12). However, his statement is contradicted by the evidence from the following studies.

219. Puberty, which pertains to the physical development of the reproductive tract, breasts, and associated secondary sex characteristics, can begin as early as age 8 in girls and age 9 in boys. The studies which have examined desistance involved adolescents and children aged twelve and under. For example, table 1 in Ristori and Steensma 2016 shows multiple studies involving minors. For the three most recent - Singh (2012), Wallien & Cohen-Kettenis (2008), and Drummond et al. (2008) - these involved age ranges from 3 to 12 years old.[22] The desistance rate varied from 61 to 88%. Since the upper age was twelve, this would include children in the age range of 8-12 years old, many of whom were already adolescents going through puberty based a knowledge of the ages of initiation of puberty and were therefore not pre-pubertal.[23] Therefore we can see that a high proportion of adolescents do in fact desist, contrary to what Dr. Turban has stated.

H. Mastectomy Surgery for Minors

220. Any serious look at long-term effects of surgical treatment would follow subjects out at least ten years. For example, an article was published recently examining patients who had mild calcium disorders due to a gland called the parathyroid. They compared a group of patients who had surgical removal of the parathyroid to a control group who had not. They examined data ten years after surgery was completed and concluded that parathyroid surgery in this group "did not appear to reduce morbidity or mortality" in that patient group (Pretorius, 2022).

221. To my knowledge there exists no comparable studies of minors with gender dysphoria comparing those who had mastectomy surgery to a control group who had not. There are also no known studies of minors followed for 10 years or more to determine the long-term risks and benefits of mastectomy for gender dysphoria.

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22 "This study provided information on the natural histories of 25 girls with gender identity disorder (GID). Standardized assessment data in childhood (mean age, 8.88 years; range, 3-12 years)" (Drummond et al., 2008). "We studied 77 children who had been referred in childhood to our clinic because of gender dysphoria (59 boys, 18 girls; mean age 8.4 years, age range 5-12 years)" (Wallien et al., 2008). " Standardized assessment data in childhood (mean age, 7.49 years; range, 3–12 years) and at follow-up (mean age, 20.58 years; range, 13–39 years) were used to evaluate gender identity and sexual orientation outcome. At followup, 17 participants (12.2%) were judged to have persistent gender dysphoria." (Singh, 2012).

23 To my knowledge the desistance literature does not examine Tanner stages of puberty as part of their studies. However, one can infer based on the ages that many children had at least begun puberty (Tanner stage 2) or were at a more advanced stage of puberty

222. Good quality studies specifically showing that mastectomy surgery is safe, effective, and optimal for treating minors with gender dysphoria do not exist. For example, there is a study titled "Chest Reconstruction and Chest Dysphoria in Transmasculine Minors and Young Adults Comparisons of Nonsurgical and Postsurgical Cohorts" (Olson-Kennedy, 2018). The study authors conclude that "[c]hest dysphoria was high among presurgical transmasculine youth, and surgical intervention positively affected both minors and young adults." However, there are a number of problems with this study. First, the term "chest dysphoria" is a creation of the study authors and is not found as a diagnosis or even referenced in the DSM-5. Second the "chest dysphoria scale" is a measuring tool created by the authors, but which the authors state "is not yet validated." (*Id*., p. 435) Third, the mastectomies were performed on girls as young as 13 and 14 years old and who thereby lacked the maturity and capacity of good judgment for truly informed consent for this life altering procedure. For this reason, in my professional opinion, the research and surgeries performed were flawed and unethical.

223. There exists another poorly designed study which suffers from similar methodological and ethical problems as the Olson-Kennedy study. A 2021 study published in Pediatrics examined females aged 13-21 recruited from a gender clinic. Thirty young females had mastectomy procedures and sixteen had not. The average age at surgery was 16.4 years (Mehringer, 2021). The follow up time after surgery was only 19 months and no data is provided or analyzed about key psychiatric information such as comorbid psychological illnesses, self-harming behaviors, psychiatric hospitalizations, psychiatric medication use, or suicide attempts.

224. Information returned from the study surveys were all qualitative and included responses such as "[My chest dysphoria] made me feel like shit, honestly. It made me suicidal. I would have breakdowns". Another respondent stated, "I've been suicidal quite a few times over just looking at myself in the mirror and seeing [my chest]. That's not something that I should have been born with" (Mehringer, 2021). The omission of psychiatric data is a major flaw in the study and also irresponsible given the obviously dangerous psychological states that some of these young people were in.

225. Since such a high proportion of subjects were using testosterone (83%), some of the responses could be attributed to adverse effects of testosterone. For example, as related earlier, high dose testosterone can manifest in irritability and aggressiveness. One study subject responded, "I get tingly and stuff and it kind of makes me want to punch something" (Mehringer, 2022).

226. The testosterone labeling also indicates nausea and depression as adverse reactions which are described by another study subject “There’s a feeling of hopelessness, of desperation, of—almost makes me feel physically sick" (Actavis Pharma, Inc., 2018; Mehringer, 2022).

227. The study appears to have been designed, at least in part, to justify insurance companies paying for mastectomy procedure for minors with GD, even though they have provided no long-term statistical evidence of benefit: "These findings...underscore the importance of insurance coverage not being restricted by age" (Mehrniger, 2021). This also appears to be part of the aim of the flawed Olson-Kennedy study which stated “changes in clinical practice and in insurance plans’ requirements for youth with gender dysphoria who are seeking surgery seem essential” (Olson-Kennedy, 2018). So these two studies, rather than being a thorough examination of the psychological and physical risks and benefits of mastectomy surgery over the long-term appear instead to exist, at least in part, to validate the need for insurance companies to insure the costs of these dubious procedures for minors.

I. Centers for Medicare and Medicaid Services

228. The Centers for Medicare and Medicaid Services (“CMS”) has found “inconclusive” clinical evidence regarding gender reassignment surgery. Specifically, the CMS Decision Memo for Gender Dysphoria and Gender Reassignment Surgery (CAG-00446N) (June 19, 2019) states: “The Centers for Medicare & Medicaid Services (CMS) is not issuing a National Coverage Determination (NCD) at this time on gender reassignment surgery for Medicare beneficiaries with gender dysphoria because the clinical evidence is inconclusive for the Medicare population.”

J. Nations and States Question and Reverse Course on GAT

229. Dr. Adkins and Dr. Janssen describe the WPATH “standards of care” and Endocrine Society guidelines as “widely accepted” in the medical community. (Adkins decl., p. 6; Janssen decl., p. 10). However, numerous nations are questioning and reversing course on the WPATH/Endocrine Society’s low-quality gender affirmative therapy guidelines. For example, in the *Bell v. Tavistock* Judgment in the UK, regarding puberty blockers used in GAT, they concluded that “there is real uncertainty over the short and long-term consequences of the treatment with very limited evidence as to its efficacy, or indeed quite what it is seeking to achieve. This means it is, in our view, properly described as experimental treatment.” (*Bell v. Tavistock* Judgment, 2020).

230. The case was appealed and, although the medical decision making was returned to clinicians (rather than the courts), it was noted that great pains should be taken to ensure that the child and parents are properly informed before embarking on such treatments. In its conclusion, the appeals court stated that "[c]linicians will inevitably take great care before recommending treatment to a child and be astute to ensure that the consent obtained from both child and parents is properly informed by the advantages and disadvantages of the proposed course of treatment and in the light of evolving research and understanding of the implications and long-term consequences of such treatment. Great care is needed to ensure that the necessary consents are properly obtained." (*Bell v. Tavistock* Appeal, Judgment, 2021).

231. In the bulletin of the Royal College of Psychiatrists in 2021, a reevaluation of the evidence, Griffin and co-authors wrote, "As there is evidence that many psychiatric disorders persist despite positive affirmation and medical transition, it is puzzling why transition would come to be seen as a key goal rather than other outcomes, such as improved quality of life and reduced morbidity. When the phenomena related to identity disorders and the evidence base are uncertain, it might be wiser for the profession to admit the uncertainties. Taking a supportive, exploratory approach with gender-questioning patients should not be considered conversion therapy." (Griffin et al., 2021).

232. In 2020, Finland recognized that "[r]esearch data on the treatment of dysphoria due to gender identity conflicts in minors is limited," and recommended prioritizing psychotherapy for gender dysphoria and mental health comorbidities over medical gender affirmation (Council for Choices in Healthcare in Finland, 2020). Additionally, "[s]urgical treatments are not part of the treatment methods for dysphoria caused by gender-related conflicts in minors." (Id.)

233. In 2021, Sweden's largest adolescent gender clinic announced that it would no longer prescribe puberty blockers or cross-sex hormones to youth under 18 years outside clinical trials (SEGM, 2021). "In December 2019, the SBU (Swedish Agency for Health Technology Assessment and Assessment of Social Services) published an overview of the knowledge base which showed a lack of evidence for both the long-term consequences of the treatments, and the reasons for the large influx of patients in recent years. These treatments are potentially fraught with extensive and irreversible adverse consequences such as cardiovascular disease, osteoporosis, infertility, increased cancer risk, and thrombosis. This makes it challenging to assess the risk / benefit for the individual patient, and even more challenging for the minors or their guardians to

be in a position of an informed stance regarding these treatments." (Gauffen and Norgren, 2021). In 2022, the SBU stated, “The scientific basis is not sufficient to assess effects on gender dysphoria, psychosocial conditions, cognitive function, body measurements, body composition or metabolism of puberty-inhibiting or gender-opposite hormone treatment in children and adolescents with gender dysphoria.” (SBU, 2022). In 2023, a Swedish literature review concluded that the “long-term effects of hormone therapy on psychosocial and somatic health are unknown, except that GnRHa treatment seems to delay bone maturation and gain in bone mineral density.” The study emphasized various methodological weaknesses and the lack of randomized controlled trials and long-term studies regarding the outcomes of GAT for gender dysphoria. (Ludvigsson, 2023.)

234. Dr. Hilary Cass "was appointed by NHS England and NHS Improvement to chair the Independent Review of Gender Identity Services for children and young people in late 2020” (The Cass Review website, 2022). In her interim report dated February 2022, it states that “[e]vidence on the appropriate management of children and young people with gender incongruence and dysphoria is inconclusive both nationally and internationally” (Cass, 2022). This led to the shutting down of their Tavistock child gender identity clinic.

235. In the nation of Norway, a report from the Norwegian Healthcare Investigation Board (Ukom) was released in March of this year. The report found “there is insufficient evidence for the use of puberty blockers and cross sex hormone treatments in young people, especially for teenagers who are increasingly seeking health services and being referred to specialist healthcare. Ukom defines such treatments as utprøvende behandling, or 'treatments under trial,' said Moen" (Block,"Norway", 2023).

236. In the State of Florida, effective March 6, 2023, the Florida Board of Medicine amended its "Standards of Practice for Medical Doctors" to include the following:

> "64B8-9.019 Standards of Practice for the Treatment of Gender Dysphoria in Minors.
>
> (1) The following therapies and procedures performed for the treatment of gender dysphoria in minors are prohibited.
>
> (a) Sex reassignment surgeries, or any other surgical procedures, that alter primary or secondary sexual characteristics.
>
> (b) Puberty blocking, hormone, and hormone antagonist therapies."

IV. Medical Concerns regarding the Three Minor Plaintiffs

A. L.W.

237. [redacted]

238. [redacted]

239. [redacted]

240. [redacted]

241. [redacted]

242. [redacted]

243. [redacted]

244. [redacted]

245. [redacted]

246. [redacted]

247. [redacted]

248. [redacted]

249. [redacted]

250. [redacted]

251. [redacted]

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255.

[24] "Most common related adverse reactions (>10%) in clinical trials were hot flashes/sweats, headache/migraine, decreased libido, depression/emotional lability, dizziness, nausea/vomiting, pain, vaginitis and weight gain." (Lupron Depot-Ped, 2022).

[redacted]

256. [redacted]

a. [redacted]

b. [redacted]

c. [redacted]

d. [redacted]

257. [redacted]

[25] In L.W.'s case, estrogen could be titrated down over the course of a few weeks. Lupron could be stopped immediately as it may take 6-18 months or longer for the pituitary gonadal axis to return to normal functioning.

B. Ryan Roe

258. [redacted]

259. [redacted]

260. [redacted]

261. [redacted]

262. [redacted]

263. [redacted]

[redacted]

264. [redacted]

265. [redacted]

266. [redacted]

267. [redacted]

268. [redacted]

269. [redacted]

270. [redacted]

[redacted]

271. [redacted]

272. [redacted]

273. [redacted]

274. [redacted]

275. [redacted]

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[redacted]

277. [redacted]

278. [redacted]

279. [redacted]

280. [redacted]

281. [redacted]

282. [redacted]

283. [redacted]

284. [redacted]

285. [redacted]

286. [redacted]

287. [redacted]

288. [redacted]

C. John Doe

289. [redacted]

290. [redacted]

291. [redacted]

[26] [redacted]

292. [redacted]

293. [redacted]

294. [redacted]

295. [redacted]

296. [redacted]

297. [redacted]

[redacted]

298. [redacted]

[redacted]

V. Risks of GAT Outweigh the Benefits for the Three Minor Plaintiffs

299. [redacted]

[redacted]

VI. Conclusion

[27] As of this writing, only limited medical records of the three plaintiffs are available for review.

300. The gender affirmative therapy model suffers from serious deficiencies in logic and lacks scientific foundation. The deep error hidden in this model is that one cannot in fact change sex. One cannot acquire the deep characteristics of biological sex in order to gain the complete sexual and reproductive functions of the opposite sex. This is not technologically possible.

301. Children and adolescents are of such immature minds that they are likely to believe that it is possible. In fact they may come to believe that their inherent, biologically necessary puberty is "terrifying" or needs to be stopped. Social transition serves to convince the child or adolescent that they can be the opposite sex. Puberty blockers sustain this state of mind by retaining a childlike state with respect to the genitalia and body habitus. High dose opposite sex hormones then cause medical conditions such as hirsutism and irreversible damage to the vocal cords in females and gynecomastia in males. These conditions serve to convince the young person that they are going through puberty of the opposite sex when in fact they are not developing sexually and are infertile.

302. There are known risks for both adults and minors, some of which I have described above, including cardiovascular disease, cancer, deficiencies in ultimate bone density, harms to sexual function, infertility, and for some permanent sterility. The child or adolescent cannot consent to these harms when they are not mature enough to fully comprehend what they mean. Long-term studies regarding the treatment effects specifically for minors with hormones and surgeries, using randomized controlled studies or even proper observational studies do not exist.

303. WPATH's newly released SOC 8 represents a grave and immediate danger to minors, young adults, and adults and should not be followed by any physician, mental health care provider, or other medical professional.

304. For the reasons set forth above, in my professional opinion as an endocrinologist, no child or adolescent should receive puberty blockers to block normal puberty, nor should they receive supraphysiologic doses of opposite sex hormones to attempt to alter secondary sex characteristics, nor should they have surgeries to remove or alter the breasts, genitalia or reproductive tracts as part of GAT. There exists insufficient evidence of benefit, but serious concerns for risk of harm. Therefore, I believe that the newly enacted Tenn. Code Ann. § 68-33-101, *et seq*., is based on sound medical principles for the protection of minors.

I declare, pursuant to 28 U.S.C. § 1746, under penalty of perjury that the foregoing is true and correct. Executed 5/19/2023.

Michael K. Laidlaw, M.D.

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Michael K. Laidlaw, M.D.
Endocrinology, Diabetes, and Metabolism
5180 Grove St.
Rocklin, CA 95677
Office: (916) 315-9100
Fax: (916) 315-0141
docdrlaidlaw@gmail.com

EMPLOYMENT

2006-Present	Michael K Laidlaw, MD Inc. Private Practice – Endocrinology, Diabetes, and Metabolism. Rocklin, CA

EDUCATION

2004-2006	Endocrinology and Metabolism Fellowship - Los Angeles County/University of Southern California Keck School of Medicine
2001-2004	Internal Medicine Residency - Los Angeles County/University of Southern California Keck School of Medicine
1997-2001	University of Southern California Keck School of Medicine Doctor of Medicine Degree May 2001
1990-1997	San Jose State University Bachelor of Science Degree in Biology with a concentration in Molecular Biology, Cum Laude

LICENSURE

California Medical License – Physician and Surgeon: # A81060: Nov 6, 2002. Exp 5/31/2024.

PROFESSIONAL AFFILIATIONS

Endocrine Society 2006-2023
American Board of Internal Medicine - Endocrinology, Diabetes, and Metabolism – 2006
American Board of Internal Medicine - Internal Medicine - 2005
National Board of Physicians and Surgeons - Endocrinology, Diabetes, & Metabolism 2018-2024
National Board of Physicians and Surgeons - Internal Medicine 2018-2024

HONORS AND RECOGNITION

2010	Endocrine Society Harold Vigersky Practicing Physician Travel Award
2004-2005	Vice President - Joint Council of Interns and Residents
2002-2004	Council Member – Joint Council of Interns and Residents
1996, 1997	Dean's Scholar, San Jose State University
1995	Golden Key National Honor Society

RESEARCH AND PUBLICATIONS

2021 Publication – Michael K Laidlaw, Andre Van Mol, Quentin Van Meter, Jeffrey E Hansen. Letter to the Editor from M Laidlaw et al.: "Erythrocytosis in a Large Cohort of Trans Men Using Testosterone: A Long-Term Follow-Up Study on Prevalence, Determinants, and Exposure Years." The Journal of Clinical Endocrinology & Metabolism, Volume 106, Issue 12, December 2021, Pages e5275–e5276, https://doi.org/10.1210/clinem/dgab514

2020 Publication – Van Mol A, Laidlaw MK, Grossman M, McHugh P. "Correction: Transgender Surgery Provides No Mental Health Benefit." Public Discourse, 13 Sep 2020. https://www.thepublicdiscourse.com/2020/09/71296/

2020 Publication – VanMol A, Laidlaw MK, Grossman M, McHugh P.. "Gender-affirmation surgery conclusion lacks evidence (letter)". Am J Psychiatry 2020; 177:765–766.

2020 Publication – Laidlaw MK. "The Pediatric Endocrine Society's Statement on Puberty Blockers Isn't Just Deceptive. It's Dangerous." Public Discourse. 13 Jan 2020. https://www.thepublicdiscourse.com/2020/01/59422/

2019 Speech to the U.K. House of Lords – Laidlaw MK. "Medical Harms Associated with the Hormonal and Surgical Therapy of Child and Adolescent Gender Dysphoria". Parliament, London, U.K. 15 May 2019.

2019 Publication – Laidlaw MK, Cretella M, Donovan K. "The Right to Best Care for Children Does Not Include the Right to Medical Transition". The American Journal of Bioethics. Volume 19. Published online 20 Feb 2019. 75-77. https://doi.org/10.1080/15265161.2018.1557288

2018 Publication – Laidlaw MK, Van Meter QL, Hruz PW, Van Mol A, Malone WJ. Letter to the Editor: "Endocrine Treatment of Gender-Dysphoric/Gender-Incongruent Persons: An Endocrine Society Clinical Practice Guideline." The Journal of Clinical Endocrinology & Metabolism, Volume 104, Issue 3, 1 March 2019, Pages 686–687, https://doi.org/10.1210/jc.2018-01925 (first published on-line 11/2018)

2018 Publication – Laidlaw MK. "The Gender Identity Phantom". gdworkinggroup.org, 24 Oct 2018. http://gdworkinggroup.org/2018/10/24/the-gender-identity-phantom/

2018 Publication – Laidlaw MK. "Gender Dysphoria and Children: An Endocrinologist's Evaluation of 'I am Jazz'". Public Discourse, 5 Apr 2018. https://www.thepublicdiscourse.com/2018/04/21220/

2013 Abstract – Poster presentation Jun 2013. Endocrine Society Annual Meeting. A 12 Step Program for the Treatment of Type 2 Diabetes and Obesity.

2011 Abstract – Poster presentation Nov 2011. Journal of Diabetes Science and Technology. A Video Game Teaching Tool for the Prevention of Type 2 Diabetes and Obesity in Children and Young Adults.

2011 Abstract – Journal of Diabetes Science and Technology. A Web-Based Clinical Software Tool to Assist in Meeting Diabetes Guidelines and Documenting Patient Encounters.

2008 Abstract - Accepted to Endocrine Society Annual Meeting 2008. Hypercalcemia with an elevated 1,25 dihydroxy-Vitamin D level and low PTH due to granulomatous disease.

2005-2006 Clinical Research - University of Southern California – Utility of Thyroid Ultrasound in the Detection of Thyroid Cancer. Study involving the use of color flow/power doppler ultrasound and ultrasound guided biopsy to detect the recurrence of thyroid cancer in patients with total thyroidectomies.

2005 Certification - Certification in Diagnostic Thyroid Ultrasound and Biopsy – AACE 2005

2003 Certification - Understanding the Fundamentals: Responsibilities and Requirements for the Protection of Human Subjects in Research. University of Southern California. 29 Sep 2003 - 29 Sep 2006

2002-2005 Clinical Research - University of Southern California - Determining the Role of Magnesium in Osteoporosis. Study involved collecting and analyzing patient data related to patient characteristics, laboratory results, bone mineral density exams, nutrition analysis, and genetic analysis in order to determine a link between magnesium deficiency and osteoporosis.

1996 Research Assistant - San Jose State University - Role of the suprachiasmatic nucleus pacemaker in antelope ground squirrels.

1995-1996 Research Assistant - San Jose State University/NASA. Acoustic tolerance test and paste diet study for space shuttle rats.

EXPERT WITNESS WORK AND AMICUS BRIEFS

2022-2023 Expert Witness – Laidlaw MK. United States District Court for the Northern District of Florida Tallahassee Division. AUGUST DEKKER, et al., Plaintiffs, v. SIMONE MARSTILLER, et al., Defendants. Case No. 4:22-cv-00325-RHMAF. Report October 3, 2022. Testified in court October 12, 2022. Expert Report February 17, 2023. Rebuttal March 10, 2023.

2022 Expert Witness Report – Laidlaw MK. C. P., by and through his parents, Patricia Pritchard and Nolle Pritchard; and PATRICIA PRITCHARD, Plaintiff, vs. BLUE CROSS BLUE SHIELD OF ILLINOIS, Defendants. Case No. 3:20-cv-06145-RJB

2022 Expert Witness Report – Laidlaw MK. DISTRICT COURT OF TRAVIS COUNTY, TEXAS 459th JUDICIAL DISTRICT. PFLAG, INC., ET AL., Plaintiffs, v. GREG ABBOTT, ET AL., Defendants. NO. D-1-GN-22-002569. 3 July 2022.

2022 Expert Witness Report #2 – Laidlaw MK. United States District Court for the District of Arizona. DH and John Doe, Plaintiffs, vs. Jami Snyder, Director of the Arizona Health Care Cost Containment System, in her official capacity, Defendant. Case No. 4:20-cv-00335-SHR. 24 Jun 2022. (Sealed under Protective Order).

2022 Expert Witness Report – Laidlaw MK. United States District Court for the Middle District of Alabama Northern Division. REV. PAUL A. EKNES-TUCKER, et al., Plaintiffs, v. KAY IVEY, in her official capacity as Governor of Alabama, et al., Defendants. Civil Action No. 2:22-cv-184-LCB. 2 May 2022.

2021 Brief of Amicus Curiae – Bursch, John J., McCaleb, Gary S., Van Meter, Quentin L., Laidlaw, Michael K., Van Mol, Andre, Hansen, Jeffrey E. Brief of Amicus Curiae. United States Court of Appeals for the Eight Circuit. DYLAN BRANDT, et al., Plaintiffs-Appellees v. LESLIE RUTLEDGE, in her official capacity as the Arkansas Attorney General, et. al. Defendants-Appellants. 23 Nov 2021.

2021 Expert Witness – JULIANA PAOLI v. JOSEPH HUDSON et al. heard in THE SUPERIOR COURT OF THE STATE OF CALIFORNIA, COUNTY OF TULARE. CASE NO. 279126. 2021.

2021 Brief of Amicus Curiae – Bursch, John J., McCaleb, Gary S., Grossman, Miriam, Van Meter, Quentin L., Laidlaw, Michael K., Van Mol, Andre, Hansen, Jeffrey E. Brief of Amicus Curiae. United States Court of Appeals for the Eleventh Circuit. DREW ADAMS, Plaintiffs-Appellee v. SCHOOL BOARD OF ST. JOHNS COUNTY, FLORIDA, et. al. Defendants-Appellant. 26 Oct 2021.

2020 Expert Witness Affidavit 1 & 2 – Laidlaw MK. Supreme Court of British Columbia. File No. S2011599, Vancouver Registry. Between A.M. Plaintiff and Dr. F and Daniel McKee Defendants. 11/23/20 & 11/25/20.

2020 Brief of Amicus Curiae – Wenger, Randal L., McCaleb, Gary S., Grossman, Miriam, Laidlaw, Michael K., McCaleb, Gary S., Van Meter, Quentin L., Van Mol, Andre. Brief of Amicus Curiae. United States Court of Appeals for the Ninth Circuit. LINDSAY HECOX and JANE DOE, with her next friends Jean Doe and John Doe, Plaintiffs-Appellees v. BRADLEY LITTLE, in his official capacity as Governor of the State of Idaho, et. al. Defendant-Appellant. 19 Nov 2020

2020 Expert Witness Report – Laidlaw MK. United States District Court for the District of Arizona. DH and John Doe, Plaintiffs, vs. Jami Snyder, Director of the Arizona Health Care Cost Containment System, in her official capacity, Defendant. Case No. 4:20-cv-00335-SHR. 27 Sep 2020.

2019 Expert Witness Affidavit – Laidlaw MK. Court of Appeal File No. CA45940, Vancouver Registry. B.C. Supreme Court File No. E190334, between A.B. Respondent/Claimant, and C.D. Appellant/Respondent, and E.F. Respondent/Respondent. 24 Jun 2019.

2018 Brief of Amicus Curiae – Alliance Defending Freedom, Campbell, James A., Grossman, Miriam, Laidlaw, Michael K., McCaleb, Gary S., Van Meter, Quentin L., Van Mol, Andre. Brief of Amicus Curiae. United States Court of Appeals for the Eleventh Circuit. Drew Adams, Plaintiff-Appellee, v. School Board of St. Johns County, Florida, Defendant-Appellant. 12/27/2018.

PERSONAL

Languages: Conversational Spanish, French
Tutor: Biochemistry, computer science, High School mentor
Computers: Ruby, Rails, Javascript, C++, C, Java, and HTML programming

EXHIBIT 8

IN THE UNITED STATES DISTRICT COURT
FOR THE MIDDLE DISTRICT OF TENNESSEE
Nashville Division

L.W., by and through her parents and next friends, Samantha Williams and Brian Williams, et al. Plaintiffs, v. JONATHAN SKRMETTI, in his official capacity as the Tennessee Attorney General and Reporter, et al., Defendants.	Civil No. 3:23-cv-00376

EXPERT DECLARATION OF
GEETA NANGIA, M.D.

TABLE OF CONTENTS

I, Geeta Nangia, MD, have been retained by counsel for the Defendants in connection with the above captioned litigation.

1. I have been asked by counsel for the Defendants to provide my expert opinion on the diagnosis and treatment of gender dysphoria in minors as it relates to Tennessee Senate Bill I.

2. I am over the age of 18. I have actual knowledge of the matters stated herein. If called to testify in this matter, I would testify truthfully and based on my expert opinion. I am being compensated at an hourly rate of $350.00 per hour for documentation and $550.00 per hour of testimony that I devote to this case. My compensation does not depend on the outcome of this litigation, the opinions that I express, or the testimony that I provide.

BACKGROUND AND QUALIFICATIONS

3. I am a Board-Certified Child and Adolescent Psychiatrist, and Board-Certified Adult Psychiatrist. I obtained my B.A. in Biochemistry and Molecular Biology from Boston University and my M.D. from Boston University School of Medicine. I graduated with the Ruth Hunter Johnson Prize in Psychiatry. My residency and fellowship training, in Psychiatry and Child and Adolescent Psychiatry, respectively, were at The Medical University of South Carolina (MUSC). I completed my fellowship in 2007.

4. I have been active in teaching medical students and residents throughout my

career and received the Circle of Excellence in Teaching at MUSC. In recent years, my clinical lectures have focused on child and adolescent development.

5. I have worked in the field of Child and Adolescent Psychiatry as a community psychiatrist in a wide range of settings, providing comprehensive psychiatric services for children and families. I chose to work as a community psychiatrist because I desired to evaluate and treat a wide range of mental health disorders and wanted to see young people in the context of their families and community "systems" (e.g., schools, extracurriculars, local supports). Throughout my career I have worked in rural, urban, and suburban areas, and in outpatient, inpatient, partial, as well as residential care settings. I have been very active in school consultations and advocating on a community level for mental health accommodations for youths in school. I have worked toward providing access to mental health care for youths who are underfunded and lack services due to barriers of access and cost. I have provided psychiatric evaluations, psychotherapy, and medication management for children and adolescents, as well as family therapy. I have been a part of multiple interdisciplinary teams.

6. Much of my career has been spent educating, equipping, and supporting families of children who struggle with depression, anxiety, and other mental health issues by stressing the importance of attachment between parents and

children. I believe that an attachment-centered approach to therapy helps children to find their homes as a safe place to connect, where they feel nurtured, supported, and loved. It is connection and secure attachment to safe caregivers that form the foundation for healthy childhood development, allowing a child to successfully progress through the developmental trajectory toward identity consolidation.

7. I continue to provide community mental health care through my private practice and am providing this opinion as a child psychiatrist working in private practice.

8. Over the course of my career, seeing a broad range of psychiatric disorders, I have treated many patients with active gender dysphoria or a history of gender dysphoria. Per my best reflection, I'd estimate that 550 of these have been minors. As discussed below, the modalities of care that I have utilized with minor patients who have gender dysphoria include supportive and exploratory (psychodynamic) therapy, family therapy, and psychopharmacology. The latter has only been used if children and adolescents are also struggling with mental health disorders such as depression or anxiety. I have collaborated with others in the community to garner a network of support for my patients, when deemed appropriate.

9. Given the nature of being a community child psychiatrist, I have the benefit

of being involved with children's health care not only in my office, but also with their families, schools, and outside support systems. This provides me with the ability to have a more complete perspective on their development, and the interventions that produce the best outcomes for their overall wellbeing.

10. My medical opinion below is based upon my training and clinical experience as a Child and Adolescent Psychiatrist, my knowledge of child development, and review of the literature (including standards) on this subject. I may wish to supplement my opinions or the bases for them as new research is published or in response to statements made in my area of expertise.

11. My previous expert witness testimony has been regarding abuse and trauma, and interventions for children struggling with mental health disorders. I also submitted a written report in *Dekker v. Marstiller*, No. 4:22-cv-325-RH-MAF (N.D. Fla.) and *Boe v. Marshall*, No. 2:22-cv-0184 (M.D. Ala.).

12. For medicolegal purposes, I have also, throughout my career in mental health, served as a designated examiner for persons during inpatient hospitalizations, and as part of this process, I have performed numerous capacity assessments and presented them to courts.

GENDER DYSPHORIA

I. Diagnostic Criteria

13. Gender dysphoria in adolescents is defined by the DSM-5-TR as: A marked incongruence between one's experienced/expressed gender and assigned gender, of at least six months duration, as manifested by at least two or more of the following:

- A marked incongruence between one's experienced/expressed gender and primary and/or secondary sex characteristics (or in young adolescents, the anticipated secondary sex characteristics)
- A strong desire to be rid of one's primary and/or secondary sex characteristics because of a marked incongruence with one's experienced/expressed gender (or in young adolescents, a desire to prevent the development of the anticipated secondary sex characteristics)
- A strong desire for the primary and/or secondary sex characteristics of the other gender
- A strong desire to be of the other gender (or some alternative gender different from one's assigned gender)
- A strong desire to be treated as the other gender (or some alternative gender different from one's assigned gender)

- A strong conviction that one has the typical feelings and reactions of the other gender (or some alternative gender different from one's assigned gender)

The condition is associated with clinically significant distress or impairment in social, occupational, and other important areas of functioning. (DSM-5, TR)

14. According to the American Psychiatric Association, gender dysphoria often begins in childhood, but some individuals may not experience it until puberty or much later. (DSM-5-TR)

15. The DSM-5-TR defines gender dysphoria in children as a marked incongruence between one's experienced/expressed gender and assigned gender, lasting at least six months, as manifested by at least six of the following (one of which must be the first criterion):

- A strong desire to be of the other gender or an insistence that one is the other gender (or some alternative gender different from one's assigned gender)
- In boys (assigned gender), a strong preference for cross dressing or simulating female attire; or in girls (assigned gender), a strong preference for wearing only typical masculine clothing and a strong resistance to the wearing of typical feminine clothing.

- A strong preference for cross gender roles in make-believe play or fantasy play
- A strong preference for the toys, games, or activities stereotypically used or engaged in by the other gender
- A strong preference for playmates of the other gender
- In boys (assigned gender), a strong rejection of typically masculine toys, games, and activities, and a strong avoidance of rough-and-tumble play; or in girls (assigned gender), a strong rejection of typically feminine toys, games, and activities
- A strong dislike of one's sexual anatomy
- A strong desire for the physical sex characteristics that match one's experienced gender

As with adolescents and adults, the condition must also be associated with clinically significant distress or impairment in social, occupational, or other important areas of functioning. (DSM-5-TR)

II. Prevalence

16. According to a 2022 study done by The UCLA School of Law Williams Institute, entitled "How Many Adults and Youth Identify as Transgender in the United States?" over 1.6 million adults and youth (13-17) identify as transgender in the U.S. Among youth ages 13-17, 1.4 percent identify as

transgender. The data used was from the CDC's BRFSS and YBRS (Behavioral Risk Factor Surveillance System and the Youth Risk Behavior Survey). The BRFSS questionnaire asks, "Do you consider yourself to be transgender?" (Herman 2022)

17. Research shows that transgender individuals are younger on average than the U.S. population, and youth ages 13-17 are significantly more likely to identify as transgender than adults ages 65 and older. (Herman 2022)

18. At the state level, estimates from this same study show that 3.0% of youth ages 13-17 are identifying as transgender in New York as compared to 0.6% in Wyoming. (Herman 2022)

19. Per a 2022 report from Herman et al. and The Williams Institute, when comparing the current report with estimates made by The Williams Institute in 2016-2017, researchers found that the percentage and number of adults who identify as transgender has remained steady over time. The YRBS data shows that youth comprise a larger share of the transgender identified population than what was previously estimated, currently comprising 18.3% of the transgender identified population in the United States, up from 10 percent previously. (Herman 2022)

20. There are several contributing factors to the rise of gender dysphoria that I observe in my own patient population: 1) an increase in "pathologizing" of

what I view — and what much of the reliable scientific literature has long viewed — as a normal part of childhood development, 2) shifts in cultural norms having to do with gender exploration in adolescence, 3) the advent of social media, 4) heightened vulnerability in youth, and 5) what some call "social contagion." These are explained below.

21. Increase in pathologization of a normal part of childhood development: When gathering a developmental history, it has been my experience that many parents and children describe a period of time, greater than six months, during which the child was a "tomboy" or "tomgirl" (per their own terminology). When discussing this further, most of these parents and children openly talk about how the child felt strongly that he/she wanted to be the opposite gender, preferred to play with stereotypical opposite gender toys, preferred to engage in opposite gender activities, wanted to only wear opposite gender clothing, preferred opposite gender playmates, rejected same gender toys/activities, and had significant associated distress. These are the first six out of eight criteria in the gender dysphoria diagnosis, and only six criteria and significant distress are necessary for the diagnosis. However, these children weren't ever diagnosed formally, their parents didn't label or pathologize their behavior, and the symptoms eventually passed and the children became comfortable with their natal sex.

22. In colloquial English, in decades past, society referred to children who had such symptoms as "tomboys" and "tomgirls." Gender-medicine experts today distinguish between tomboys or tomgirls and children with gender dysphoria. They state that the former display an outward expression of the opposite gender to the world, but feel an internal comfort with their birth gender. The latter, they say, have an internal psychological sense that they are of another gender. (DSM-5-TR)

23. The American Academy of Child and Adolescent Psychiatry uses the terms gender nonconformity versus gender discordance to make this same distinction. However, they acknowledge in their Practice Parameters that "there may be clinical difficulty distinguishing between gender nonconformity and gender discordance." (Adelson 2012)

24. In my clinical experience, I have had difficulty appreciating this distinction. First, this is because both parents and children, who describe such a period in the child's life of having been a "tomboy" or "tomgirl," most often retrospectively endorse the criteria that are necessary for the gender dysphoria diagnosis. Second, this assertion — that children with gender dysphoria have an "internal psychological sense" of their gender incongruence — implies that children are able to have consolidated identity. This is not congruent with what we know about identity formation and consolidation, a stage which

doesn't occur until adolescence. While gender identity is in the process of forming in very early childhood, this formation continues to be influenced by multiple factors over many years, as the normal course of childhood development unfolds. It isn't until adolescence that several key psychosexual and psychosocial development models show identity forming and becoming more fixed. In other words, children's sense of who they are, or their "identity," can and often does shift over time as part of normal development. It is not until they reach the end of adolescence, at the cusp of adulthood, when identity is said to consolidate. (Erikson 1998)

25. Still, this notion that children have an internal sense of gender and should be offered specialized care if they endorse the above criteria has led to the unnecessary pathologization of what otherwise has been considered a normal phase of development. This mistaken notion has contributed to an increase in gender dysphoria diagnoses. Many parents, who in the past simply would have not worried about their children who had the above "symptoms," are now compelled to consider a diagnosis of gender dysphoria and treat the child because of the fear that their child may suffer if they don't. Physicians, likewise, are acting quickly to usher these children into gender-affirming care, out of the same fear. This is in spite of the data showing that "cross-gender wishes usually fade over time and do not persist into adulthood." (Adelson

2012)

26. Shifts in cultural norms in adolescence and the advent of social media: Culturally, society has created a new "norm" of gender questioning and exploration in adolescence. This cultural norm of gender exploration also has been reinforced by the medical community. According to a recent *New York Times* article, "It's developmentally appropriate for teenagers to explore all facets of their identity — that is what teenagers do," stated Dr. Angela Goepferd, medical director of the Gender Health Program at Children's Minnesota Hospital. "And, generationally, gender has become a part of someone's identity that is more socially acceptable to explore." (Ghorayshi 2022)

27. Hence, not only have cultural norms shifted due to information availability and social media, but they have also shifted due to physicians informing parents and children that gender exploration is healthy and appropriate. One can infer that if a child has never questioned their own gender previously, this new norm tells them that it is healthy to do so and encourages it as part of normal development.

28. Further, the advent and expansion of social media has created waves in what youth consider to be popular, acceptable, and normative. Youths are consuming more social media than ever before. Social media enables the

spread of information pertaining to many issues, including those related to sexual development, sexual orientation, sexual activity and practices, and gender. There has been a dramatic increase in the global public discourse surrounding LGBTQA issues amongst youths. There has been widespread content circulating throughout society on gender exploration, incongruence, and dysphoria. This is generally accompanied by passionate advocacy that is highly regarded by youths of all ages. Celebrities have highlighted LGBTQA issues and have used various forms of social media, like TikTok, to promote and celebrate gender incongruence. On a local level, information sharing has led to the popularity of LGBTQA clubs at schools, community groups dedicated to raising awareness and acceptance, and enthusiastic support networks for those who identify as LGBTQA. Many of these can easily be found online. With the spread of online information and cultural advocacy, the natural heightened propensity of youth to explore gender and see it as fluid has increased.

29. In a 2018 study on parent surveys of children with gender dysphoria, Littman writes: "Parents identified the sources they thought were most influential for their child becoming gender dysphoric. The most frequently answered influences were: YouTube transition videos (63.6%); Tumblr (61.7%); a group of friends they know in person (44.5%); a community/group of people

that they met online (42.9%); a person they know in-person (not online) 41.7%." (Littman 2018)

30. Youths are more vulnerable to novel information streams. According to another article in *The New York Times*,

> Helana Darwin, a sociologist at the State University of New York at Stony Brook who began researching nonbinary identities in 2014, found that the social-media community played an unparalleled role in people's lives, especially those who were geographically isolated from other nonbinary people. . . . Her research found that social media is a gathering place for discussing the logistics of gender — providing advice, reassurance and emotional support, as well as soliciting feedback about everything from voice modulation to hairstyles. . . . Psychologists often posit that as children, we operate almost like scientists, experimenting and gathering information to make sense of our surroundings. Children use their available resources — generally limited to their immediate environment — to gather cues, including information about gender roles, to create a sense of self.

(Wortham 2018)

31. In this same *New York Times* article, author Jenna Wortham asked Alison Gopnik, a renowned philosopher and child psychologist, "if it's possible that social media can function as a foreign country, where millions of new ideas and identities and habitats are on display — and whether that exposure can pry our calcified minds open in unexpected ways." Gopnik replied, "Absolutely. . . . Having a wider range of possibilities to look at gives people a sense of a wider range of possibilities, and those different experiences might

lead to having different identities." Wortham continued:

> When we dive into Instagram or Facebook, we are on exploratory missions, processing large volumes of information that help us shape our understanding of ourselves and one another. And this is a country that a majority of young adults are visiting on a regular basis. A Pew study from this year found that some 88 percent of 18-to-29-year-olds report using some form of social media, and 71 percent of Americans between ages 18 and 24 use Instagram. Social media is perhaps the most influential form of media they now have. They turn to it for the profound and the mundane — to shape their views and their aesthetics. Social media is a testing ground for expression, the locus of experimentation and exploration.

(Wortham 2018)

32. So, it would seem most plausible that the normalization and even encouragement of gender exploration in adolescence combined with the emphasis on building awareness of gender dysphoria, particularly through social media, would lead to a heightened prevalence of the gender dysphoria diagnosis. More adolescents naturally are exploring gender, more have awareness of gender fluidity and gender dysphoria, and more are seeking out help or guidance.

33. For example, an adolescent natal female who has been bullied by female peers for years now has shifted to having mainly male friends, preferring male athletic clothing, and wanting a short haircut to fit in with them. She believes her emotions to be more in line with theirs and feels distress over this. Later, through exposure to transgender friends and information she finds online, she

comes to believe that she has gender dysphoria and needs gender-affirming care, so she seeks help. Previously she may have viewed her feelings of distress and her behaviors to be a mere reflection of her vulnerability around females based on her negative experiences. In years past, such an adolescent natal female may not have interpreted that her feelings and negative experiences or the reactions of others had anything to do with a condition like gender dysphoria. But now, surrounded by widespread societal, cultural, and peer encouragement, she may contextualize those feelings and discomfort in ways that prompt her to inquire, first, into gender dysphoria as a concept, and then into riskier or more invasive and biologically systemic responses to her internal discomfort. Situations like this are common, in my experience, and I believe they have led to an increase in the diagnosis of gender dysphoria.

34. Heightened vulnerability: Youth today are also experiencing more vulnerability and a feeling of being disconnected, or not belonging. A new U.S. Department of Health and Human Services (HHS) study published in the American Medical Association's journal, *JAMA Pediatrics*, reports significant increases in the number of children diagnosed with mental health conditions. The study, conducted by the Health Resources and Services Administration (HRSA), finds that between 2016 and 2020, the number of children ages 3-17 years diagnosed with anxiety grew by 28.9% and those

with depression by 26.7%. (Lebrun-Harris 2022)

35. Certainly, there has been a large increase in mental health disorders in the United States over the last several years, with COVID increasing the numbers of vulnerable children. Families have been struggling, and there has been an increased rate of family disruption. Stress and trauma have exponentially increased, and all these stressors impact youth vulnerability, and youth seeking out places where they fit and belong. In my experience with adolescents, many are drawn to LGBTQ clubs and online groups, and find them to be a kind respite where they are cared for, affirmed, and feel a sense of comradery with other peers who've faced social vulnerability and had a feeling of not belonging. Feeling embraced and accepted by friends whom they can relate to may lead them to consider that they, too, may be transgender. In my adolescent patients, this type of feeling is echoed often and lends to them endorsing gender-dysphoria criteria.

36. Social Contagion: Lastly, heightened prevalence of gender dysphoria may be attributed to a "bandwagon effect" or, as others call it, "contagion." In my experience, adolescents presenting with gender dysphoria have often described being influenced by peers and social media to consider that they may be the opposite gender. Similar types of influence have been reported in the past with other mental health conditions in psychiatry. For example, a

study showed self-harming behaviors were socially contagious in adolescents, and studies on eating disorders have shown similar patterns. (Riggio 2022; Dishion 2011)

III. Treatments

37. According to the American Academy of Child and Adolescent Psychiatry, principles that are important in the treatment of youth with gender discordance are as follows:

1) A comprehensive diagnostic evaluation should include an age-appropriate assessment of psychosexual development for all youths

2) The need for confidentiality in the clinical alliance is a special consideration in the assessment of sexual and gender minority youth.

3) Family dynamics pertinent to sexual orientation, gender nonconformity, and gender identity should be explored in the context of the cultural values of the youth, family, and community.

4) Clinicians should inquire about circumstances commonly encountered by youth with sexual and gender minority status that confer increased psychiatric risk.

5) Clinicians should aim to foster healthy psychosexual development in sexual and gender minority youth and to protect the individual's full capacity for integrated identity formation and adaptive functioning.

6) Clinicians should be aware of current evidence on the natural course of gender discordance and associated psychopathology in children and adolescents in choosing the treatment goals and modality.

7) Clinicians should be prepared to consult and act as a liaison with schools, community agencies, and other health care providers, advocating for the unique needs of sexual and gender minority youth and their families.

8) Mental health professionals should be aware of community and professional resources relevant to sexual and gender minority youth.

(Adelson 2012) The parameters also note, with regard to medical or surgical transition: "In general, it is desirable to help adolescents who may be experiencing gender distress and dysphoria to defer sex reassignment until adulthood, or at least until the wish to change sex is unequivocal, consistent, and made with appropriate consent." They go on to describe

different treatment approaches when waiting until adulthood is not "feasible." One approach described is puberty suppression at age 12 followed by cross-sex hormones at age 16, and then gender reassignment surgeries at age 18. Another approach is waiting until Tanner Stage 2 to initiate pubertal suppression, and then proceeding with options for cross-sex hormones and gender reassignment surgeries. A therapeutic group approach with families to help them offer support is described. While the authors report negative outcomes with conversion therapies, they repeatedly comment on the lack of controlled trials looking at other therapeutic (including psychodynamic therapy) approaches in children with gender discordance. (Adelson 2012)

IV. Medical Interventions and Associated Risks

38. Medical gender transition involves puberty blockers and subsequently cross-sex hormones. These interventions are frequently followed by surgeries that can include but not limited to breast augmentation, orchiectomy, vaginoplasty, hysterectomy, phalloplasty, metoidioplasty, and facial surgery.

39. Puberty blockers (gonadotropic releasing hormone agonists or GnRHa) are a form of medication that block the physiological production of sex hormones and are given during the Tanner Stage 2 of development when puberty has just started. (Delemarre-van de Waal 2006)

40. Testosterone (in males) and estrogen (in females) are responsible for changes that occur in puberty. Puberty blockers stop the production of follicle-stimulating hormone (FSH) and luteinizing hormone (LH) from the pituitary, and this then prevents the production of sex hormones.

41. None of the puberty blockers are currently FDA-approved for use in gender dysphoria.

42. In gender dysphoria, puberty blockers are given "off-label" to postpone the changes that occur with puberty. The clinical reasoning behind this is that proponents say that it gives youth time to decide whether to "fully" transition, through a trajectory of cross-sex hormones and then surgeries, while preventing changes that may cause distress. (Delemarre-van de Waal 2006)

43. There is marked debate on the safety of puberty blockers, cross-sex hormones, and surgeries utilized in gender transition.

44. Some of the risks that are debated in the literature are the long-term effects of these medications on the endocrine system, reproductive system, bone growth, brain maturation, psychological functioning, and metabolic functioning.

45. I am generally familiar with the literature surrounding these debates. I have reviewed the report of Dr. James Cantor submitted in this case and agree with his conclusion that the existing studies of puberty-blockers and cross-sex

hormones in minors provide no reliable evidence of effectiveness for improving mental health relative to mental health treatments that lack medical risk. I also agree with his conclusion that all existing systematic reviews of safety and effectiveness of these treatments have concluded that the evidence on medicalized transition in minors is of poor quality.

V. Clinical Experience with Gender Dysphoria

46. As part of an initial evaluation, I ask individuals how they identify in terms of sexual orientation and gender. When taking a developmental history during an in-person assessment, I ask about an individual's social development, as well as questions pertaining to self-concept (how one views oneself). As part of this, I may delve into questions that deal with gender, in an age-appropriate manner, with the child, adolescent, and/or parent. Questions that I ask pertaining to gender identity include, but are not limited to:

- 1) How did you feel about your gender early on in your life?
- 2) Did you feel comfortable with your gender?
- 3) If not, did you identify with another gender?
- 4) How did this affect you, and the way that you saw yourself?
- 5) What types of play did you enjoy the most?
- 6) Were most of your friends of the same gender or opposite gender?
- 7) Do you remember feeling discomfort with your body in any fashion?

- 8) Did you prefer to ever dress as another gender?
- 9) If you previously felt more comfortable as another gender, or unsure of identifying with your birth sex, how long did this persist?
- 10) If you now feel comfortable with your natal sex, but previously did not, what led to you feeling comfortable?

47. The reason such questions are important in addressing self-concept — and gender as a part of self-concept — is that, developmentally, an individual's early experiences and view of oneself in the context of a greater environment are important to understanding the individual's presenting clinical issues.

48. Since becoming a physician in 2002, I estimate that I've evaluated and treated 550 children and adolescents (and hundreds of adults) who have met criteria at some point in their lives for a "gender dysphoria" diagnosis. Of 550 adolescent patients, I approximate that 350 of these patients had a history of gender dysphoria, as discovered on evaluation or over the course of patient care. This was ascertained via parent or child retrospective report wherein they had met criteria for the diagnosis. For these children, the gender dysphoria resolved with age maturation alone prior to seeing me. Many of these children were referred to by their parents as having been a "tomboy" or "tomgirl," and their parents were not concerned. I discuss these terms above. I did not label or pathologize these children during the course of their mental

health treatment as having had "gender dysphoria," despite the diagnostic criteria seeming to have been met. But for the purpose of this declaration, I am including them in the discussion of patients I have treated who have had gender dysphoria.

49. I estimate that I've seen close to 100 additional child patients who meet criteria for gender dysphoria on clinical interview during or over the course of treatment with me (as opposed to retrospective report). I have often observed that children's feelings regarding their own gender are a reflection of their perception of gender roles within their family unit and sphere of influence. I have had many female child patients who enjoy climbing trees and playing "boy sports," playing with "boy toys," who have a strong desire to be boys like their brothers, play with only boys on the playground, reject "girly" toys and activities, and want to use the restroom standing up like boys do. These children often are emotional and experience some real distress for significant periods about having been born as girls and wanting to be boys in every imaginable way. I've had male child patients who do the opposite. With all these children, I have told their parents not to become anxious, and not to pathologize or characterize their child based on their observations.

50. In every case that I have observed, children grow out of such "gender dysphoria" and become comfortable with their natal sex. In fact, these

children are naturally some of the most confident children I've seen over time. I have always attributed this to their parents being comfortable allowing them to explore and engage in free play without feeling any anxious desire to push them toward the toys and activities that are stereotypical of only one gender. They have not pathologized or seen their child's preferences for play and fun as something to be concerned about. Hence, their children learn confidence to explore the world around them, feel validated and affirmed by their parents, without any assumptions that their exploration is anything more than a normal part of growing up.

51. My experience has been that periods of gender incongruence and associated distress are normative and transient, with resolution as the child matures. I have provided these parents and children with guidance; support; and, when needed, exploratory therapy.

52. I also estimate that I have seen just over 100 adolescents who have presented with gender dysphoria that has been more abrupt in onset. The majority of these are biological females, and these cases have grown increasingly frequent over recent years.

53. In these cases, adolescents and/or their parents reported at least one of the following issues as also being primary within their life "systems" (e.g., school, family, peer group, community): 1) a feeling of not fitting in with peers, or

feeling "different" and not belonging, 2) an experience of gender roles within their own families, or within their peer groups, that has had a marked influence on their own perception of gender and gender identity, 3) a history of trauma, 4) a history of disruption of primary attachment, 5) a history of feeling vulnerable and emotionally unsafe, 6) a history of depression, anxiety, or social anxiety, 7) a history of an autism spectrum disorder, 8) an exposure to information on gender via social media, TV, or the internet, with a subsequent curiosity about gender exploration, 9) a feeling of vulnerability, followed by a search for belonging, or 10) a feeling of a good "fit" among peers who have also felt vulnerable in an LGBTQA group online or in school.

54. Almost all of the adolescent patients had taken steps to access additional information about their gender dysphoria from readily available online sources and social media, and many found friendship within LGBTQA clubs at school or online friends in the LGBTQA community. They described feeling accepted, supported, and affirmed within these social groups. Some did not identify as the opposite gender, but rather stated they were "gender queer" or "non-binary."

55. For all of these youth, I provided exploratory therapy, supportive therapy, and family therapy, or I worked with a therapist who collaborated with me in treatment, to address these factors within the adolescent's life systems. I also

provided medication management where needed for other mental health issues. Their treatment plans included crafting an individualized approach from the above therapies, harnessing community support, and providing guidance to parents in two key areas: 1) How to best be "present" and establish an emotionally safe environment at home, and 2) how to grow in connection and relationship with their child by loving them for who they are. Among these adolescents, the vast majority realigned with their natal sex over the period of treatment. Some stated, over time, that they were questioning their sexual orientation, and not their gender. All responded to these interventions positively such that, over time, regardless of whether they'd realigned with their natal sex or had a future plan to transition, they no longer experienced gender dysphoria and their mental health improved. Those who had continued gender incongruence felt that they wanted to see how they felt over time rather than pursuing options to medically transition as minors. They were appreciative of the support and therapy and found it helpful.

56. I've treated approximately 25 children/adolescents during their social and/or medical transition. I supported them where they were at on their journey, through psychotherapy and medication management, and I respected their decision based on what treatment options had been afforded to them by other doctors. To clarify, I have never personally referred a minor for medical

transition, as I don't believe the option should be given to minors based on reasons I explain below.

VI. The Role of Exploratory Therapy for Gender Dysphoria in My Practice

57. Minor patients with gender dysphoria benefit tremendously from therapy that explores their feelings and experiences within their "life systems," past and present. I have found that adolescents with gender dysphoria are generally very open to this. They voice that they feel supported and that they gain clarity in the process. Through therapy, just like most youth with presentations other than gender dysphoria, these patients improve in self-concept and mindfulness, becoming aware of how their experiences have affected them, and what defenses they employ when feeling challenged or stressed. They learn to identify their own values and what matters to them, which makes their choices and decisions clearer.

58. The primary modality of therapy that I have utilized in treating gender dysphoria is psychodynamic therapy, I have also utilized cognitive behavioral therapy, interpersonal therapy, and family therapy. I *do not* endorse conversion therapy and I believe it is detrimental. I have treated one adolescent who underwent conversion therapy as part of a religious school prior to seeing me, and she suffered significant trauma as a result. This patient required specific therapy to help her process that trauma.

59. Psychodynamic therapy engages individuals in "free association." Free association is the idea that whatever is on a patient's mind guides the clinical session. The free association, or whatever the patient brings up, is deemed of importance and is used to spur exploration of the patient's past and how that past may be affecting the patient's present circumstances and feelings.

60. In this context, then, the therapist can help the patient identify how repressed feelings from the past may be influencing the patient's current decision making, relationships, and behaviors. Over time, this leads to natural "uncovering" of coping and defense mechanisms, fears, desires, and values that are rooted in a person's past experiences.

INFORMED CONSENT

61. To provide children the best-quality care, physicians should abide by the ethical standards that are universal to the practice of medicine. One of these standards is informed consent. Implicit to the informed consent process are related standards of medical ethics that are central to the practice of medicine, taught in medical school, and widely accepted.

I. Medical Ethical Standards

62. These universal ethical standards include beneficence, non-maleficence, autonomy, truth-telling, confidentiality, and justice.

63. Beneficence is the obligation of the physician to act for the benefit of the

patient. In principle, the physician should support moral rules to protect and defend the rights of others, prevent harm, remove conditions which cause harm, help persons with disabilities, and rescue persons in danger. This means not simply avoiding harm, but actively seeking to promote the welfare of the patient. Beneficence is applied most often during clinical assessment, but also throughout treatment (Varkey 2020).

64. Non-maleficence is the obligation of the physician to not harm the patient. This is supported by moral rules (e.g., do not cause pain or suffering, do not kill, do not cause offense, or deprive others of the goods of life). Hence, the doctor must weigh the benefits of interventions with risks or burdens they may place on the patient. Nonmaleficence and beneficence are both part of the quality-of-life discussion between a doctor and patient. (Varkey 2020)

65. Autonomy is the supposition that all persons have intrinsic and unconditional value or worth, and therefore, should have the power to make moral choices and rational decisions, and to do so for self-determination. (Guyer 2003)

66. Autonomy does not extend to persons who lack capacity to act autonomously. Thus, children, adolescents, or individuals who have disorders that prevent capacity or competency lack autonomy. (Grisso 1998) Autonomy is at its most important as the doctor considers patient rights and preferences.

67. Truth-telling is the principle that doctors must not withhold information, nor

misrepresent it, but rather provide information plainly and honestly to the patient, so that the patient or parent can, in turn, demonstrate full understanding in order to provide voluntary consent. Informed consent is at its most important in discussing treatment options, and truth-telling is critical throughout patient care.

68. Confidentiality is maintaining the patient's privacy. This must apply to all domains of treatment.

69. Justice is the fair, equitable, and appropriate treatment of persons. Distributive justice is the equitable distribution of health care resources determined by justified norms. This standard is at its most important in the discussion of external forces and context for a patient, including their cultural, spiritual, religious, and economic beliefs and circumstances. (Fleischacker 2005; Varkey 2020)

70. In providing care for gender dysphoria, or for any other medical or mental health condition, these ethical standards must be adhered to.

II. Informed Consent as an Ethical Standard in Minors

71. The principle of informed consent rests upon the moral and legal premise of patient autonomy. In all populations, informed consent must balance the respect for patient autonomy with the protection of patient vulnerability. (Appelbaum 2007) This is particularly relevant as it applies to minors.

72. The informed consent process requires that certain criteria be met, and these are dependent on development (neurologic, cognitive, psychosocial) and experience. Informed consent involves the following principles: a) decision-making capacity, b) full disclosure of medical options, c) comprehension, and d) voluntary consent. (Grisso 1998) Voluntary consent is one's agreement to the intervention, without coercion or distress. Explanation of the other principles, and the neurodevelopmental requirements for each, follows.

A. Decision-Making Capacity

73. To provide informed consent, one must have the ability to make the decision at hand. In a model of assessing decision-making capacity in children, Miller et al. identified cognitive development and experience as being pivotal. (Miller 2004)

74. In an article published in BMC Pediatrics, researchers expanded on this by undertaking a multidisciplinary approach to describing capacity in their research. Taking from neuroscience research concerning the developing brain, and other fields such as psychology and decision-making science and ethics, they highlighted the development necessary to meet the four standards for capacity. (Appelbaum 2001) They then identified certain neurodevelopmental skills and abilities that needed to be developed for each standard to be met. (Grootens-Wiegers 2017) These skills include:

A. **The ability to communicate a choice:** This is the least rigorous standard for decision-making capacity. To consent to treatment, a person needs to be able to communicate that there is a choice to be made and a preference of treatment, via written or spoken language. This neurologic skill is "communication", either spoken or nonverbal. Nonverbal communication is an indication of dissent or implicit consent, but not legal consent. Hence, this standard depends on language development, which is initiated in early childhood. Children have a reasonable understanding of language by age five, with refinement continuing until age nine. Further development of vocabulary and expression occurs throughout adolescence. (Shaffer 2007)

B. **The ability to understand:** In order to understand information presented about diagnosis and treatment options, and comprehend what choices for treatment are, and that a choice needs to be made, a person must be able to orient and direct attention to information. They must have sufficient intelligence, language proficiency to process the information, and memory and recall to integrate information beyond the short term. The foundation for this is laid down during infancy. Maturity in orientation and attention develops from ages seven to ten. (Rueda 2004) Memory increases between ages six and twelve, and then increases slightly during adolescence. (Thaler 2013)

C. **The ability to reason:** One must understand information, and then be able to reason regarding risks, benefits, and possible consequences of treatment. (Appelbaum 2007; Grisso 1997) To do this, one must have the "ability to engage in consequential and comparative reasoning and to manipulate information rationally." (Palmer 2016) Children, between the ages of six and eight years old, can engage in logical reasoning, and this ability grows from ages eight through eleven, as they use and access their own knowledge. (Markovits 1998) Complex reasoning, about alternative causal relations, develops into adulthood. Risk identification develops strongly between ages six through ten. (Hillier 1998) Although risk identification is mature in late adolescence, adolescents are paradoxically more inclined toward risky behaviors due to the impulse control centers of their brains not having yet matured. (Casey 2015) This is further discussed below.

D. **The ability to appreciate:** This is the strictest standard of decision-making capacity. It requires that one understand the various options for treatment, and the relevance of those options to one's personal circumstances, values, and beliefs. Therein, one needs to have the ability to think abstractly and to understand the intangible consequences of a decision. This includes being aware that others have a mind of their own.

(Appelbaum 2001) Many different areas of the brain are involved in this skill. Children start to recognize their own beliefs and desires, which contribute to their personal values and norms, between the ages of three and four. (Shaffer 2007) They begin to understand how these beliefs influence their actions. As an individual ages, due to the efficiency of working memory, one can think about more abstract and hypothetical things. (Markovits 2013; Pike 2010)

75. Capacity judgments should also take into consideration the factors, or circumstances and stressors, that affect minors in decision-making competency (competency being a legal decision). These are: personality (the child's predisposition to view information a particular way), emotional state (which can be seen as a motivator for information and preferences), and disease severity (which can affect understanding, retention of information, and reasons to consent).

76. Additionally, the minor's decision-making capacity for medical treatment should be assessed in the context of parental and clinician attitude and influence. (Miller 2004; Alderson 1992; Mann 1989)

77. Finally, the minor's capacity should also take into consideration the type and complexity of the decision, the setting, and the timing of the decision and time constraints.

78. Decision-making capacity can be considered in terms of neurodevelopment, psychosocial development, and cognitive development. Each is considered below.

79. **Neurodevelopment.** The MacArthur Competence Assessment Tool is often used to assess medical decision-making capacity. It was shown to be valid and reliable in children. (Palmer 2016; Appelbaum 2001) In a group of children six to eighteen years of age, it demonstrated that age limits for children to be deemed competent were estimated as early as 11.2 years old. (Hein 2014; Hein 2015) However, the authors point out that the cut off age of 11.2 years does not imply competence for any decision, in any situation. Rather, it is an age when, given favorable environmental factors, competency may be considered. (Hein 2014) Furthermore, with adolescence approaching, a child this age will continue to experience specific events in brain development that influence competency. (Appelbaum 2001) As noted by Hein et al. in a 2015 study, "[C] hildren may differ from adults by not having developed yet stable long term goals and values in life, meaning that children may procedurally be classified as competent although their decisions are based on values that might change. This could imply that later on they might regret decisions based on those early-life values." (Hein 2015)

80. These specific events in adolescent brain development (Appelbaum 2001)

contribute to a non-linear increase in decision-making competency from ages twelve to eighteen. During this adolescent stage of development the most significant changes in the brain have to do with processing rewards and risks, and self-regulation. Because of this, adolescence is often marked by risky behaviors, sensation seeking, and high prioritization of peer influences when making decisions. This also is the explanation for the higher rates of health issues and mortality in adolescents. (Steinberg 2004)

81. The increase in adolescent decision-making competency is non-linear due, in part, to "cross talk" between various brain structures during development. The three areas of the brain that are developing during adolescence and that pertain to decision making are the pre-frontal cortex (the brain's control system), the ventral striatum (the reward system), and the amygdala (the emotional center). The "cross talk" between these structures is not fully developed until early adulthood. (Steinberg 2013)

82. The prefrontal cortex is involved in impulse control and self-regulation. The ability to self-regulate develops significantly by age eighteen, and then further into early adulthood. The prefrontal cortex also is involved in functions that require control, like paying attention, planning, organizing tasks, weighing risks and benefits, and processing more complicated decisions. (Gogtay 2004)

83. The ventral striatum is pivotal in the brain's reward system. It produces dopamine in response to rewards. During adolescence, the reward system is hyperresponsive. (Van Leijenhorst 2010) This means that the dopamine response to reward is much higher and is associated with increased reward seeking and sensation-seeking. This heightened responsiveness applies even to "small" rewards, making the positive effect of small rewards greater than in adults. Hence, "in a dilemma in which there is a small chance of reward, this reward may be attributed such a high value that the situation is no longer perceived a dilemma by the adolescent and there is only one path to choose." (Steinberg 2004)

84. The amygdala is involved in emotional processing and input to the reward system. The maturation of the amygdala stabilizes in late adolescence.

85. There is a mismatch in timing and pacing between the development of the amygdala, the ventral striatum, and the prefrontal cortex. The control system in the prefrontal cortex develops slowly and is last to complete maturation in early adulthood, whereas the reward system and emotional input system (ventral striatum and amygdala) begin change in early adolescence and complete maturation at a quicker pace. This accounts for the fact that even though adolescents can estimate risk or make responsible decisions, they often end up in precarious and risky situations and their behavior is not always

consistent with their capacities. This also accounts for their often "too quick" decision making. Adolescents are prone to picking pathways with more immediate reward, regardless of consequences or consideration of other pathways. (Mills 2014; Steinberg 2013)

86. Consider, as a simple example, the "kid in a toy store" scenario. Children and adolescents are more likely to choose a flashy toy or item that they encounter first and feel instantly drawn toward rather than waiting to explore the rest of the store where they may find toys and items they like even more and that are more valuable. They seek out immediate gratification and pursue impulse-driven choices when confronted with reward stimuli rather than contemplating other options that carry the same or better reward but entail delayed gratification.

87. Steinberg puts it another way by discussing "hot" and "cold" contexts. An emotionally laden context is hot, whereas a minimally emotional context is cold. When emotions play a role in a situation, this can influence the decision-making process and the outcome. In adolescence, risk taking in a cold situation may be similar to that in children and adults. However, in hot situations, risk taking is increased, and this affects decision-making severely. This explains "the often-risky decisions adolescents make, seemingly only thinking about short term rewards, even though afterwards they can

reasonably assess their 'leap in judgment.'" (Steinberg 2013; Metcalfe 1999)

88. These neurobiological models of adolescence are summarized in Appendix A. (Ernst 2006; McClure 2004; Metcalfe 1999; Casey 2008)

89. Johnson et al. also report similar conclusions in their work. The brain continues to mature into an individual's mid-20s. Functional MRI studies show that the prefrontal cortex is still maturing; this is the part of the brain involved with executive functioning and impulse control. Johnson et al. state that "[a]mong the many behavior changes that have been noted for teens, the three that are most robustly seen across cultures are: (1) increased novelty seeking, (2) increased risk taking, and (3) a social affiliation toward peer-based interactions." (Johnson 2009)

90. B.J. Casey confirmed this in her research on adolescent decision making. Her research concludes that the adolescent brain is more vulnerable when tasked with decision making in emotionally laden situations and in situations with peer involvement. (Casey 2008a; Casey 2008b; Casey 2010; Casey 2013; Chein 2011)

91. Casey's team studied adolescent response time when pairing stimuli with rewards and incentives. (Hare 2008, Appendix B and C). Naturally, without conscious awareness, people have quicker responses when they associate certain stimuli with positive outcomes or incentives. Individuals have slower

responses to stimuli when there are fewer expected positive outcomes or rewards. (McClure 2004) Representation of rewards and incentives is found in the ventral striatum. Across development, studies show that adolescents activate this deeper region of the brain more than young children and adults. When greater activity is seen in the ventral striatum, it is correlated with a higher degree of risk-taking behaviors or impulsivity. (Casey 2015)

92. Per Casey's research, the presence of peers also influences response time and accuracy for the adolescent. According to studies, when peers are present, adolescents make more errors in social cue interpretation and response time. They react more quickly to incentives and are more drawn to danger and risk taking or impulsive behaviors. Their brains are activated in the areas of the ventral striatum and the amygdala shows heightened activity relative to younger children and adults. (Casey 2015; Chein 2011)

93. Essentially, then, peers serve as reinforcers to influence behavior. (Chein 2011). Jones et al. (2014) developed a social reinforcement learning model to evaluate the degree to which peers reinforce behaviors from childhood to adulthood. The investigators manipulated the probability of the participant receiving positive social feedback from three virtual peers, who provided 33 percent, 66 percent, or 100 percent positive feedback. The results showed that different amounts of positive feedback enhanced learning in childhood

through adulthood. However, based upon response latency measurement, it was concluded that all positive social reinforcement from peers equally motivated adolescents. Furthermore, adolescents, unlike children and adults, had an increase in premotor circuitry when receiving positive social feedback regardless of the expected outcome. (The premotor cortex communicates with other parts of the brain to cause motion.) Hence, peer interactions appear to motivate adolescents toward action. (Jones 2014)

94. Casey concludes that adolescents show impairment in overriding impulses in emotionally charged situations. The imbalance appears to reflect earlier developing emotional centers in the brain and those involved in self-control. Lastly, she states that diminished self-control is transient and continues to develop in adulthood as these brain systems mature with experience. (Casey 2008; Casey 2015).

95. **Psychosocial development.** Children are developing human beings. Children go through several stages of psychosocial development according to Erik Erikson, a developmental psychologist whose theories are utilized across the fields of mental health and development. He stated that children enter the stage of "Industry vs. Inferiority" between ages five and twelve, wherein their major milestone is attaining the virtue of competence. (Erikson 1998)

96. During this stage, a child's peer group becomes more important. The child

views his or her peers as being highly significant. The child's self-concept begins to form more closely around peer approval or disapproval. Children's reactions of feeling confident or proud, rejected and incapable, often form around their accomplishments and the responses of their peers. If their efforts are reinforced by praise and reward, they feel industrious (or "competent"). They exude a readiness to move past this stage and further along the developmental trajectory. If, however, they feel rejected or disapproved of, they feel inferior ("incompetent"), causing a halt in development and an inability to move forward along the developmental trajectory. (Erikson 1998)

97. Adolescence, which is the next stage, is a time when youth develop the capacity to navigate social situations, and process social cues in more abstract ways. The ability to understand others' perspectives is expanding. Additionally, self-awareness is increasing into late adolescence and early adulthood, and modulating decision making as identity is consolidated.

98. According to Erikson, adolescents ages twelve to eighteen, who successfully moved forward from the former phase of development, enter the stage of "Identity vs. Role Confusion." During this stage, they are searching for a sense of self and identity. They experience intense exploration of personal values, beliefs, and goals. Adolescents begin to analyze and think more deeply about their own morality and ethics, and to determine their individual

identities based upon their life experiences.

99. Body image is critical in this stage of development, and Erikson suggests that two identities are forming: "sexual" and "occupational." Erikson says that adolescents may feel discomfort with their bodies for some period until they can adapt and grow into the changes. Success in this stage leads to the virtue of "fidelity," which he defines as the ability to commit oneself to others on the basis of accepting them even where there are differences.

100. Adolescents have a desire to belong to society and to be productive. During this period, those adolescents who fail to form a sense of identity experience role confusion, feeling unsure where they fit into society in the long term.

101. Also, during this stage, youth are particularly impacted by peers, and are seeking to approve of themselves while being approved of by their peer group. Their exploration of their identities is ongoing throughout this stage and not solidified until they reach adulthood. (Erikson 1998)

102. **Cognitive development:** A model of cognitive development in children and adolescents was developed by Jean Piaget, another developmental psychologist.

103. Piaget described children between the ages of 2 to 7 as being in the "preoperational stage" of development. During this stage, children struggle with logic and have difficulty with the idea of constancy. They use their

imagination and engage in pretend play but are concrete in the way they view their immediate surroundings. They also think symbolically and enjoy role play. Their cognitive skills (working memory, attention) are being developed.

104. He stated that between ages 7 through 11 (middle childhood through pre-adolescence), children entered the stage of "concrete operations." During this stage, children use logic in problem solving, and can engage in inductive (inferential) reasoning. However, they struggle with deductive reasoning, which involves the ability to use a general principle to predict an outcome. They are able to see another person's perspective. They lack the ability to solve problems that deal with more abstract concepts, while they can solve concrete problems (actual objects or events). They have difficulty with understanding and utilizing common sense, and difficulty applying what they know to more hypothetical situations. (Santrock 2008)

105. Children in this stage also begin to think through social matters differently. Piaget's theory suggests that during the stage of concrete operations and on into the stage of formal operations, adolescents experience a feeling of uniqueness and invincibility. He refers to this as "imaginary audience" and "personal fable." Imaginary audience is evidenced by the adolescent always thinking others are watching, and personal fable is the adolescent's belief that he or she is exceptional in some way.

106. From age 11 through adulthood, adolescents go through "formal operations," the final stage in Piaget's theory. An adolescent during this stage is starting to engage more in deductive reasoning (Berger 2016), and is able to consider the hypothetical and "what if?" type of situations. The adolescent's metacognition is also developing, which is the awareness and understanding of their own thought processes.

107. Piaget's theories were rooted in observation and testing and are still utilized in our field. Neuroscientific developments through functional imaging have helped refine our understanding of his cognitive development theory.

108. To summarize, neurological, psychosocial, and cognitive development in the child and adolescent all play a role in the determination of decision-making capacity.

B. Full Disclosure

109. To provide informed consent to treatment, a patient must be given full disclosure. (Varkey 2020) This must include: a) an explanation of the diagnosis and how it was arrived upon, b) information about the diagnosis and what is known regarding outcomes, c) the options that the patient has for treatment (including no treatment), d) the risks and benefits surrounding each treatment option, including those risks and benefits that are unknown, and e) the likelihood of the risks and benefits (occurring over the short and long term)

for each treatment option.

110. Additionally, the physician must present details of the treatment options, including but not limited to, the preparation for the treatment that is necessary, and the follow up that should occur afterward for the best outcomes.

111. The physician should have knowledge of the subject area, and be objective in approach, placing the decision in the hands of the patient. The physician's role is to provide information and education to the patient based on expertise and to allow the patient to voluntarily consent.

C. Comprehension

112. Comprehension in the informed-consent process requires that the patient understand the diagnosis, the treatment options, and risks and benefits. To demonstrate comprehension, patients are asked to explain these things back to the physician in their own words, indicating that they intellectually have grasped the content. Adolescents are developing the ability to engage in deductive reasoning as they grow toward adulthood. They can consider the hypothetical, which makes their ability to think about abstract consequences of treatments possible as they mature. However, it is important to note that the adolescent brain's ability to "appreciate" is evolving throughout adolescence and into adulthood. Hence, being able to fully appreciate outcomes of treatment, particularly those that are more abstract, is difficult

through this period. Additionally, adolescents are still prone to impulse-driven decisions that end in more immediate gratification or reward, regardless of risk.

III. Parental Consent with Child Assent When Minor Informed Consent Is Unattainable

113. An adolescent's capacity and competency are not assumed in most cases, and parents are generally seen as medical decision makers for them. The rationale underlying this presumption is that "parents have what children lack in maturity, experience, and capacity for judgment when making difficult life decisions." (Diaz 2015).

114. There are exceptions to parents' ability to provide consent for the minor. In certain circumstances, a state may substitute its judgment that a medical procedure is in a child's best interests, even if parents do not consent. Likewise, a state may determine that a medical procedure is *not* in a child's best interest, even if parents attempt to give consent — an example being parents seeking to permit sterilization of their children.

GENDER DYSPHORIA AND INFORMED CONSENT IN MINORS

115. As explained above, informed consent requires that a patient have decision-making capacity, which includes the ability to understand, reason, appreciate, and comprehend the information presented in a full disclosure of a diagnosis, its prevalence, available treatments, and the treatments' risks and benefits.

There are at least two problems with this within the minor population when it comes to gender dysphoria.

116. First, patients must understand, reason through, and appreciate that the prevalence of gender dysphoria has been on the rise in adolescents, and there has been little research as to contributing factors. Additionally, there are a host of other co-occurring issues that need to be weighed in navigating treatment direction. Patients must understand that when these factors and co-occurring issues are brought to conscious awareness in therapy, gender dysphoria is often transient and remits. This is, at minimum, a difficult task for minors to understand.

117. Second, when considering treatment options for gender dysphoria, patients must be able to appreciate and weigh their options. The option of exploratory therapy inherently has far less risk than undergoing medical gender transition, but it takes time and considerable emotional investment as it explores the various systems in an adolescent's life. Albeit very fruitful and with minimal risks, it can still be emotionally taxing. Research confirms that adolescents devalue delayed outcomes relative to adults. (Huang 2017) Adolescents are less inclined to plan ahead or anticipate the future consequences of their actions before acting. (Steinberg 2009).

118. Gender affirming care and medical transition may appear to be "quicker"

answers to dysphoria and internal discomfort, as they aim to directly and immediately validate the adolescent's feelings about becoming the opposite gender, and they summarily dispense with any need to understand or explore causation. Considering both options, the impulse-prone adolescent is likely to find the latter far more rewarding.

119. In order for the minor to provide informed consent, the adolescent would need to be developmentally capable of appreciating the long-term consequences and risks of each option, and to be able to supersede impulse and desire for reward (to become the opposite gender), and attribute both options equal consideration. This requires complex deductive reasoning, planning, and thinking through future hypothetical life events like the desire to have children and potentially breastfeed. They would have to be able to fully comprehend and appreciate the debate over medical gender transition side effects, risks, benefits, and outcomes, and the issue of data quality. The complexity of the debate over the safety and outcome data is remarkable, and essential for the patient to understand as the potential risks involved can affect a minor patient's entire life. This particular task, in my opinion, is insurmountable for a minor patient.

120. These two barriers and necessary prerequisites to minor informed consent — (1) the requirement to understand, reason through, and appreciate that the

prevalence of gender dysphoria has been on the rise in adolescents, that there has been little research as to both contributing factors, and the long-term effects of suggested medical interventions; and (2) that there can be a host of other co-occurring issues that need to be weighed in navigating treatment direction — are discussed further below. These details must be adequately and sensitively considered by all persons involved in the informed consent process to accurately ascertain and preserve the range of informed choices and effective options available to the patient. This more detailed discussion of these prerequisites and barriers will be followed by a discussion of why parental consent with minor assent should not be sufficient in the case of medical or gender transition.

I. Minor Gender Dysphoria Prevalence and Informed Consent

121. When the prevalence of a particular presentation increases, regardless of what presentation is, physicians must first ask themselves what factors are leading to the increased prevalence and what co-occurring issues are also presenting.

122. For example, if there were an increase in the prevalence of hypertension (high blood pressure) in teenagers, physicians would naturally craft a two-pronged response. One would be tailored to the potential factors that have led to the heightened prevalence, and the second would be tailored to any co-occurring conditions they see accompanying the hypertension in the event that those are

linked or causative. They would not simply advise all teens with hypertension to take medications that could carry associated risks. They would first take measures to address factors that may affect prevalence, like an increase in sugar consumption among youths, or an increase in cultural acceptance of childhood obesity. Second, they would also take measures to address co-occurring factors like obesity, stress, and sedentary lifestyles. Patients would be informed of these factors and co-occurring issues, and physicians would help each patient to appreciate them and to address them with education about the effects of obesity and too much sugar and about the need for improved diet, exercise, and stress-relieving measures. While these interventions may take time in comparison to medicines that relieve hypertension quickly, they would carry far less risk to the adolescent.

123. Second, when looking at increased prevalence of a presentation, physicians should ask themselves if the presentation is transient or continual over a meaningful span of time. Patients, in the informed-consent process, would need to know if their diagnosis is one that can resolve over time, if it is permanent, whether or not it requires immediate treatment, how soon it might require an intervention that entails proportionally significant risk, the relative likelihood or probabilities of all of the above, and how all of this information relates to the reliability of existing research and the current frontiers and limits

of scientific inquiry.

124. For example, if teens were showing signs of mood lability through a particular stage of puberty, physicians would look at whether the lability was transient, and whether it would resolve completely on its own. If a known external cause was identified, they would seek to address it. If it were determined to be transient and a normal part of youth maturation, then physicians would likely provide support through that stage and see if the lability declined naturally. If not, they'd address it later.

125. Taking a second example, in mental health, if a five-year-old patient presented with difficulty with affect regulation, as well as trouble focusing and being still in the classroom, most physicians would not diagnose ADHD on initial assessment. The diagnosis and labeling of ADHD carelessly or prematurely can have negative implications for the child. Rather, they would investigate what other issues are happening in the child's life, and consider the child's development, family history, abilities according to a psychoeducational assessment, teacher input, the way the child learns, his classroom structure, social skills, and his stressors. Additionally, they would consider that children who are five years of age are in the developmental stage of initiative vs. guilt, and the milestone of this stage is "purpose." The child is learning to navigate social rules and gain self-regulation. From a neurodevelopmental perspective,

the child's brain is presently at the stage in which impulse control centers, motor centers, and expressive language centers are not yet fully matured, and hence, his behavior may be merely a result of him needing to grow more. Any treatment interventions beyond parental guidance, teacher guidance, and therapeutic support may be unnecessary or even detrimental as risk would likely outweigh benefit. Further time and observation would allow physicians to gain a better understanding as to whether the child will outgrow these behaviors, or whether they will be sustained once he grows and other factors resolve. The child and his parents, as part of informed consent, would need to know that these behaviors sometimes pass on their own with maturation. They would also need to understand the evidence (or lack thereof), risks, and benefits of all treatment options that are available if these behaviors did not resolve with maturation.

126. With regard to gender dysphoria, the heightened prevalence in recent years should cause physicians to identify possible contributing factors and co-occurring issues, and then craft a two-pronged response that addresses these, all prior to recommending medical transition which entails risk. Patients need to be able to understand, reason through, and appreciate these factors and co-occurring issues and have the opportunity to explore them prior to considering transition. The factors I've observed to contribute to the heightened

prevalence of gender dysphoria are an increase in "pathologizing" of a normal part of childhood development, shifts in cultural norms having to do with gender exploration in adolescence, the influence of social media, heightened vulnerability in youth, and what some call "social contagion." Some co-occurring issues that I have observed are trauma, depression, anxiety, autism spectrum disorders, influential gender-role experiences, vulnerability and a lack of feeling socially accepted, and the influence of social media. These are identified and addressed as the patient goes through the therapeutic process and supports for the patient are also harnessed. As part of informed consent, patients should understand and appreciate that when these issues are addressed, frequently gender dysphoria is transient and remits. As stated above, this understanding and appreciation is an extremely difficult task for adolescents.

II. Minor Treatment Recommendations and Informed Consent

127. Major medical associations, including WPATH, have endorsed puberty suppression and cross-sex hormones as treatments for youth with gender dysphoria. Patients, in the informed-consent process, need to be able to understand, reason through, and appreciate the limits of medical knowledge and the issues that are of ongoing debate regarding gender transition, including the debate over long-term outcomes, safety, and potential risks.

128. The WPATH SOC-8, in its adolescent chapter, states: "We recommend health care professionals working with gender diverse adolescents undertake a comprehensive biopsychosocial assessment of adolescents who present with gender identity-related concerns and seek medical/surgical transition-related care, and that this be accomplished in a collaborative and supportive manner." (Coleman 2022, Recommendation 6.3) It goes on to state:

> ***The following recommendations are made regarding the requirements for gender-affirming medical and surgical treatment (All of them must be met):***
>
> **6.12- We recommend health care professionals assessing transgender and gender diverse adolescents only recommend gender-affirming medical or surgical treatments requested by the patient when:**
>
> **6.12.a- the adolescent meets the diagnostic criteria of gender incongruence as per the ICd-11 in situations where a diagnosis is necessary to access health care . . . .**
>
> **6.12.b- the experience of gender diversity/incongruence is marked and sustained over time.**
>
> **6.12.c- the adolescent demonstrates the emotional and cognitive maturity required to provide informed consent/assent for the treatment.**
>
> **6.12.d- the adolescent's mental health concerns (if any) that may interfere with diagnostic clarity, capacity to consent, and gender-affirming medical treatments have been addressed.**
>
> **6.12.e- the adolescent has been informed of the reproductive effects, including the potential loss of fertility and the available options to preserve fertility, and these have been**

> **discussed in the context of the adolescent's stage of pubertal development.**
>
> **6.12.f- the adolescent has reached [T]anner [S]tage 2 of puberty for pubertal suppression to be initiated.**
>
> **6.12.g- the adolescent had at least 12 months of gender-affirming hormone therapy or longer, if required, to achieve the desired surgical result for gender-affirming procedures, including breast augmentation, orchiectomy, vaginoplasty, hysterectomy, phalloplasty, metoidioplasty, and facial surgery as part of gender-affirming treatment unless hormone therapy is either not desired or is medically contraindicated.**

(Coleman 2022, Recommendation 6.12)

129. On page S5 of the WPATH SOC-8 guidelines, the Introduction presents the guidelines as reliable, comfort-oriented, safety-oriented, and evidence based. "The overall goal of the . . . (SOC-8) is to provide clinical guidance to health care professionals to assist transgender and gender diverse (TGD) people in accessing safe and effective pathways to achieving lasting personal comfort with their gendered selves with the aim of optimizing their overall physical health, psychological well-being, and self-fulfillment." The introduction continues: "WPATH envisions a world wherein people of all gender identities and gender expressions have access to evidence-based health care, social services, justice, and equality." In the next paragraph, WPATH assures readers that "[o]ne of the main functions of WPATH is to promote the highest standards of health care for individuals through the Standards of Care (SOC)

for the health of TGD people," and that "[t]he SOC-8 is based on the best available science and expert professional consensus." The Abstract itself, in the Methods paragraph, expressly offers the following assurance:

> The SOC-8 is based on the best available science and expert professional consensus in transgender health. International professionals and stakeholders were selected to serve on the SOC-8 committee. Recommendation statements were developed based on data derived from independent systematic literature reviews, where available, background reviews and expert opinions. Grading of recommendations was based on the available evidence supporting interventions, a discussion of risks and harms, as well as the feasibility and acceptability within different contexts and country settings.

(Coleman 2022)

130. Reading these statements, the natural assumption of patients, parents, caregivers, and many physicians is that the factors contributing to gender dysphoria have been well established and that based on those factors, "seek medical/surgical transition-related care." (Coleman 2022, Recommendation 6.3) It is further assumed that when the recommendations above are followed with minors who have gender dysphoria — directing the patient to gender-affirming care, then on toward medical suppression of puberty, cross sex hormones, and gender reassignment surgeries. — these interventions will automatically be the best course of treatment. Furthermore, the WPATH recommendations leave ample room for physicians, patients, and parents to erroneously assume that recommendations for medical and surgical gender

transition are evidence-based, that is, founded in rigorous scientific inquiry through randomized controlled trials and long-term follow-up studies that affirmatively show positive medical and psychological outcomes and established safety records. Lastly, the physician and the patient (and parent) might naturally assume that the quality of the studies must be high, given that altering the natural course of development in youth is a significant measure; that it is relatively new; that it is not something that the medical community has engaged in historically; and that common sense would indicate that such major interventions generally would only be justified on the basis of thorough deliberation, ample and solid research, and strong evidence.

131. However, there is remarkable controversy and debate over these recommendations and the data that supports them.

132. While physicians can understand and appreciate the controversies that follow below, in my view adolescents are not developmentally able to do so. Their neurodevelopment and proneness to impulse-driven decisions make it highly possible that they will disregard or undervalue the critical issues of controversy and debate and move forward with assent/consent to medical or surgical transition, all to achieve the perceived reward of achieving secondary sex characteristics of the opposite gender.

133. I believe that several issues must be fully considered and appreciated by

patients in order for them to be able to provide appropriate informed consent. However, many of the most vital issues cannot be sufficiently appreciated in adolescence. These issues are listed below:

- The Dutch Studies have been foundational in the formation of the WPATH recommendations but are suspect in terms of their quality and their applicability to the patient population currently presenting in America. "Several recent international systematic reviews of evidence have concluded that the practice of pediatric gender transition rests on low to very low quality evidence—meaning that the benefits reported by the existing studies are unlikely to be true due to profound problems in the study designs." (Abbruzzese 2023)
- Gender dysphoria is the only diagnosis that I am aware of for which an alteration of bodily integrity is being clinically advised for the purpose of affirming identity.
- There is debate over the quality of data used in studies assessing links between suicide rates and gender dysphoria, including the change in suicide rates post-transition.
- The WPATH recommendations state that only one comprehensive psychological assessment should be required for minors in order to proceed to transition. (Coleman 2022) Patients should understand that

such co-occurring health concerns and issues accompanying gender dysphoria take time to identify, and one comprehensive assessment is not sufficient to do so for any practically condition in mental health.

- The WPATH recommendations state that decision-making capacity has to be determined in each adolescent wanting to undergo gender transition based on each adolescent's development. (Coleman 2022) But WPATH elides the crucial issue: both patients and parents/guardians should understand that it is not well established that adolescents can *ever* meet such requirements for decision-making capacity when they are offered non-emergent treatments that substantially affect bodily integrity and that have potentially life-long irreversible consequences on reproduction and multiple other bodily systems.
- There is significant debate about whether the majority of children and adolescents with gender dysphoria realign with their birth sex with time and maturation.
- There is debate as to the lack of studies that evaluate the factors that are leading to the heightened prevalence of gender dysphoria.
- Patients and their parents must understand that while gender medicine experts claim minimal risk with puberty blockers, this is highly controversial. They should also understand that almost one hundred

percent of those taking puberty blockers go on to receive cross-sex hormones. Hence, even if puberty blockers themselves were of low risk, the trajectory of medical gender transition includes cross-sex hormones, which render a patient infertile.

- There is additional debate over the long-term side effects and consequences of the medical transition trajectory, including but not limited to potential problems with bone growth, brain maturation, metabolic function, endocrine function, sexual health, psychological function, and reproductive capacity.
- There is debate as to whether minors can appreciate the potential impact that infertility can have on an individual's psyche should they one day desire to have children.
- There is insufficient data on detransitioners, and there is literature that states that those who detransition may not access adequate follow up or support.
- The interplay between gender dysphoria and common co-occurring conditions, and how treating those conditions may affect an individual's gender dysphoria, have not been adequately studied.
- Alternative approaches to treating gender dysphoria have not been adequately studied.

134. In my experience, the task of understanding, reasoning through, appreciating, and comprehending the above matters is insurmountable for adolescents.

135. Furthermore, I don't believe that parents should be able to provide medical consent with minor assent for medical gender transition. This is because the debate that exists has to do with the safety of treatments that affect the bodily integrity of the minor, and there is debate as to the long-term outcomes of such treatments. Many of these debated outcomes would stand to permanently affect the quality of life of the minor, in multiple arenas such as romantic relationships, marriage, sexual intimacy, childbirth, child rearing, self-concept, social and workplace relationships, potential adversity due to discrimination, and long-term psychological and medical health. In my opinion, for a parent to provide consent to non-emergent treatments that stand to affect the rest of a minor's life in every arena, and to do so without the minor's full ability to appreciate the above debate and potential long-term ramifications, violates the minor's future right to autonomy.

TRAUMA AND GENDER DYSPHORIA

136. Children and adolescents with gender dysphoria who have been through trauma may have an even greater difficulty with appreciating and weighing the various treatment options for gender dysphoria. Trauma affects how children and adolescents process the world around them, how they interact

and engage in relationships, how they perceive various events and situations, and how they react and behave. Trauma influences the way individuals perceive their own bodies. Their sense of bodily safety and how they feel about their outward appearance is often significantly affected. The risk in offering medical or surgical transition to adolescents who have gender dysphoria and a history of trauma is that they may find gender transition to be appealing and a "quick fix" to their complex internal emotions and feelings about their bodies. This may stand in contrast to a child or adolescent's perception of trauma-focused therapy modalities that are directed at helping an individual work through, process, and recover from trauma, as these treatments take an extensive amount of time (months to years) and are emotionally very difficult. While trauma-focused therapies are data-driven and effective and allow an individual to experience healing and then to make more consequential life decisions, the child or adolescent may not give them consideration when perceiving that medical or surgical transition would help them to feel better faster by changing how they feel about their body. It may prove tempting to try and resolve internal woundedness by changing external appearance, but an adolescent is likely to experience regret after transition if the internal woundedness is not first addressed through the therapeutic process.

137. Trauma can be due to a number of different experiences. Trauma arises when there is a "failure of the natural physiologic activation and hormonal secretions to organize an effective response to threat." In early childhood development, the orbitofrontal and limbic structures in the brain mature in response to the caregiver. Dysfunctional associations in this relationship between caregiver and child result in permanent physicochemical and anatomical changes which impact the child's developing personality and behaviors. Children who have been exposed to ongoing stress lose the ability to use their own emotions to guide effective actions. They often cannot recognize their own feelings, and so they are not able to respond appropriately to stressors. The inability to identify emotional states also often affects the child's ability to recognize others' emotions. Due to difficulty in regulating their own internal state, they become very reactive to their environment. They respond with emotion and impulsivity, behaviors that are often an externalization of the chaos and stress they feel inside. (Trauma Recovery Institute)

138. Trauma can occur outside the parent-child relationship. Exposure to domestic violence, abuse, neglect, animal abuse, poverty, substance abuse, bullying, disasters, loss of a loved one, or parental illness can cause similar psychological and physiological responses in children. Some forms of

trauma, particularly interpersonal trauma and abuse, place children and other survivors at increased risk of future trauma because past experiences of victimization are associated with an increased risk of subsequent victimization. (Jaffe 2019)

139. Trauma can cause:

- Loss of self worth
- Heightened Reactivity (e.g., explosivity and anger outbursts)
- Hyperarousal
- Withdrawal from others or avoidance
- Difficulty with trusting others
- Shame
- Loss of danger cues
- Loss of a sense of self
- Poor self-esteem
- Hypervigilance
- Confusion or feelings of being lost
- Depression and anxiety
- Impulsivity
- Negative body image and desire to hide body or change appearance
- Oversexualized behavior or sexual avoidance

- Dissociation
- Hallucinations or Re-experiencing
- Flooding
- Frequent somatic symptoms
- Enuresis (bedwetting)/encopresis (soiling)
- Body inflammation or repeated infections, autoimmune problems

140. Trauma impacts every system in the body: gastrointestinal, genitourinary, endocrine, cardiovascular, neurologic, and immune systems. (Heim 2008) With regard to neurodevelopment, functional neuroimaging of children and adolescents exposed to maltreatment has shown executive, attentional, and affective emotional dysregulation. (Mueller 2010).

141. Children do not generally disclose trauma on initial assessment. Disclosure can take months and sometimes years. Children must experience safety within the therapeutic relationship, which takes time and patience to establish. As therapy continues, children will disclose trauma when they feel safe enough to do so and trust the examiner's response.

142. Trauma treatment (psychodynamic therapy and trauma focused cognitive behavioral therapy) focuses on a) education surrounding trauma; b) identification of feelings and emotions; c) understanding safety and practicing mindfulness, relaxation, and the ability to calm the sympathetic nervous

system; d) exploration and processing of the trauma and its effects through a trauma narrative in a safe therapeutic setting; e) harnessing family/loved one support and validation; f) clarification where appropriate; g) building a healthy self-concept; h) a reorientation to the environment through awareness that trauma can impact all arenas of life; and i) continued support. The goal in recovery is for the individual to heal emotionally, to have internal and external ability to self-regulate and respond to stress appropriately, and to be able to engage in relationships in a healthy fashion. This type of treatment takes time, as there must be patient-therapist rapport and adequate trust laid down as a foundation.

143. Due to the effects of trauma on all bodily systems, and its effects on self-concept and body image and appearance, it is critical to realize that it can contribute to gender dysphoria. Explorative (psychodynamic) therapy and Trauma Focused Cognitive Behavioral Therapy is important to help the patient identify, process, and work through trauma in order to ensure that the patient is not experiencing gender incongruence due to the trauma itself. This information is valuable to patients as they navigate and chart their own courses through their unique, individual processes of healing and growth.

144. Research suggests relatively higher levels of reported trauma among children with gender dysphoria and among transgender and gender-nonconforming

adults. In one study that considered relational trauma up to age 14 within primary relationships:

> Results showed that 10% of GD participants had not experienced any early adversity, 13% had experienced one form of trauma, 8% had experienced two forms, 13% had experienced three forms and 56% had experienced four or more forms. In the control group, 30% of participants had not experienced any form of trauma, 37% had experienced one form of trauma, 16% had experienced two forms, 9% had experienced three forms and 7% had experienced four or more forms.

(Giovanardi 2018) Another study reported similar findings. (Schnarrs 2019)

145. Timely and compassionate assessment, diagnosis, and trauma-informed treatment is likely to meaningfully improve long-term outcomes for children with gender dysphoria, whether they come to identify with their natal sex or whether they persist in their transgender identity.

146. It has been my clinical experience that when youths with gender dysphoria are treated with psychodynamic therapy, and a history of trauma is identified and subsequently treated, gender dysphoria often remits or resolves. In other cases, youths have gained clarity about how trauma has affected them and can move forward as adults with the ability to make mindful decisions surrounding gender dysphoria treatments. Each of these children deserves the option to achieve this clarity, treatment, education, and support, regardless of which options they ultimately choose.

147. Because actual patient cases cannot be discussed in this report, I have

provided four hypothetical situations based on my experiences to illustrate how trauma affects gender incongruence and gender dysphoria, and when treated, can result in its resolution or provide clarity for future treatment decisions.

a. A female teen describes gender dysphoria. She wants to be called "she/her" and not change pronouns yet because she is worried that her grandmother may find out about her gender dysphoria and be angry. On initial assessment, it becomes clear that she experienced maternal abandonment at a young age.

   Over the course of therapy, she says has a vivid recollection of her mother leaving her at her grandmother's home and not returning. Her grandmother is emotionally and physically abusive toward her often and a child protective report has to be filed. She has remarkable difficulty in trusting others and isolates herself socially due to fear of not being accepted. She has been bullied by female peers. She says that she is unsure of others' responses and fears rejection. Inside, she feels persistently anxious, struggles to enjoy normal activities for girls her age, and describes feeling uneasy. She expresses that she identifies as male. When her perception of gender roles is explored further, she talks about women being angry, uncaring, and harsh. She describes

wishing she'd had a father who had protected her and kept her safe. She says she always thinks about how she could have kept herself safe and struggles with guilt and shame associated with the abuse because she believes she allowed it to happen.

As trauma-focused treatment is provided, she learns about the effects of trauma and what emotions survivors struggle with. After working through her trauma narrative, she realizes that her identification with male gender is due to an unconscious desire to protect herself from abuse, and to be strong enough to "fight it," and to not feel anything in common with the females in her life who have been neglectful, abusive, and wounding. This conscious awareness allows her to begin recovering. She learns new ways to feel in control and safe and learns to identify her feelings and process them and use logic alongside emotion in decision making and in relationships. Over the course of many months, and ongoing support and psychodynamic therapy, she realigns with her natal sex. She says she feels safe and in control of her own body now.

b. A male teen is nonbinary and prefers to be called "they/them." On initial assessment, they report having been bullied at school and not fitting in since a very young age. They have suffered from ADHD

related impulsivity and reactivity and often got in trouble in elementary school. Peers were unkind and often refused to eat with them at lunch or play with them at recess. Due to ADHD medication side effects, they reported being very thin and feeling awkward. As other kids developed and boys became more athletic, and girls developed breasts, they described feeling uncomfortable in their body because they remained thin, lanky, and of short stature through middle school. Last year, while being online playing video games, they met a couple of transgender peers online. They began to get to know one another and establish friendships. This was the first time they felt connected and safe. Engagement with them during daily gaming became routine, and they got to know one another and built friendships. They began to learn more about gender incongruence online and began to feel that they were nonbinary and that maybe this was why they never fit it and felt so anxious socially. They discussed this with their friends online, and friends supported gender exploration and made statements that they "knew the feeling" and "were there for them."

In exploratory therapy, they discuss several incidences of bullying that were traumatic and caused marked emotional harm. Trauma focused-therapy is initiated, and they are able to bring to conscious awareness

past feelings of being trapped, of being unwanted, being unworthy, and being unloved by others. They also identify fear of bodily harm due to bullying and wanting to go unnoticed by peers at school to preserve a sense of safety. As they learn ways to identify and work through the intense emotion that accompanies memories of past trauma, they begin to realize that being gender nonbinary has allowed them to feel safer. It has been a way to describe a deep feeling of discomfort with their own body and a feeling of being different. Having made strong friendships with transgender peers who also had gone through similar feelings, they realize that identifying as nonbinary allowed them to also feel closer to their friends. Over time, they begin to feel more positively about their own self-concept and friendship making ability, and to use coping skills to work through memories of past trauma. They begin to want to be referred to as "he" and describe realigning with natal sex. He is able to process and understand trauma and its impact on feelings about bodily appearance, bodily safety, and a need for secure relationships.

c. A female teen has gender dysphoria. She describes wanting to be called "he/him." He talks about wanting to medically transition and denies any past history of psychiatric issues. He describes having a good

relationship with his mom, and not knowing where his father is, who left their home when he was ten years old. He describes having a history of urinary tract infections, enuresis (bedwetting), and constipation. Medical records are consistent with his description. Throughout early therapy, he talks about his relationship with his mother and how she is dating someone new. He says he doesn't mind, but becomes more uncomfortable when mom's partner moves in. He begins to have difficulty with sleep, and his mother reports that he is very reactive and at times hostile toward her partner. He begins to have enuresis again and also stomachaches.

Over the course of therapy, he eventually discloses that his father had touched his (female) privates several times and shown him naked pictures of girls. Trauma-focused therapy is initiated. He learns about trauma, its impacts, and normal feelings that children experience when victimized. He learns how to calm himself and self-regulate intense emotion through progressive muscle relaxation and deep breathing. He engages in developing a trauma narrative and is able to detail what happened to him over the upcoming many weeks. He talks about past fear of his father that turned into rage and fantasies of fighting his father and making sure that he could never harm anyone again. This brings

to his conscious awareness that identifying as male allowed him to feel power over his abuser and to feel a sense of control. When thinking of being in a male body, he felt safer, and he didn't have to feel the fear and feeling of being trapped that he used to in a female body. Over the course of a couple of years, as he begins to recover from the sexual trauma he'd suffered, through ongoing therapy and support, he begins to come in wearing female clothes. He wants to be called "she/her" and says that she feels more comfortable being female now. She feels safe and in control in her own body.

d. A male teen is struggling with gender dysphoria and prefers to be called by "she/her." She talks about being raised by her single adoptive mother since age four. Her dad was not active in her life. She struggled with ADHD and anxiety throughout elementary and middle school. She struggled with academics and didn't feel like she fit in. She began experiencing gender dysphoria at the age of eleven when she began to develop body hair and sweat and feel "gross." She talks about male features (like her broad shoulders) having made her feel angry when she looked in the mirror.

   Through explorative therapy, she began to talk about how she often wondered about her birth family and why she was given up. She

wondered if she looked like her birth father, and she said this thought made her physically ill. She said she'd have panic attacks when looking at her shoulders widening and at hair in her armpits and private areas. As therapy progressed, she talked about having been told her birth father had been in jail and was a drug addict. She wondered if she'd be like him, and this caused her to have tremendous anxiety. She is able to bring to conscious awareness that she felt more comfortable as a female because she didn't want to grow to up be like her birth father, because he abandoned her and was a "criminal."

Through additional work with a therapist specializing in adoptions, she is able to understand that she suffered trauma as a child due to separation from her birth mother, regardless of being moved to a safer adopted home. She is able to learn about the feelings that children who've experienced adoption often go through and understand that her feelings are reasonable and normal. She is able to bring to conscious awareness that her feelings about not wanting to be like her birth father are a normal part of processing her past and considering who she wants to be in the future. She learns from her therapist about neurodevelopment and how the adolescent brain is still developing. With good support from her family in place, she continues in her social

transition, but also continues therapy for support and ongoing processing of her stressors. She decides to medically transition as an adult, and says she feels her decision making is clearer as she has been able to understand her gender identity, come to terms with how trauma has affected her, and be confident in her ability to provide informed consent as an adult with a lesser risk of regret.

CONCLUSIONS

148. In my clinical experience, informed consent is remarkably difficult with minors. Even when prescribing a psychiatric medication, adolescents are most often unable to appreciate the long-term risks, nor are they able to comprehend the details of full disclosure. I find this is secondary to their psychosocial and neurodevelopmental stage of development. They can communicate a choice. They can understand the diagnosis and treatment options to an extent. However, they are less able to comprehend and appreciate the implications of the diagnosis and treatment options long term. Generally, they are focused on "feeling better" and choosing the treatment pathway that leads to feeling better quickly regardless of treatment side effects or risks. Once they have identified the path they want to take, they most often lose sight of other treatment options that may take longer, though they are just as effective at helping them feel well, and with lesser risk. In the setting with

outside influences, this push to choose the path with the immediate reward while devoting less attention to other options, is even more evident.

149. For this reason, with very rare exceptions, I employ parental consent with minor assent in the process of prescribing treatments to minors, and only after weighing the risk/benefit ratio of treatment interventions and providing full disclosure.

150. If there are insufficient evidence-based benefits to treatment, and if benefits do not substantially outweigh risks of treatment, I do not prescribe medication.

151. In the event, that parental consent and minor assent is provided for a medication, but there is an issue of the growing child or adolescent's future autonomy being affected, I do not prescribe, unless there is medical necessity to treat due to an imminent risk to the child's safety or to others if the child is not treated.

152. Individuals with gender dysphoria deserve compassionate care that is not only equitable, but also well thought out, well researched, and well executed. In the matter of medical and surgical gender transition in minors, the overarching questions I ask myself regarding my own patients and the informed consent process, when reviewing all the literature and processing my own clinical experience, are:

- Can youths understand, reason through, appreciate, and comprehend all of the issues with the present data, the ethical dilemmas that are present, and the debate in the medical community?
- Can youths appreciate the future risks that medical gender transition entails, particularly regarding circumstances that only present later in life (like the desire to bear children and breastfeed)?
- Can they understand, appreciate, and comprehend the unknown risks of treatment on brain maturation?
- Can they appreciate and comprehend that there is debate as to whether suicidality improves or worsens post-transition?
- Can they understand the significance of the paucity of data on de-transitioners?
- Can parents provide consent (with minor assent) for treatments that affect bodily integrity, that are appropriately considered experimental due to lack of quality data, that carry marked long-term medical and psychological risk, for which long-term safety and efficacy is unproven, and that have the potential to create irreversible consequences such as infertility? All for the purpose of affirming an identity that has not yet solidified, based on what we know about the developing adolescent?

My answer to all these is, "Absolutely not."

153. With this context, I draw three primary conclusions:

I. Informed Consent Is Not Attainable for Medical or Surgical Transition in Minors

154. Minors lack decision-making capacity for medical and surgical transition. In my opinion, due to a lack of full neurologic, psychosocial, and cognitive developmental maturation, adolescents are unable to understand, reason through, appreciate, and comprehend the impact of the shortcomings of the present data, the lack of FDA indication for puberty blockers, the long-term risks and consequences of transition, and the low-grade rating of studies that have been used to support medical and surgical transition. Hence, they lack decision-making capacity.

155. As discussed in the section above regarding neurodevelopment and psychosocial development, when there is perceived reward with one pathway, despite long-term risks associated with that pathway, adolescents will generally select it rather than consider that there are alternative pathways with fewer long-term risks. With medical gender transition, adolescents are likely to perceive reward (in this case, reduced dysphoria) with the pathway of puberty blockers and cross-sex hormones and hence, they are likely to choose this path rather than considering other paths (such as engaging in exploratory or supportive therapy, socially transitioning, and waiting until adulthood for medical transition). Additionally, as peer and cultural influences are more

significant in adolescence, adolescents may make more impulsive decisions to pursue medical transition without considering risks. This also factors into a capacity judgment.

156. The risks associated with puberty blockers and cross-sex hormones are difficult for adolescents to comprehend and appreciate. First, the near certainty of infertility on the transition pathway is likely to not be appreciated until the age during which most individuals consider having children. The debate over impacts on hormonal shifts, bone density, cardiovascular risk, and brain maturation are simply too difficult for minors to grasp. Furthermore, effects of transition on more abstract situations that the adolescent may face decades later, such as effects on intimate relationships, sexual gratification, reproduction, breastfeeding, child rearing, family relationships, and self-concept are even more difficult to fully realize. Adolescents have not fully developed the ability to appreciate the treatment options in this context of "later life", which is part of decision-making capacity. Their deductive reasoning is developing, but not yet complete.

157. Furthermore, while parental consent and adolescent assent is possible for other medical interventions, it is insufficient in the matter of gender transition in minors. First, the risks to the growing adolescent are remarkable, including infertility, irreversible changes to secondary sex characteristics, potential

issues with bone density, cardiovascular risks, metabolic function, endocrine function, reproductive capacity, psychological and medical health, and brain maturation. Second, a parent is unable to determine whether their child will realign with his or her natal sex. This presents inherent risk. Third, the present data supporting the benefit of transition in adolescence is rated "very low quality." There is no reliable long-term data on safety or efficacy of these treatments.

158. For this reason, I believe that parental consent with adolescent assent for medical gender transition is problematic and can result in long-term detriment to the adolescent that later cannot be reversed. Parental consent may be deemed in the short term to be preserving the adolescent's autonomy by prioritizing the adolescent's desire to self-actualize and reduce dysphoria. However, in the long term, there is remarkable intrusion on the growing adolescent's autonomy as an adult. When the adolescent matures to adulthood and can't reverse consequences (e.g., fertility) of interventions that the parent consented to without the adolescent having had full capacity to appreciate, psychological repercussions are likely to be profound.

159. Regarding other medical diagnoses, where bodily integrity is challenged as a result of treatment, such as with cosmetic surgery in minors, informed consent has been a central issue.

160. In 2005, in the *AMA Journal of Ethics*, pertaining to teens who desire cosmetic surgery, authors cited The American Society of Plastic Surgeons statement against breast augmentation for patients under 18. In the absence of longitudinal research, they said,

> [I]t is impossible for physicians to warn patients, or their parents, about the risks of performing cosmetic surgery on bodies that have not reached maturation, the operative complications and long term physical effects of these surgeries and the psychological implications of surgery on developing body image, or the extent to which distorted body image common among adolescence may result in the pursuit of plastic surgery.

(Zuckerman 2005)

161. During the FDA hearings on breast augmentation, several physicians noted that obtaining meaningful informed consent from teenagers and their parents can often be difficult. According to one speaker, this difficulty is largely related to the fact that the kind of information being given to potential breast implant surgery patients is largely "probabilistic information" and "probabilistic thinking is the most abstract kind of thinking and the last one to develop in the range of skills and capacity that we have." Several physicians in attendance agreed. Dr. Charles Bailey noted that, "with respect to interacting with the patients, it's not uncommon to be sitting in front of a very young patient where you feel like nothing that you're saying is being heard." This is the exact sentiment echoed by physicians who are opposed to medical

and surgical gender transition in minors, an area in which data is even more controversial and the long-term risks of far greater magnitude. (Cohen Cooper 2014)

162. Furthermore, within my own clinical experience, I cannot envision a circumstance with my own patients wherein parental consent and minor assent would be sufficient for medical or surgical gender transition based on the above explanation. The justification of imminent risk to the child's safety or others around the child is not present. Additionally, not only could proceeding to medical or surgical gender transition profoundly affect the child, but also the parent-child relationship, which is of remarkable concern to me as a child psychiatrist.

II. A Better and More Compassionate Approach is Provision of Therapy Until Adulthood When Consent Can be Provided

163. Gender dysphoria can be a normal part of childhood development, as discussed in the section on my clinical experience above. It should not be labeled or pathologized, as it is most often transient, making a "watch and wait" approach sensible.

164. A compassionate approach to gender dysphoria in adolescents entails: a comprehensive assessment, individual and family therapy, and harnessing a support network for the patient. I have used this approach for years and have found it to be beneficial and far less risky. The child patients I've treated that

meet criteria for gender dysphoria realign with their birth sex with maturation (children) and a "watch and wait" approach. Adolescents most often realign with their natal sex with maturation, therapy, and support. Further, my patients who have decided to transition as adults have been grateful that they waited and that therapy helped them to be sure of their choice. They have felt positively about their decision-making capacity as adults.

165. This approach takes into consideration that medical and psychological risks are far too great to risk providing unproven treatment to a substantial number of minors who would otherwise realign with their natal sex.

166. Additionally, this compassionate approach adheres to ethical standards in the field of medicine, while medical and surgical transition for minors, individually and in combination, substantially risks violating those standards.

167. As an example, beneficence requires that the physician actively promote the welfare of the patient and protect the patient from harm. Regardless of positive intentions to provide relief for the minor with gender dysphoria, when a physician is seeking to use controversial treatments for a diagnosis 1) that has an increasing prevalence 2) for which contributing factors have not yet been adequately identified 3) for which alternative treatment pathways with less risk may not have not been well studied 4) that may resolve in children without any intervention or respond to very low risk supportive interventions

in adolescence and 5) could be intertwined with co-occurring conditions that could be treated with low risk interventions first, there should be concern over whether the physician violates the standards of beneficence and nonmaleficence. That is especially true when the risky treatments 1) have marked effects on a minor's bodily integrity, 2) carry significant long-term risks, 3) are unsupported by reliable long-term data about safety and efficacy, and 4) are recommended based on evidence deemed to be of very low quality by systematic reviews.

168. The physician seeking to recommend medical transition to a minor also risks violating the principle of informed consent, considering the minor patient lacks decision-making capacity.

169. If all of the above issues of debate and controversy have not been fully disclosed to the minor patient, and comprehended, the standard of truth telling is also not met.

170. And, lastly, the standard of distributive justice may be violated if the minor patient has not been meaningfully offered available resources such as exploratory therapy, family therapy, and supportive mental health care that may be offered to others in this same situation, given these are low in risk and likely high in benefit.

III. Tennessee Senate Bill I Appropriately Protects Minors

171. Individuals with gender dysphoria deserve compassionate care that is not only equitable, but also well thought out, well researched, and well executed.

172. They deserve to not be subjected to experimental treatments that, to date, lack high-quality studies, long-term outcome measures, and proven psychological benefit. Instead, they should all be afforded well-researched options that entail less risk and are more likely to be effective. They should also receive the time and patience and ongoing support necessary in order to pursue those options.

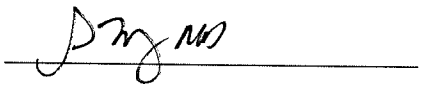
173. They deserve to have methodologically and scientifically sound research conducted on all possible pathways of treatment, so that they can make well informed decisions as adults about which pathway of treatment they'd like to choose.

174. They deserve to be supported, cared for, and shown that they are valued, as all individuals should.

175. Minor patients with gender dysphoria deserve to be treated with respect for their vulnerability and their stage of development, which makes them unable to provide informed consent. They deserve for their future autonomy to be protected.

176. While their immediate desire for relief needs to be addressed, they also need their desire for long-term happiness honored, as growing members of society.

They deserve to have the capacity to make their own decisions about treatments that would systemically alter their bodies and thereby affect their future relationships, their ability to have children, their ability to breastfeed, their ability to experience and feel positively about sexual intimacy, and their ability to feel well about themselves. This capacity cannot be reached until adulthood.



Geeta Nangia

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APPENDIX A. TRIADIC MODEL OF NEUROBIOLOGY

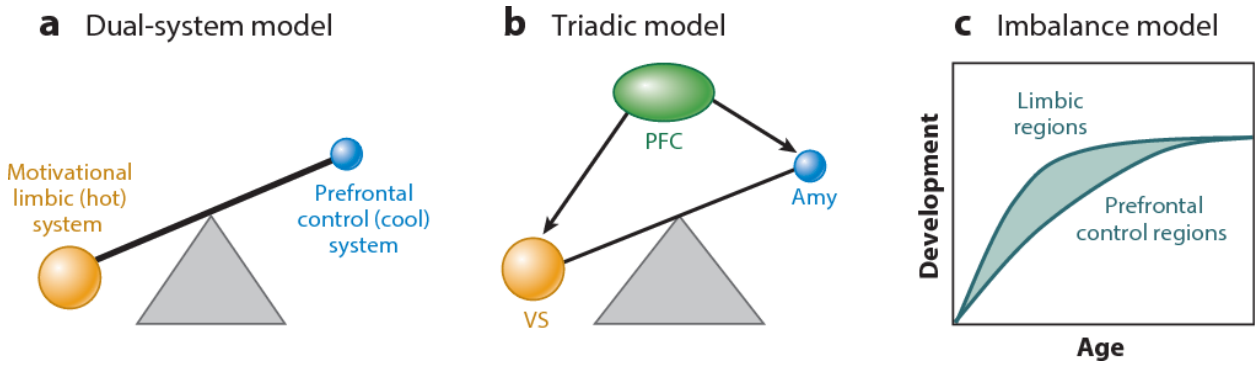

Figure 2

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Beyond simple models of self-control to circuit-based accounts of adolescent behavior.

B. Casey

APPENDIX B. ADOLESCENT FMRI STUDIES WHEN PRESENTED WITH REWARD

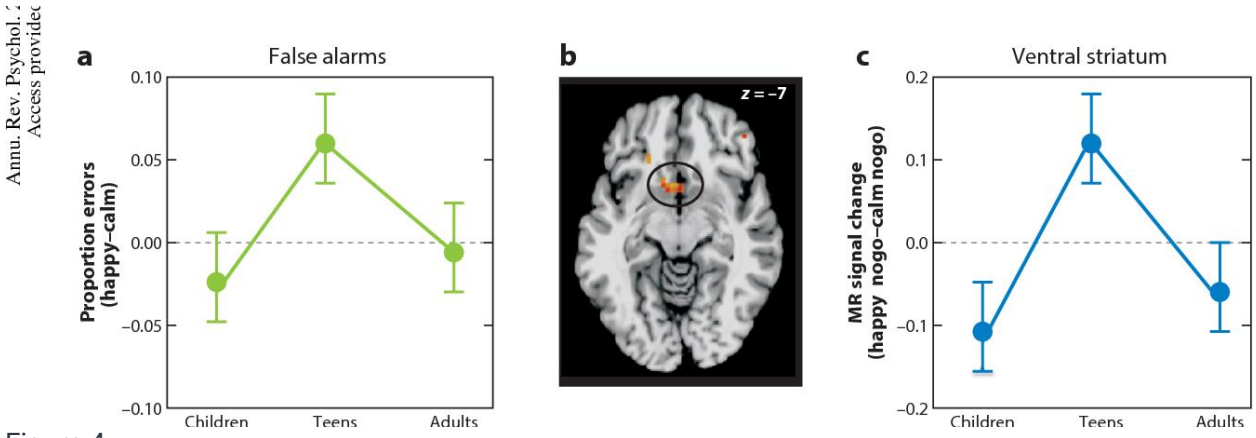

Figure 4
Published in Annual Review of Psychology 2015

Beyond simple models of self-control to circuit-based accounts of adolescent behavior.

B. Casey

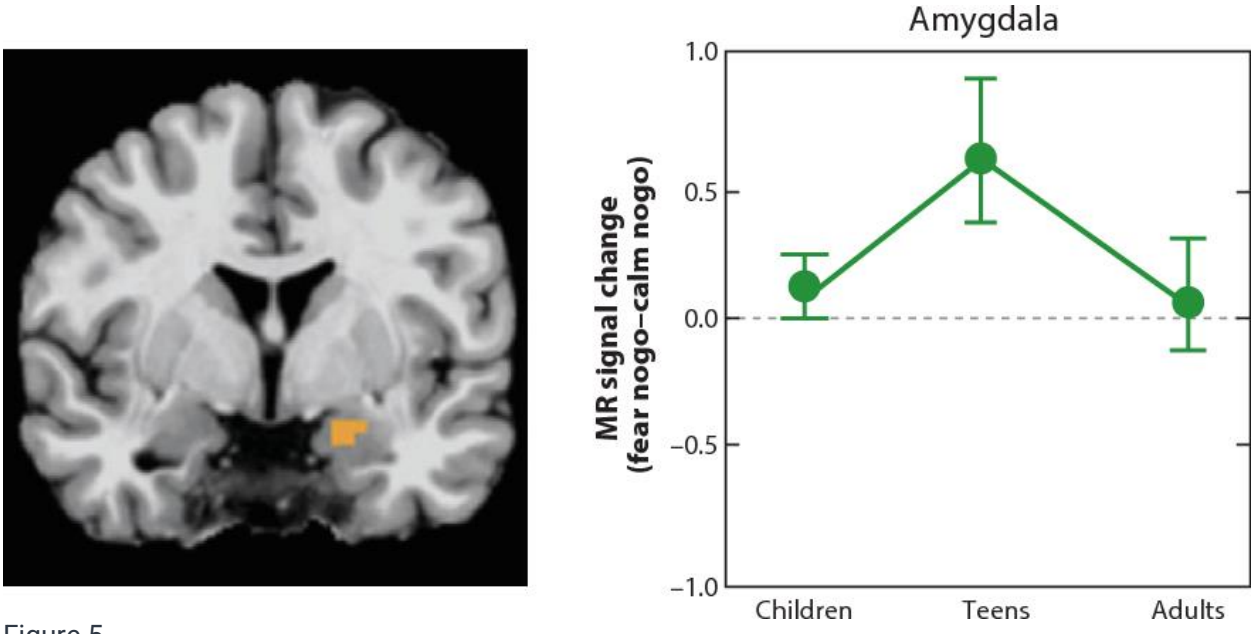

Figure 5
Published in Annual Review of Psychology 2015

Beyond simple models of self-control to circuit-based accounts of adolescent behavior.

APPENDIX C. CROSS TALK BETWEEN THE PFC AND VENTRAL STRIATUM

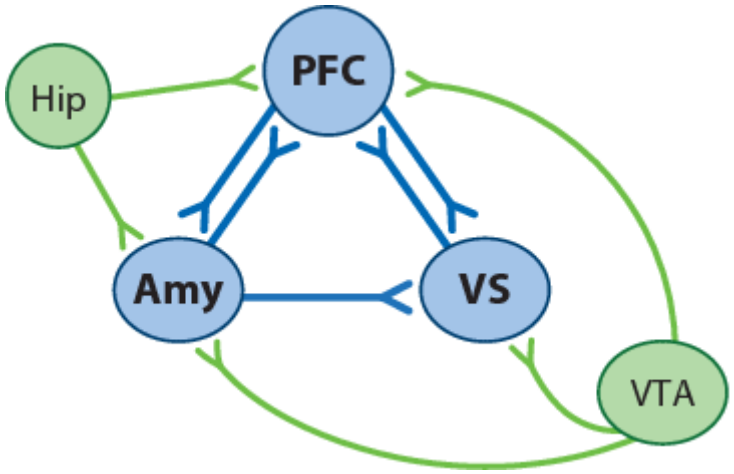

FIGURE 3

Published in Annual Review of Psychology 2015

Beyond simple models of self-control to circuit-based accounts of adolescent behavior.

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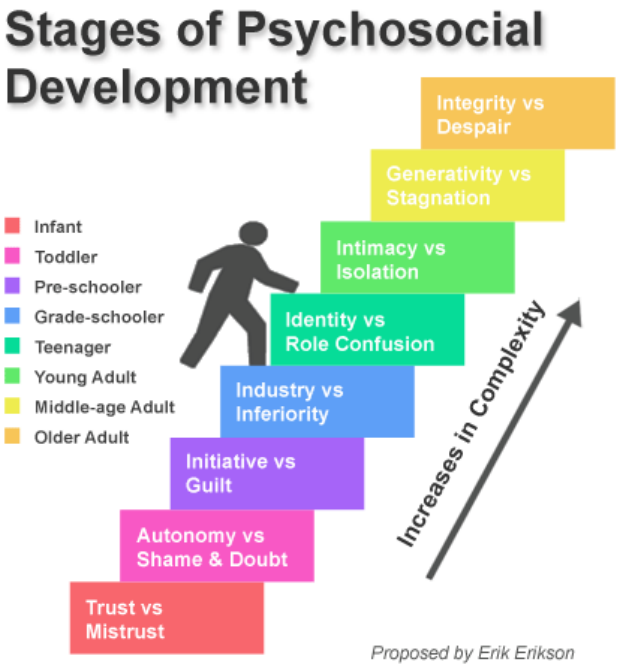
APPENDIX D. ERIKSON'S PSYCHOSOCIAL DEVELOPMENT MODEL



Geeta Nangia, M.D.

Board Certified in Adult Psychiatry and Child & Adolescent Psychiatry

Phone (864) 318-9930 • drnangia@jothgreenville.com

EDUCATION

Boston University School of Medicine — **Boston, MA**
Doctor of Medicine — May 2002

Boston University — **Boston, MA**
Bachelor of Arts Biochemistry, Molecular Biology — May 1998

INTERNSHIP AND RESIDENCY

Medical University of South Carolina — **Charleston, SC**
Child and Adolescent Psychiatry Fellow — June 2007

Medical University of South Carolina — **Charleston, SC**
General Psychiatry Resident — June 2006

EXPERIENCE

Known and Loved — **Greenville, SC**
CEO — **2021-present**
Educating, equipping, and supporting the growth of healthy families in our region. Providing mental health education and support to parents, with a special focus on foster and adoptive families. Helping parents to establish secure and healthy attachments with children, thereby improving their long term mental health outcomes. Laying the groundwork for schools, community service organizations, first responders, medical providers, and families to become educated and informed about Trust Based Relational Intervention (TBRI) and the importance of a trauma informed approach in working with children and youth.

Journey of the Heart, LLC — **Piedmont, SC**
Child and Adolescent Psychiatrist — **2022-present**
Providing behavioral health care for children and families, specializing in complex cases and trauma.

Parkside Pediatrics Behavioral Health — **Greenville, SC**
Child & Adolescent Psychiatrist — **2019-2022**
Opened and developed Parkside Behavioral Health at Parkside Pediatrics for Upstate SC children and families. Consulted on child and adolescent mental health cases for a large pediatric group with multiple sites. Coordinated care with local schools in order to provide accommodations and support for children

and youth. Provided parent and provider education classes. Specialized in complex cases and trauma.

Carolina Family Services **Greenville, SC**
Staff Psychiatrist **2016-2018**
Provided behavioral health care for children and families.

Edward Via College of Osteopathic Medicine **Spartanburg, SC**
Community Clinical Faculty and Lecturer **2015-2020**
Taught medical students about the principles of childhood development and clinical psychiatry.

Carolina Center for Behavioral Health **Greer, SC**
Staff Psychiatrist **2015-2016**
Provided psychiatric services in an inpatient unit for children and adults of all ages who were in need of acute crisis stabilization and mental health services. Provided medication management for intensive outpatient programs and addiction programs.

The Well Planted Child, LLC **Bellefonte, PA**
Child and Adolescent Psychiatrist **2014- 2015**
Provided school based psychiatric consultation services for children with behavioral and/or academic difficulties. Assisted teachers in developing effective classroom management strategies and in creating accommodations for children with special needs. Provided care for the BLAST Intermediate Unit which serves multiple school districts in the region.

Centre County Christian Academy **Bellefonte, PA**
Kindergarten Teacher **2014-2015**
Primary teacher for morning academics at a private school for an academic year. Assessed classroom modifications and strategies typically recommended by clinical mental health professionals to assess their efficacy. Provided consulting services for children with special needs or behavioral issues.

Diversified Treatment Alternatives **Lewisburg, PA**
Child and Adolescent Psychiatrist **2012- 2015**
Provided evaluation and treatment for children in two residential care facilities. Provided care for a high risk youth population with a special focus on sexual abuse, sexual perpetration, trauma, and addiction. Supervised treatment teams who were providing trauma focused treatment for children. Provided psychiatric care for children and adolescents in a partial hospitalization program.

Sunpointe Health **State College, PA**
Child and Adolescent Outpatient Psychiatrist **2011-2012**
Adult Psychiatry Inpatient Attending Psychiatrist
Provided inpatient adult psychiatric evaluation and treatment in an acute care setting at Mount Nittany Medical Center. Taught medical students during their psychiatry rotation. Provided outpatient psychiatric care for children and adolescents.

Palmetto Christian Psychiatry **Charleston, SC**
Private Practice Psychiatrist **2010-2011**
Provided psychiatric evaluation and treatment for individuals of all ages. Provided individual and family psychotherapy.

Susquehanna Health Medical Group **Williamsport, PA**
Child and Adolescent Psychiatrist **2007-2010**
Adult Psychiatry Inpatient Attending Psychiatrist
Spearheaded The Department of Child Psychiatry at a local community hospital with a mission to serve children who otherwise did not have access to mental health care. Performed evaluations and treatment for children and adults with a broad spectrum of mental health and developmental disorders. Actively conducted family therapy, psychodynamic therapy, cognitive behavioral therapy, play therapy, as well as group therapy. Provided medication management. Worked with outlying community agencies in all arenas, consulting with and for schools, social services, court systems, pediatricians and primary care physicians, wrap around services, and partial hospitalization programs to coordinate care for children. Taught in the family medicine residency program weekly. Supervised staff therapist and psychiatric nurse. Provided courtroom testimony in custody and abuse cases. Performed on call duties on the adult inpatient unit.

Carolina Center for Behavioral Health **Greer, SC**
Staff Psychiatrist **2006-2007**
Served in a weekend moonlighting position servicing an adult inpatient population while in fellowship training. Managed crisis calls, multiple levels of acuity, and geriatric patients on weekends during my fellowship.

HONORS

Susquehanna Physician Appreciation Award, 2008
Family Medicine Residency Teaching Certificate 2008
Circle of Excellence in Teaching 2003
Ruth Hunter Johnson Prize in Psychiatry 2002

LICENSURES

Pennsylvania Medical License MD 431126 inactive
South Carolina Medical License MD 26215 active

CERTIFICATIONS

American Board of Psychiatry and Neurology, General Psychiatry
American Board of Psychiatry and Neurology, Child and Adolescent Psychiatry