IN THE UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF WEST VIRGINIA
HUNTINGTON DIVISION

CHRISTOPHER FAIN, *et al.*,
Plaintiffs,

Civil Action No. 3:20-cv-00740
Hon. Robert C. Chambers, Judge

v.

WILLIAM CROUCH, *et al.*,
Defendants.

DEFENDANTS' RESPONSE TO PLAINTIFFS' MOTION TO EXCLUDE EXPERT TESTIMONY OF STEPHEN B. LEVINE, M.D.

NOW COME the Defendants, by counsel, Lou Ann S. Cyrus, Roberta F. Green, Caleb B. David, Kimberly M. Bandy, and Shuman McCuskey Slicer PLLC, and, for their Response to Plaintiffs' Motion to Exclude Expert Testimony of Stephen B. Levine, M.D., state as follows:

INTRODUCTION AND SUMMARY OF ARGUMENTS

Plaintiffs have moved this Court to exclude all of Stephen B. Levine, M.D.'s opinions, not because he is unqualified to provide them but because his opinions allegedly lack probative value. Pls.' Mot. to Exclude, p. 20.[1] Plaintiffs also move to exclude certain opinions expressed by Dr. Levine in his report on various grounds. Plaintiffs oddly seek exclusion on the grounds that some of Dr. Levine's opinions align with Plaintiffs' own experts' opinions. Pls.' Mot. to Exclude, p. 4. Plaintiffs seek exclusion of certain opinions on relevancy grounds. Pls. 'Mot. to Exclude, p. 6. Plaintiffs seek exclusion of certain opinions because the medical literature their experts cite is inapposite to the medical literature cited by Dr. Levine. Pls.' Mot. to Exclude, p. 8. Finally, Plaintiffs seek exclusion of Dr. Levine's opinions regarding costs of gender-confirming care,

[1] It is impossible to determine from Plaintiffs' Motion whether Plaintiffs seek to exclude Dr. Levine's testimony in this case or his testimony from other cases. Dr. Levine only intends to offer the opinions disclosed in this civil action.

regarding puberty-delaying treatment, and regarding the treatment of pre-pubescent transgender children on the grounds that Dr. Levine is not qualified to offer opinions in these areas. Pls.' Mot. to Exclude, p. 16. Defendants will address each of Plaintiffs' arguments in turn; however, a brief analysis of Plaintiffs' burden of proof for each of their claims is required.

Plaintiffs have asserted four causes of action: (1) alleged violation of the Equal Protection Clause of the Fourteenth Amendment, (2) alleged violation of Section 1557 of the Affordable Care Act, (3) alleged violation of the Medicaid Act's availability requirements, and (4) alleged violation of the Medicaid Act's comparability requirements. Am. Compl. ¶¶ 157 – 195 (ECF 140). Regarding Plaintiffs' equal protection claim, to the extent the Court finds that Defendants' policy is subject to rational basis review, it is Plaintiffs' burden "to negate every conceivable basis which might support" the alleged unequal treatment. *Giarratano v. Johnson*, 521 F.3d 298, 303 (4th Cir. 2008) (additional citation omitted). This includes the basis of medical necessity. If intermediate scrutiny is applied to Plaintiffs' equal protection claim, the challenged classification must serve an important governmental purpose, and the means employed must be substantially related to that purpose. *U.S. v. Virginia*, 518 U.S. 515, 524, 532-33 (1996). Medical necessity may be an important governmental purpose. To prevail on their Section 1557 discrimination claim, Plaintiffs must prove that Defendants discriminated against them on the basis of sex rather than made a determination based on factors such as medical necessity.

To prevail on their claim for alleged violation of the Medicaid Act's availability requirements, Plaintiffs must prove that Defendants have failed to make available to them care that is required to be covered by the Act. 42 U.S.C. § 1396a(a)(10)(A). The regulations associated with the availability requirements permit an agency to place appropriate limits on a service based on criteria such as medical necessity or on utilization control procedures. 42 C.F.R. § 440.230(d).

Finally, to prevail on their claim for alleged violation of the Medicaid Act's comparability requirements, Plaintiffs must prove that Defendants' policy discriminates among categorically needy beneficiaries. *See Schott v. Olszewski*, 401 F.3d 682, 686 (6th Cir. 2005) ("Under the Act, states must provide comparable medical assistance to all Medicaid recipients within each classification, so long as the medically needy do not receive greater benefits than the categorically needy (although the reverse is permitted)."). Because Plaintiffs' claim is based upon the argument that procedures such as mastectomy are covered for breast cancer but not for gender dysphoria, medical necessity is again a consideration that the jury must undertake.

Because each of Plaintiffs' causes of action requires the jury to consider policy motives and/or medical necessity, it is essential that the jury be provided expert testimony regarding the medical necessity of gender-affirming surgeries. Thus, it is important that the jury be provided with information explaining the etiology of gender dysphoria, diagnostic criteria for gender dysphoria, treatment modalities for gender dysphoria, the efficacy of those treatment modalities, and the risks, benefits, and alternatives of those treatment modalities. To assist the jury with these issues, Defendants have retained Stephen B. Levine, M.D., who thoroughly discusses and explains these issues in his expert report and in his deposition. *See generally* Levine Report (ECF 252-11); Levine Dep. (ECF 252-20 to 252-22).

LEGAL STANDARD

Rule 702 of the Federal Rules of Evidence governs the admissibility of expert witness testimony. Rule 702 states as follows:

> A witness who is qualified as an expert by knowledge, skill, experience, training, or education may testify in the form of an opinion or otherwise if:
>
> (a) the expert's scientific, technical, or other specialized knowledge will help the trier of fact to understand the evidence or to determine a fact in issue;
>
> (b) the testimony is based on sufficient facts or data;

> (c) the testimony is the product of reliable principles and methods; and
> (d) the expert has reliably applied the principles and methods to the facts of the case.

Fed. R. Evid. 702. "Nothing in the text of this Rule establishes 'general acceptance' as an absolute prerequisite to admissibility." *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579, 588 (1993). "Vigorous cross-examination, presentation of contrary evidence, and careful instruction on the burden of proof are the traditional and appropriate means of attacking shaky but admissible evidence." *Id.* at 596 (citing *Rock v. Arkansas*, 483 U.S. 44, 61, 97 L. Ed. 2d 37, 107 S. Ct. 2704 (1987)). "These conventional devices, rather than wholesale exclusion under an uncompromising 'general acceptance' test, are the appropriate safeguards where the basis of scientific testimony meets the standards of Rule 702." *Id.*

"Implicit in the text of Rule 702, the *Daubert* Court concluded, is a district court's gatekeeping responsibility to 'ensur[e] that an expert's testimony both rests on a reliable foundation and is relevant to the task at hand.'" *Nease v. Ford Motor Co.*, 848 F.3d 219, 229 (4th Cir. 2017) (quoting *Daubert*, 509 U.S. at 597) (emphasis in original). "Relevant evidence, of course, is evidence that helps 'the trier of fact to understand the evidence or to determine a fact in issue.'" *Id.* (quoting *Daubert*, 509 U.S. at 591) (internal question marks omitted). "To be relevant under *Daubert*, the proposed expert testimony must have 'a valid scientific connection to the pertinent inquiry as a precondition to admissibility.'" *Id.* (quoting *Daubert*, 509 U.S. at 592).

"With respect to reliability, the district court must ensure that the proffered expert opinion is 'based on scientific, technical, or other specialized knowledge and not on belief or speculation, and inferences must be derived using scientific or other valid methods.'" *Id.* (quoting *Oglesby v. Gen. Motors Corp.*, 190 F.3d 244, 250 (4th Cir. 1999)). "*Daubert* offered a number of guideposts to help a district court determine if expert testimony is sufficiently reliable to be admissible. First,

'a key question to be answered in determining whether a theory or technique is scientific knowledge that will assist the trier of fact will be whether it can be (and has been) tested.'" *Id.* (quoting *Daubert*, 509 U.S. at 593). "A second question to be considered by a district court is 'whether the theory or technique has been subjected to peer review and publication.'" *Id.* (quoting *Daubert*, 509 U.S. at 593). "Publication regarding the theory bears upon peer review; '[t]he fact of publication (or lack thereof) in a peer reviewed journal will be a relevant, though not dispositive, consideration in assessing the scientific validity of a particular technique or methodology on which an opinion is premised.'" *Id.* (quoting *Daubert*, 509 U.S. at 594). "[D]espite the displacement of *Frye*, 'general acceptance' is nonetheless relevant to the reliability inquiry." *Id.* (quoting *Daubert*, 509 U.S. at 594). "*Daubert's* list of relevant considerations is not exhaustive; indeed, the Court has cautioned that this 'list of specific factors neither necessarily nor exclusively applies to all experts or in every case,' and that a trial court has 'broad latitude' to determine whether these factors are 'reasonable measures of reliability in a particular case[.]'" *Id.* (quoting *Kumho Tire Co. v. Carmichael*, 526 U.S. 137, 141, 153, 119 S. Ct. 1167, 143 L. Ed. 2d 238 (1999)).

ARGUMENT

Dr. Levine is eminently qualified to provide opinions regarding the issues germane to this case. Dr. Levine's testimony in this case is well-supported by the medical literature and by his education, training, experience, knowledge, and skill. Plaintiffs' arguments go to the weight of Dr. Levine's testimony, not its admissibility; therefore, Plaintiffs' Motion must be denied.

I. Dr. Levine is qualified to testify regarding the issues germane to this case.

Dr. Levine is eminently qualified to testify regarding the etiology of gender dysphoria, diagnostic criteria for gender dysphoria, treatment modalities for gender dysphoria, the efficacy of those treatment modalities, and the risks, benefits, and alternatives of those treatment modalities.

Dr. Levine is a clinical professor of psychiatry at Case Western Reserve University School of Medicine and a private clinician. Levine Report, ¶ 1 (ECF 252-11). Dr. Levine has been practicing psychiatry for nearly 50 years. Levine Report, ¶ 2 (ECF 252-11). Dr. Levine founded Case Western's Gender Identity Clinic in 1974 and has served as its Co-Director since that time. Levine Report, ¶ 3 (ECF 252-11). Dr. Levine has treated several dozens of patients with transgender identities. Levine Report, ¶ 3 (ECF 252-11). Dr. Levine was an early member of the Harry Benjamin International Gender Dysphoria Association, now known as the World Professional Association for Transgender Health ("WPATH"), and he served as the Chairman of the committee that developed the fifth version of WPATH's "Standards of Care." Levine Report, ¶ 3 (ECF 252-11). Dr. Levine is a Distinguished Life Fellow of the American Psychiatric Association and an inductee in the Case Western's Department of Psychiatry's Hall of Fame. Levine Report, ¶ 2 (ECF 252-11). Dr. Levine has served and continues to serve as a peer reviewer for dozens of journals. Levine Report, ¶ 4 (ECF 252-11). He has served as the editor of psychiatric textbooks, has authored books, and has published 180 articles and book chapters, 19 of which focus specifically on the issues relevant to this case. Levine Report, ¶ 4 (ECF 252-11). Dr. Levine is frequently invited to lecture to professional groups and organizations in the field of psychiatry and regarding the mental health professional's role in treating gender dysphoria. Levine Report, ¶ 6 (ECF 252-11).

Thus, there is no question that Dr. Levine is qualified as an expert by knowledge, skill, experience, training, and/or education. Because Dr. Levine possesses Rule 702's qualifications to opine regarding the etiology of gender dysphoria, diagnostic criteria for gender dysphoria, treatment modalities for gender dysphoria, the efficacy of those treatment modalities, and the risks, benefits, and alternatives of those treatment modalities, Dr. Levine must be permitted to provide testimony regarding the same so long as the other requirements of Rule 702 are met.

As discussed in detail above, the issues upon which Dr. Levine opines are relevant to the elements of Plaintiffs' causes of action. Thus, Dr. Levine's opinions and specialized knowledge will help the trier of fact to understand the evidence and to determine facts in issue, namely the medical necessity of gender-affirming surgery. Dr. Levine's opinions are based on sufficient facts or data. Dr. Levine's opinions are supported by 242 citations to relevant medical literature, studies, and commentaries, as well as Dr. Levine's own education, training, experience, and knowledge, which includes nearly 50 years of clinical practice. Dr. Levine's opinions are the product of reliable principles and methods. In addition to his own education, training, experience, and knowledge, Dr. Levine relies upon peer-reviewed medical literature and systematic reviews of the literature to support his opinions. Finally, Dr. Levine has reliably applied the principles and methods to the facts of this case. Dr. Levine has synthesized the literature, studies, and commentaries to provide opinions regarding the medical necessity of gender-affirming surgery, which is a crucial fact in this case. Therefore, Dr. Levine's opinions generally meet the Rule 702 standard for admissibility. Defendants will address each of Plaintiffs' specific arguments regarding specific opinions in turn.

II. Dr. Levine's opinions are not supportive of Plaintiffs' claims; regardless, however, agreement on issues is not grounds for exclusion.

Plaintiffs claim that Dr. Levine's opinions are supportive of their claims for relief because Dr. Levine has provided "letters of approval for gender-confirming surgeries for transgender people incarcerated at Framingham, a correctional institution in Massachusetts." Pl.'s Mot. to Exclude, pp. 4 – 5. Dr. Levine's provision of "letters of approval" is irrelevant to the issues in this case and is not an admission of medical necessity. Dr. Levine opines in his report that "[t]he right to bodily autonomy via 'gender-affirming' hormonal and surgical interventions should not be confused with medical necessity." Levine Report, ¶ 10 (ECF 252-11). Dr. Levine explains, "An objective test for medical necessity of transgender interventions does not exist. The diagnosis is

self-generated by the patient and merely recorded by the clinician. The choice of interventions is granted based on a patient's wish. In transgender healthcare, this is often wrongly equated with medical necessity." Levine Report, ¶ 10 (ECF 252-11). This is consistent with Dr. Levine's deposition testimony regarding the "letters of approval":

> Q. And if you were treating a patient and determined that they understood the risks and you and the patient agreed the treatment would be – actually, let me back up, sorry. When you authorize medical interventions for transgender patients, Dr. Levine, you don't use the word medically necessary, right?
> A. I generally do not.
> Q. Is it correct to say that you use the word psychologically beneficial?
> A. Yes, it may be psychologically beneficial.
> …
> Q. Let me ask the question again. If you were treating a patient and determined that they understood the risks and you thought the treatment would be psychologically beneficial and you provided letters of authorization to them, you would want the patient then to be able to access the care, right?
> A. If after getting the letter of authorization the patient still wanted to do it, then I had already said to the endocrinologist or the surgeon it's okay with me to go ahead, that I've done my due diligence in this case. But the reason I'm hesitating, Mr. Charles, is that I've had several experiences, more than several, where I write a letter of recommendation for a desired treatment and then the patient does not follow through as a reflection of ambivalence about what they're doing. So I don't want to say that if I wrote a letter of recommendation for a particular treatment that I would want him to have it. I would say that if the patient still wants to after they have the go-ahead from me who's worked with the patient for a long time, then they may go ahead and do it and they have my blessing. …
> …
> A. … So the answer to your question is not, is that I would not strongly want the person to have that. I have already done my work, I've already written my letter, I've explained the patient's circumstances as far as I understand them to the endocrinologist or to the surgeon, and then what happens is determined by the patient and is, is determined by the doctor, the, you know, the consultant or the endocrinologist or the surgeon.

Levine Dep. 69:9 – 71:1 (ECF 252-20). Thus, Dr. Levine testified that he has provided letters of approval based upon patients' bodily autonomy, desire for treatment, and that such treatment may be psychologically beneficial for the patient. Dr. Levine specifically testified that he does not use the phrase "medically necessary." Rather, he respects the patient's bodily autonomy and signs off

on medical and surgical interventions if he has determined that the patient has the capacity to consent to the intervention and desires the intervention. This is no way supports Plaintiffs' claims for relief under the Equal Protection Clause, Section 1557 of the ACA, or the Medicaid Act and has no bearing upon whether West Virginia Medicaid is required by law to afford coverage for gender-affirming surgeries.

Plaintiffs also suggest that, because Dr. Levine does not hold himself out to be an insurance expert and is not advancing a non-medical opinion regarding whether Medicaid should or should not cover gender-affirming surgeries, his opinions will not assist the trier of fact. Pl.'s Mot. to Exclude, pp. 5 – 6. Dr. Levine is a psychiatrist who has opined on the medical necessity of medical and surgical treatment for a psychiatric condition with which Plaintiffs have been diagnosed and for which Plaintiffs seek insurance coverage. Dr. Levine is not required to have insurance expertise to testify regarding medical necessity. Dr. Levine is also not required to have a personal opinion on Medicaid's policy to testify regarding medical necessity.

In short, Dr. Levine's opinions regarding the etiology of gender dysphoria, diagnostic criteria for gender dysphoria, treatment modalities for gender dysphoria, the efficacy of those treatment modalities, and the risks, benefits, and alternatives of those treatment modalities will assist the trier of fact to understand the evidence and to determine facts in issue. Dr. Levine is not required to opine on every issue germane to this case, and agreements among Dr. Levine and Plaintiffs, to the extent any exist, do not preclude Dr. Levine's testimony. Therefore, Plaintiffs' Motion must be denied.

III. Dr. Levine's opinions are relevant and within the scope of this dispute, and the Fourth Circuit's factual findings in *Grimm* are irrelevant to the facts of this case and to Plaintiffs' Motion.

Plaintiffs claim that certain of Dr. Levine's opinions have no relevance to Plaintiffs' claims and, therefore, must be excluded. Specifically, Plaintiffs seek to exclude as irrelevant Dr. Levine's opinion that "the biology of the person remains as defined by his (XY) or her (XX) chromosomes, including cellular, anatomic and physiologic characteristics…." Pl.'s Mot. to Exclude, p. 6. Plaintiffs claim that this partial sentence removed from context has no bearing on this case; however, in context, this opinion is relevant to the issue of medical necessity. Dr. Levine's report states as follows:

> 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 the assertions of certain members of the medical community, the aspiration of some trans individuals to become "a complete man" or "a complete woman" is not biologically attainable. It is possible for some individuals to "pass" unnoticed as the opposite gender that they aspire to be—**but with limitations, costs, and risks**.

Levine Report, ¶ 18 (internal citations omitted) (emphasis added). This opinion is, therefore, relevant as a basis for Dr. Levine's opinion that gender-affirming surgeries do not and cannot fully achieve the results desired by patients and come with limitations, costs, and risks, all of which informs the issue of medical necessity. Additionally, Plaintiffs' experts assert similar opinions regarding sex and gender identity. Karasic Report, ¶¶ 20-21 (ECF 250-20); Schechter Report, ¶¶ 18-19 (ECF 250-23); Olson-Kennedy Report, ¶¶ 18-20 (ECF 250-26). Thus, if Dr. Levine's opinions regarding biological sex are irrelevant, then Plaintiffs' experts' opinions regarding the same are likewise irrelevant.

Plaintiffs also seek to exclude Dr. Levine's opinion that "'gender exploratory' therapy can and has led to a resolution of gender dysphoria." Pls.' Mot. to Exclude, p. 7. Plaintiffs attempt to

discredit Dr. Levine's opinion by claiming that it is supported only by "anecdotal narrative articles" and by likening psychotherapy to "conversion therapy." Pls.' Mot. to Exclude, p. 7. Plaintiffs' most recent attempt to make Dr. Levine a pariah is unfounded and is consistent with recent comments from the current president of WPATH, Dr. Marci Bowers, who stated, "There are definitely people [in WPATH] who are trying to keep out anyone who doesn't absolutely buy the party line that everything should be affirming, and that there's no room for dissent." Levine Report, ¶ 23 (ECF 252-11) (citation omitted). Plaintiffs are again demonstrating that there is no room for dissent and assert that, because Dr. Levine disagrees with them, he is labeled as a proponent of conversion therapy.

Dr. Levine's report actually states,

> In a growing number of instances, especially among gender-dysphoric youth, proper therapeutic exploration has led to a resolution of gender dysphoria. It is true that quality evidence proving long-term effectiveness of psychotherapy interventions is missing—just as they are lacking for the hormonal and surgical interventions. However, Dr. Karasic's attempts to stigmatize gender-exploratory psychotherapy as "gender identity change efforts," or to stigmatize as "unethical" appear to be politically motivated to maintain his beliefs with little concern for the patient's long-term outcomes in mind. Such efforts will only serve to limit access to quality healthcare for the already struggling and vulnerable group of gender dysphoric patients.

Levine Report, ¶ 37 (internal citations omitted). Nowhere in Dr. Levine's report does he state that therapeutic exploration resolves transgender identity. Rather, he states that therapeutic exploration has resolved gender dysphoria, which is purportedly the goal of the surgical treatment for which Plaintiffs seek coverage. Dr. Levine's opinion is supported by not only his own clinical experience but also by peer-reviewed literature in the Journal of Infant, Child, and Adolescent Psychotherapy, the Metalogos Systemic Therapy Journal, the Journal of Child Psychotherapy, Clinical Child Psychology and Psychiatry, the International Journal of Psychoanalysis, and the Archives of Sexual Behavior. Levine Report, ¶ 37 (ECF 252-11). Plaintiffs are correct that Dr. Levine admits

that psychotherapy, like medical and surgical interventions, is lacking in long-term evidence of results. Levine Report, ¶ 160 (ECF 252-11). Once again, however, Plaintiffs take a single sentence out of context and fail to cite to the rest of the paragraph:

> The results of alternative approaches, such as watchful waiting for children, or gender-psychotherapy, are likewise lacking in long-term evidence. However, **emerging evidence suggests that psychotherapy is a promising intervention for young people**. It should be noted that a key Finnish gender program recently announced that psychotherapy should be the first line of treatment for all gender dysphoric youth. **A growing list of European countries appear to be moving in the same direction**.

Levine Report, ¶ 160 (ECF 252-11) (internal citations omitted) (emphasis added). Thus, Dr. Levine recognizes that more research is required to fully understand the efficacy of psychotherapy as a treatment modality for gender dysphoria, but he also cites to peer-reviewed literature showing emerging evidence supportive of psychotherapy and a growing consensus supporting the use of psychotherapy as the first treatment modality for gender dysphoria.

Additionally, Plaintiffs attempt to conflate a transgender identity with gender dysphoria and to argue that, because the Fourth Circuit made certain findings in *Grimm*, Dr. Levine's opinions have no relevance. First, Fourth Circuit precedent is not found in factual findings. The District Court in *Grimm* admitted the submissions of *amici curiae* as "evidence of the views of the organizations that prepared them, and not as substantive evidence of the accuracy of such views." *Grimm v. Gloucester Cnty. Sch. Bd.*, 400 F. Supp. 3d 444, 455 (E.D. Va. 2019). The Fourth Circuit then quoted the *amici* briefs in the factual section of its opinion. *Grimm v. Gloucester Cnty. Sch. Bd.*, 972 F.3d 586, 594-96 (4th Cir. 2020). Plaintiffs' quotes from *Grimm* are not holdings and lack any precedential value. Moreover, the *Daubert* Court recognized that "[s]cientific conclusions are subject to perpetual revision," and, as a result, "open debate is an essential part of both legal and scientific analyses." *Daubert*, 509 U.S. at 596-97. In reversing the Court of Appeals, the *Daubert*

Court noted that "[t]he inquiries of the District Court and the Court of Appeals focused almost exclusively on 'general acceptance,' as gauged by publication and the decisions of other courts." *Id.* at 597. Thus, *Daubert's* principles require the trial court to rely upon the factual record before it, not the "decisions of other courts." Therefore, Plaintiffs' Motion must be denied.

IV. Dr. Levine's opinions are methodologically reliable and supported by science and medicine.

Plaintiffs claim that Dr. Levine "admitted" that his opinions lack any scientific support and have not been tested or subjected to peer review or publication. This is wildly inaccurate and misleading. Dr. Levine's opinions are supported by 242 citations to relevant medical literature, studies, and commentaries, as well as Dr. Levine's own education, training, experience, and knowledge, which includes nearly 50 years of clinical practice. Dr. Levine's opinions are the product of reliable principles and methods. In addition to his own education, training, experience, and knowledge, Dr. Levine relies upon peer-reviewed medical literature and systematic reviews of the literature to support his opinions. Finally, Dr. Levine has reliably applied the principles and methods to the facts of this case. Dr. Levine has synthesized the literature, studies, and commentaries to provide his opinions. Plaintiffs identify four specific opinions they claim are not reliable, and, without explanation, Plaintiffs claim that Dr. Levine's methodology is unreliable. Defendants will address each of Plaintiffs' specific arguments in turn.

1. Dr. Levine's opinions regarding WPATH's treatment guidelines are accurate and reliable.

Plaintiffs take issue with Dr. Levine's accurate citations to medical literature and to WPATH's president's comments about the advocacy organization's refusal to consider opinions outside its core beliefs. First, Plaintiffs take issue with Dr. Levine's opinion that WPATH's "standards of care" are "very low quality and unfit tools for clinical decision-making[.]" Pls.' Mot.

to Exclude, p. 10. Again, Plaintiffs leave out important context. Dr. Levine's report fully states, "A recently published systematic review found the current WPATH SOC7 guidelines to be of very low quality and unfit tools for clinical decision-making, noting 'incoherence' within the recommendations." Levine Report, ¶ 21 (ECF 252-11). Dr. Levine cites directly to the systematic review that noted incoherence within the recommendations. Levine Report, ¶ 21 (ECF 252-11). The systematic review states,

> No statements were highlighted by the WPATH SOCv7 authors as key recommendations, and it proved impossible for all six reviewers independently performing data extraction to identify them. The total number of extracted recommendations ranged between 0 and 168 with little consistency or agreement on what passages were selected. **Some extracted statements might have been intended as recommendations or standards, but many were flexible, disconnected from evidence and could not be used by individuals or services to benchmark practice**. After discussion of this **incoherence** within WPATH SOCv7 and our inability therefore to compare recommendations across all [clinical practice guidelines], it was decided not to revisit inclusions post hoc but to abandon this protocol aim.

Levine Dep., Ex. SL10 (ECF 252-21) (emphasis added). Thus, Dr. Levine accurately and reliably stated the findings of the article cited to in his report.

Plaintiffs also take issue with Dr. Levine's citation to a blog post that included comments from Dr. Marci Bowers. Plaintiffs do not claim that Dr. Levine inaccurately cited to the blog post or that the blog post inaccurately quoted Dr. Bowers. Rather, Plaintiffs argue Dr. Levine should have also cited to a subsequent statement of Dr. Bowers. This has no bearing on whether Dr. Bowers was accurately quoted and has no bearing on the admissibility of Dr. Levine's opinions. Plaintiffs do not even attempt to explain how the failure to include other comments from Dr. Bowers is exclusionary.

Plaintiffs further claim that Dr. Levine's opinions regarding foreign countries moving away from WPATH's guidelines should be excluded. Again, Dr. Levine's report includes citations to

support his opinions. Levine Report, ¶ 22. Since his report, additional information has been published, including a statement from the Swedish National Board of Health and Welfare, which recommends restraint when it comes to hormone therapy, finds a lack of firm conclusions about the efficacy and safety of hormone and puberty-blocking treatments, and finds that the risks outweigh the benefits. Olson Kennedy Dep., Ex. 7 (ECF 252-18). Thus, again, while Plaintiffs may cross-examine Dr. Levine and present their own evidence, Plaintiffs lack any grounds for exclusion of Dr. Levine's opinions, which are based upon medical literature, government statements, and Dr. Levine's education, training, experience, and knowledge. Therefore, Plaintiffs' Motion must be denied.

2. Dr. Levine's opinions regarding gender-confirming care are reliable.

Plaintiffs claim that Dr. Levine's opinions that gender-confirming care is inadequate, risky, and without lasting benefit are inaccurate and unsupported. Plaintiffs specifically cite to Paragraphs 23, 39, 51, 55, and 118 through 124 of Dr. Levine's report as opinions that are not supported. Dr. Levine's report totals 161 paragraphs. Thus, Plaintiffs take issue with less than ten percent of Dr. Levine's opinions. Regardless, ample support is found throughout Dr. Levine's report. Paragraph 23 of Dr. Levine's Report discusses his own experience with WPATH and includes the previously discussed comments by Dr. Marci Bowers. There is no better source for Dr. Levine's own experience with WPATH than Dr. Levine. Thus, Plaintiffs' argument is unfounded. Paragraph 39 of Dr. Levine's Report rebuts Dr. Karasic's opinions regarding the Dutch Study and discusses the Dutch Study's failure to include the outcomes of several members of its study population in its statistical analysis. Dr. Levine does not invent the excluded members of the population; they are disclosed in the study's methodology section but not included in the statistical analysis. *See* de Vries ALC, et al., "Young Adult Psychological Outcome After Puberty

Suppression and Gender Reassignment," *Pediatrics*, 2014, 134(4): 696-704, attached hereto as **Exhibit A**. Thus, Dr. Levine's opinion is based on the very same article as the opinion he was criticizing. Thus, Plaintiffs' argument is unfounded.

Paragraph 51 of Dr. Levine's Report disputes Dr. Karasic's analysis of the costs of medical and surgical interventions. Dr. Levine cites to six sources to support his opinions. Levine Report, ¶ 51 (ECF 252-11). Again, Plaintiffs may disagree with Dr. Levine's opinions and may disagree with the literature and other sources he cites, but that disagreement does not render Dr. Levine's opinions inadmissible. Paragraphs 118 through 124 provide opinions regarding the risks of complications associated with gender-affirming hormonal and surgical interventions. Levine Report, ¶¶ 118-124 (ECF 252-11). Dr. Levine's opinions in these seven paragraphs are supported by citations to nine separate publications in the literature. Plaintiffs do not identify any specific opinions in these seven paragraphs that should be excluded and do not identify any specific opinions that are allegedly unsupported. Thus, the record demonstrates that Dr. Levine's opinions are well-supported by the literature, and Plaintiffs have failed to specify opinions that are allegedly unsupported. Therefore, Plaintiffs' Motion must be denied.

3. Dr. Levine's opinions regarding desistance are based in fact and in the literature.

Plaintiffs claim that Dr. Levine's opinions regarding desistance are not based in fact. Again, Plaintiffs attempt to mischaracterize his opinions in a fictional binary vacuum, stating that the opinions in his report are not based in fact because Dr. Levine "conceded" that some children persist in their transgender identity. Pls.' Mot. to Exclude, pp. 12 – 13. Dr. Levine's opinion is that "the majority (61-98%) of children who identify has transgender will reidentify with their sex before reaching maturity absent any interventions." Levine Report, ¶ 90 (citation omitted). Dr.

Levine does not claim that no children persist in their transgender identity, and Plaintiffs' attempt to mischaracterize his opinions is unsupported.

Plaintiffs do not and cannot claim that Dr. Levine's opinions on this topic are unsupported. Rather, they claim that the literature cited to by Dr. Levine used prior versions of the DSM-V, so the literature is unreliable. While some of the literature cited to by Dr. Levine did indeed analyze treatment outcomes using diagnostic criteria from the DSM-IV, much of the literature cited to by Dr. Levine is from 2020 and 2021, representing the most recent available literature in the field. Levine Report, ¶ 90 (ECF 252-11). Additionally, there is literature examining the outcomes of using various diagnostic criteria on the same patients. That literature found significant overlap of the diagnostic criteria: "Interrater agreement rates for each instrument ranged from 65% to 79% for the adolescence/adulthood diagnoses and from 67% to 94% for the childhood diagnoses and were comparable regardless of the system used." Karasic Dep., Ex. 9, de Vries, et al., "Reliability and Clinical Utility of Gender Identity-Related Diagnoses: Comparisons Between the ICD-11, ICD-10, DSM-IV, and DSM-5," *LGBT Health*, Volume 8, No. 2, 2021 (ECF 252-8; PageID 4389). Thus, Dr. Levine's opinions, which rely upon medical literature from the last two years, are not unreliable simply because some of the literature analyzed data under the DSM-IV's diagnostic criteria. Indeed, there is no significant statistical difference in the diagnosis rates for individuals under the DSM-IV and DSM-V. Thus, Plaintiffs' argument is unfounded.

Plaintiffs also attempt to characterize Dr. Levine's opinions as an attempt to "undercut the validity" of the DSM-V. Dr. Levine has no opinions that claim that the DSM-V is invalid. Rather, he opines that the ICD-11 criteria do not include a criterion requiring clinically significant distress for diagnosis. Levine Report, ¶ 86. This is, of course, true. In the draft eighth version of WPATH's "Standards of Care," WPATH states, "One important reconceptualization in comparison to the

DSM-5 Gender Dysphoria classification is that distress is not a required indicator of the ICD-11 Gender Incongruence classification (WHO, 2019)." Olson-Kennedy Dep., Ex. 6 (ECF 252-18; PageID 5925). Thus, Dr. Levine's opinion does not attempt to undercut the validity of the DSM-V and, instead, is critical of the ICD-11, which WPATH is eager to adopt. Thus, there is no "hypothetical." The ICD-11 exists, and, while not yet used in the United States, is included in WPATH's still-forthcoming updated guidelines. Thus, Plaintiffs' argument is unfounded, and Plaintiffs' Motion must be denied.

3. Dr. Levine's opinions regarding rapid-onset gender dysphoria and detransition are supported by the literature.

Plaintiffs claim that Dr. Levine has asserted an "unsupported hypothesis" regarding rapid-onset gender dysphoria. Dr. Levine's opinion is that WPATH's draft eighth version of their guidelines does not acknowledge rapid-onset gender dysphoria or detransition, both of which have been documented in the literature. Levine Report, ¶ 79 (ECF 252-11) (citing Hutchinson A, et al., "In Support of Research Into Rapid-Onset Gender Dysphoria," *Arch Sex Behav*. 2020;49(1)) (citing Vandenbussche E, "Detransition-Related Needs and Support: A Cross-Sectional Online Survey," *Journal of Homosexuality*, published online April 30, 2021) (citing Littman L, "Individuals Treated for Gender Dysphoria with Medical and/or Surgical Transition Who Subsequently Detransitioned: A Survey of 100 Detransitioners," *Arch Sex Behav*., published online October 19, 2021). Plaintiffs' expert Johanna Olson-Kennedy, M.D. testified that she has witnessed a change in her patient population from a majority of individuals assigned male at birth to a majority of individuals assigned female at birth and that this cohort of patients is currently being studied. Olson-Kennedy Dep. 55:8 – 57:12 (ECF 252-18). This is consistent with the Swedish National Board of Health and Welfare's February 2022 recommendations halting the use of hormone therapy for minors: "The National Board of Health and Welfare has previously

presented statistics showing that the group of young people seeking care for gender dysphoria has increased sharply. Between 2008 and 2018, the number of new cases of diagnosed gender dysphoria multiplied. Particularly large was the increase among those aged 13 to 17 years and with registered sex female at birth." Olson-Kennedy Dep., Ex. 7 (ECF 252-18). This is precisely the phenomenon described by Dr. Levine in his report.

Additionally, regarding detransition, Dr. Levine cited to literature in his report to support that detransition occurs, and a growing number of individuals are coming out publicly to discuss their own detransition. Two of these individuals were acknowledged by Dr. Olson-Kennedy in her deposition. Olson-Kennedy Dep. 48:9 – 49:10. Dr. Levine did not "concede" in his deposition that he lacks scientific support for his opinion. Rather, he pointed to the literature cited in his report, which documented 337 individuals who had detransitioned. Levine Dep. 158:8 – 160:24. Dr. Levine did admit that the Littman article did not compare historical rates of detransition, but his "concessions" stopped there. Thus, Dr. Levine's opinions are supported by the literature. Plaintiffs' arguments are unfounded, and Plaintiffs' Motion must be denied.

V. Dr. Levine is qualified to offer opinions regarding puberty-delaying treatment and treatment of pre-pubescent children.

Plaintiffs claim that Dr. Levine is unqualified to offer opinions regarding costs of care, puberty-delaying treatment, and treatment of pre-pubescent children. At the outset, it must be noted that neither Plaintiff is seeking puberty-delaying treatment, that neither Plaintiff is a pre-pubescent child, and that Plaintiffs are not adequate representatives of a class that includes pre-pubescent children and/or individuals seeking puberty-delaying treatment. Thus, Plaintiffs' experts' opinions regarding the same are entirely irrelevant to Plaintiffs' claims.

Regardless, Dr. Levine is qualified to offer opinions regarding puberty-delaying treatment and the treatment of pre-pubescent children. Plaintiffs' expert Dr. Karasic does not treat children

at all, yet he purports to be qualified to offer opinions regarding the treatment of children. Karasic Dep. 43:22 – 44:3 (ECF 252-8). Plaintiffs posit, however, that, because Dr. Levine only rarely treats pre-pubescent children with gender dysphoria, he is not qualified. Dr. Levine has education, training, experience, and knowledge in the field of psychiatry and treating gender dysphoric children and relies upon peer-reviewed literature for his opinions. Dr. Levine's citations include his own published works as well as the work of others, including the 2017 Endocrine Society Guidelines. Levine Report, ¶¶ 132 – 139 (ECF 252-11). Plaintiffs' repeated attempts to discredit Dr. Levine through excerpts of out-of-context partial sentences is likewise unavailing. Dr. Levine only intends to offer the opinions disclosed in this case, and Plaintiffs have failed to establish that Dr. Levine is unqualified to offer those opinions or that his opinions are unreliable. Therefore, Plaintiffs' Motion must be denied.

Finally, Dr. Levine does not intend to offer opinions regarding the costs of procedures outside of the literature and sources included in his report. Dr. Levine's opinions regarding costs are directed at Dr. Karasic's financial analysis, which he is not qualified to perform, and its lack of inclusion of numerous costs. Dr. Levine disputes the cost analysis of Dr. Karasic but does not offer additional cost opinions.

WHERFORE, Defendants respectfully request that this Honorable Court deny Plaintiffs' Motion to Exclude Expert Testimony of Stephen B. Levine, M.D. Defendants request all other and further relief this Honorable Court deems just and proper.

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IN THE UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF WEST VIRGINIA
HUNTINGTON DIVISION

CHRISTOPHER FAIN and **SHAUNTAE ANDERSON;** individually and on behalf of all others similarly situated,

Plaintiffs,

Civil Action No. 3:20-cv-00740
Hon. Robert C. Chambers, Judge

v.

WILLIAM CROUCH, in his official capacity as Cabinet Secretary of the West Virginia Department of Health and Human Resources; **CYNTHIA BEANE,** in her official capacity as Commissioner for the West Virginia Bureau for Medical Services; and **WEST VIRGINIA DEPARTMENT OF HEALTH AND HUMAN RESOURCES, BUREAU FOR MEDICAL SERVICES,**

Defendants.

CERTIFICATE OF SERVICE

Now come Defendants William Crouch, Cynthia Beane and West Virginia Department of Health and Human Resources Bureau for Medical Services, by counsel, and do hereby certify that on the 14th day of June, 2022, a true and exact copy of **"DEFENDANTS' RESPONSE TO PLAINTIFFS' MOTION TO EXCLUDE EXPERT TESTIMONY OF STEPHEN B. LEVINE, M.D."** was served on counsel via electronic means as follows:

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Young Adult Psychological Outcome After Puberty Suppression and Gender Reassignment

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KEY WORDS

gender dysphoria, transgenderism, adolescents, psychological functioning, puberty suppression, longitudinal outcomes

ABBREVIATIONS

ABCL—Adult Behavior Checklist
ASR—Adult Self-Report
BDI—Beck Depression Inventory
BIS—Body Image Scale
CBCL—Child Behavior Checklist
CGAS—Children's Global Assessment Scale
CSH—cross-sex hormones
GD—gender dysphoria
GnRHa—gonadotropin-releasing hormone analogs
GRS—gender reassignment surgery
SHS—Subjective Happiness Scale
STAI—Spielberger's Trait Anxiety Scale
SWLS—Satisfaction With Life Scale
TPI—Spielberger's Trait Anger Scale
UGDS—Utrecht Gender Dysphoria Scale
YSR—Youth Self-Report

Dr de Vries conceptualized the study, clinically assessed the participants, drafted the initial manuscript, and reviewed and revised the manuscript; Dr McGuire conceptualized the study, planned and carried out the analyses, assisted in drafting the initial manuscript, and reviewed and revised the manuscript; Dr Steensma conceptualized the study, coordinated and supervised data collection, and reviewed and revised the manuscript; Dr Wagenaar coordinated and invited participants for assessments and reviewed and revised the manuscript; Drs Doreleijers and Cohen-Kettenis conceptualized the study and reviewed and revised the manuscript; and all authors approved the final manuscript as submitted.

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(Continued on last page)

WHAT'S KNOWN ON THIS SUBJECT: Puberty suppression has rapidly become part of the standard clinical management protocols for transgender adolescents. To date, there is only limited evidence for the long-term effectiveness of this approach after gender reassignment (cross-sex hormones and surgery).

WHAT THIS STUDY ADDS: In young adulthood, gender dysphoria had resolved, psychological functioning had steadily improved, and well-being was comparable to same-age peers. The clinical protocol including puberty suppression had provided these formerly gender-dysphoric youth the opportunity to develop into well-functioning young adults.

abstract

BACKGROUND: In recent years, puberty suppression by means of gonadotropin-releasing hormone analogs has become accepted in clinical management of adolescents who have gender dysphoria (GD). The current study is the first longer-term longitudinal evaluation of the effectiveness of this approach.

METHODS: A total of 55 young transgender adults (22 transwomen and 33 transmen) who had received puberty suppression during adolescence were assessed 3 times: before the start of puberty suppression (mean age, 13.6 years), when cross-sex hormones were introduced (mean age, 16.7 years), and at least 1 year after gender reassignment surgery (mean age, 20.7 years). Psychological functioning (GD, body image, global functioning, depression, anxiety, emotional and behavioral problems) and objective (social and educational/professional functioning) and subjective (quality of life, satisfaction with life and happiness) well-being were investigated.

RESULTS: After gender reassignment, in young adulthood, the GD was alleviated and psychological functioning had steadily improved. Well-being was similar to or better than same-age young adults from the general population. Improvements in psychological functioning were positively correlated with postsurgical subjective well-being.

CONCLUSIONS: A clinical protocol of a multidisciplinary team with mental health professionals, physicians, and surgeons, including puberty suppression, followed by cross-sex hormones and gender reassignment surgery, provides gender dysphoric youth who seek gender reassignment from early puberty on, the opportunity to develop into well-functioning young adults. *Pediatrics* 2014;134:1–9

Transgender adolescents experience an incongruence between their assigned gender and their experienced gender and may meet the Diagnostic and Statistical Manual of Mental Disorders 5 criteria for gender dysphoria (GD).[1] Fifteen years ago, pubertal delay was introduced as an aid in the treatment of a gender dysphoric adolescent.[2] Although not without debate, blocking pubertal development has rapidly become more widely available[3–7] and is now part of the clinical management guidelines for GD.[8–12]

Gonadotropin-releasing hormone analogs (GnRHa) are a putatively fully reversible[13] medical intervention intended to relieve distress that gender dysphoric adolescents experience when their secondary sex characteristics develop. A protocol designed by Cohen-Kettenis and Delemarre-van de Waal[14] (sometimes referred to as "the Dutch model")[4,7] considers adolescents, after a comprehensive psychological evaluation with many sessions over a longer period of time, eligible for puberty suppression, cross-sex hormones (CSH), and gender reassignment surgery (GRS) at the respective ages of 12, 16, and 18 years when there is a history of GD; no psychosocial problems interfering with assessment or treatment, for example, treatment might be postponed because of continuous moving from 1 institution to another or repeated psychiatric crises; adequate family or other support; and good comprehension of the impact of medical interventions.[12] Puberty suppression is only started after the adolescent actually enters the first stages of puberty (Tanner stages 2–3), because although in most prepubertal children GD will desist, onset of puberty serves as a critical diagnostic stage, because the likelihood that GD will persist into adulthood is much higher in adolescence than in the case of childhood GD.[15,16]

Despite the apparent usefulness of puberty suppression, there is only limited evidence available about the effectiveness of this approach. In the first cohort of adolescents who received GnRHa, we demonstrated an improvement in several domains of psychological functioning after, on average, 2 years of puberty suppression while GD remained unchanged.[16] The current study is a longer-term evaluation of the same cohort, on average, 6 years after their initial presentation at the gender identity clinic. This time, we were not only interested in psychological functioning and GD, but added as important outcome measures objective and subjective well-being (often referred to as "quality of life"), that is, the individuals' social life circumstances and their perceptions of satisfaction with life and happiness.[17–19] After all, treatment cannot be considered a success if GD resolves without young adults reporting they are healthy, content with their lives, and in a position to make a good start with their adult professional and personal lives.[20] Because various studies show that transgender youth may present with psychosocial problems,[21,22] a clinical approach that includes both medical (puberty suppression) and mental health support (regular sessions, treatment when necessary, see Cohen-Kettenis et al[12]) aims to improve long-term well-being in all respects.

In the present longitudinal study, 3 primary research questions are addressed. Do gender dysphoric youth improve over time with medical intervention consisting of GnRHa, CSH, and GRS? After gender reassignment, how satisfied are young adults with their treatment and how do they evaluate their objective and subjective well-being? Finally, do young people who report relatively greater gains in psychological functioning also report a higher subjective well-being after gender reassignment?

METHODS

Participants and Procedure

Participants included 55 young adults (22 transwomen [natal males who have a female gender identity] and 33 transmen [natal females who have a male gender identity]) of the first cohort of 70 adolescents who had GD who were prescribed puberty suppression at the Center of Expertise on Gender Dysphoria of the VU University Medical Center and continued with GRS between 2004 and 2011. These adolescents belonged to a group of 196 consecutively referred adolescents between 2000 and 2008, of whom 140 had been considered eligible for medical intervention and 111 were prescribed puberty suppression (see de Vries et al[16]). The young adults were invited between 2008 and 2012, when they were at least 1 year past their GRS (vaginoplasty for transwomen, mastectomy and hysterectomy with ovariectomy for transmen; many transmen chose not to undergo a phalloplasty or were on a long waiting list). Nonparticipation (n = 15, 11 transwomen and 4 transmen) was attributable to not being 1 year postsurgical yet (n = 6), refusal (n = 2), failure to return questionnaires (n = 2), being medically not eligible (eg, uncontrolled diabetes, morbid obesity) for surgery (n = 3), dropping out of care (n = 1), and 1 transfemale died after her vaginoplasty owing to a postsurgical necrotizing fasciitis. Between the 55 participants and the 15 nonparticipating individuals, Student's t tests revealed no significant differences on any of the pretreatment variables. A similar lack of differences was found between the 40 participants who had complete data and the 15 who were missing some data.

Participants were assessed 3 times: pre-treatment (T0, at intake), during treatment (T1, at initiation of CSH), and post-treatment (T2, 1 year after GRS). See Table 1 for age at the different time points. The VU University Medical Center medical ethics committee approved the study, and all participants gave informed consent.

TABLE 1 Age at Different Treatment Milestones and Intelligence by Gender

Variable	All Participants[a] (*N* = 55)		Transwomen (Natal Males) (*N* = 22)	Transmen (Natal Females) (*N* = 33)
Age, y	Mean (SD)	Range	Mean (SD)	Mean (SD)
At assessment PreT	13.6 (1.9)	11.1–17.0	13.6 (1.8)	13.7 (2.0)
At start of GnRHa	14.8 (1.8)	11.5–18.5	14.8 (2.0)	14.9 (1.9)
At start of CSH	16.7 (1.1)	13.9–19.0	16.5 (1.3)	16.8 (1.0)
At GRS	19.2 (0.9)	18.0–21.3	19.6 (0.9)	19.0 (0.8)
At assessment PostT	20.7 (1.0)	19.5–22.8	21.0 (1.1)	20.5 (0.8)
Full-scale intelligence[b]	99.0 (14.3)	70–128	97.8 (14.2)	100.4 (14.3)

PostT, post-treatment; PreT, pre-treatment.

[a] Comparisons between those who had complete data ($n = 40$) and those who had missing data on the CBCL/ABCL ($n = 15$) reveal no significant differences between the groups in age at any point in the study or in natal sex.

[b] WISC-R, the WISC-III, or the WAIS-III at first assessment, depending on age and time.[45–47]

Measures

Time was the predominate independent variable. Other demographic characteristics were incorporated in some models, including, age, natal sex, Full Scale Intelligence, and parent marital status; where significantly different they are reported.

Gender Dysphoria/Body Image

There was 1 indicator measuring GD (Utrecht Gender Dysphoria Scale [UGDS]) and 3 indicators measuring body image (Body Image Scale [BIS] with primary, secondary, and neutral subscales). Higher UGDS (12 items, 1–5 range, total score ranging from 12–60) total scores indicate higher levels of GD, for example, "I feel a continuous desire to be treated as a man/woman."[23] There are separate versions of the UGDS for males and females with mostly different items, permitting no gender difference analyses. BIS (30 items, 1–5 range) higher scores indicate more dissatisfaction with primary sex characteristics (important gender-defining body characteristics, eg, genitals, breasts), secondary sex characteristics (less obvious gender-defining features, eg, hips, body hair), and neutral (hormonally unresponsive) body characteristics (eg, face, height).[24] The male and the female BIS are identical except for the sexual body parts. The UGDS and the BIS of the natal gender were administered at T0 and T1. At T1, we chose the UGDS of the assigned gender, because no physical changes had occurred yet and some were still treated as their assigned gender. This way, however, decreased GD caused by social transitioning was not measured. At T2 young adults filled out the versions of their affirmed gender.

Psychological Functioning

There were 10 indicators assessing psychological functioning. To assess global functioning, the Children's Global Assessment Scale (CGAS) was used.[25] The Beck Depression Inventory (BDI; 21 items, 0–3 range) indicates presence and severity of depressive symptoms.[26] Spielberger's Trait Anger (TPI) and Spielberger's Trait Anxiety (STAI; 10 and 20 items, respectively, 1–4 range) scales of the State-Trait Personality Inventory were administered to assess the tendency to respond with anxiety or anger, respectively, to a threatening or annoying situation.[27,28]

Behavioral and emotional problems were assessed by the total, internalizing, and externalizing T scores as well as clinical range scores for these 3 indices (T score >63) of the Child/Adult Behavior Checklist (CBCL at T0 and T1, ABCL at T2), the Youth/Adult Self-Report (YSR at T0 and T1, ASR at T2).[29–31] Items referring to GD in the CBCL/YSR and ABCL/ASR were scored as 0 (for more explanation, see Cohen-Kettenis et al[32]).

Objective and Subjective Well-Being (T2 Only)

A self-constructed questionnaire was used to ask the young adults about their current life circumstances, such as living conditions, school and employment, and social support (objective well-being), and satisfaction with treatment (subjective well-being). Three instruments further assessed subjective well-being. To measure quality of life, the WHOQOL-BREF (quality of life measure developed by the World Health Organization) was administered (24 items, 4 domains: Physical Health, Psychological Health, Social Relationships, and Environment, 1–5 range with higher scores indicating better quality of life).[17] The Satisfaction With Life Scale (SWLS, 5 items, 5–35 range, 20 being neutral) was used to assess life satisfaction.[18] Higher scores on the Subjective Happiness Scale (SHS, 4 items, 7-point Likert scale, average score 1–7) reflect greater happiness.[19]

Data Analyses

General Linear Models examined the repeated measures with an analysis of variance-based model, incorporating continuous and categorical predictors, and correcting for the unbalanced cell sizes. Linear and quadratic effects of the 14 indicators across 3 time points, with time as the within-subjects factor, and sex as a between-subjects factor in a second set of analyses are reported in Tables 2 and 3 and Fig 1. A linear effect signifies an overall change across T0 to T2. A quadratic effect signifies that the change was not continuous, such as when an indicator does not improve from T0 to T1 but improves from T1 to T2. It is possible to have both a significant linear and quadratic effect on the same

TABLE 2 Gender Dysphoria and Body Image of Adolescents at Intake (T0), While on Puberty Suppression (T1), and After Gender Reassignment (T2)

	N^a	T0	T1	T2	T0–T2	Time	Time × Sex
					t test	Linear Effect Quadratic Effect	Linear Effect Quadratic Effect
		Mean (SD)	Mean (SD)	Mean (SD)	*P*	*P*	*P*
UGDS	33	53.51 (8.29)	54.39 (7.70)	15.81 (2.78)	<.001		
MtF	11	47.07 (11.05)	48.95 (10.80)	17.27 (2.57)	<.001	<.001	n/a
						<.001	
FtM	22	56.74 (3.74)	57.11 (3.40)	15.08 (2.64)	<.001	<.001	n/a
						<.001	
Body Image (BIS)							
Primary sex characteristics	45	4.13 (0.59)	4.05 (0.60)	2.59 (0.82)	<.001	<.001	.01
						<.001	.45
MtF	17	4.03 (0.68)	3.82 (0.56)	2.07 (0.74)	<.001		
FtM	28	4.18 (0.53)	4.13 (0.60)	2.89 (0.71)	<.001		
Secondary sex characteristics	45	2.73 (0.72)	2.86 (0.67)	2.27 (0.56)	<.001	<.001	.10
						<.001	<.001
MtF	17	2.63 (0.60)	2.34 (0.68)	1.93 (0.63)	<.001		
FtM	28	2.80 (0.72)	3.18 (0.43)	2.48 (0.40)	.05		
Neutral body characteristics	45	2.35 (0.68)	2.49 (0.53)	2.23 (0.49)	.29	.29	.007
						.01	.01
MtF	17	2.57 (0.70)	2.29 (0.50)	2.09 (0.56)	.014		
FtM	28	2.21 (0.64)	2.61 (0.52)	2.32 (0.44)	.40		

FtM, female to male transgender; MtF, male to female transgender; n/a, not applicable.

[a] Participants who had complete data at all 3 waves were included. Some assessments were added to the study later, yielding fewer total participants for those scales.

indicator. Other potential between-subjects factors (age, total IQ, parental marital status) were examined but excluded owing to a lack of relationship with the 14 indicators at T0. The 1 exception, age predicting secondary sex characteristics, is described below in the findings. We compared T2 sample means to population norms for subjective well-being using 1-sample *t* tests from previously published validation studies. Finally, we examined T2 subjective well-being correlations with residual change scores from T0 to T2 on the 14 indicators (an indicator of who improved relatively more or less over time).

All measures used were self-reported, except the CGAS (attending clinician) and the CBCL/ASR (parents). Each participant was given all measures at each of 3 assessments. Numbers varied across indicators owing to the later inclusion of the YSR, CGAS, BDI, TPI, and STAI, yielding 8 persons who had missing data at T0 and a clinician error yielding missing data at T1 for 10 participants on the UGDS. Dutch versions were used (see de Vries et al[16]).

RESULTS

Gender Dysphoria and Body Satisfaction

Figure 1 and Table 2 show that GD and body image difficulties persisted through puberty suppression (at T0 and T1) and remitted after the administration of CSH and GRS (at T2) (significant linear effects in 3 of 4 indicators, and significant quadratic effects in all indicators). Time by sex interactions revealed that transwomen reported more satisfaction over time with primary sex characteristics than transmen and a continuous improvement in satisfaction with secondary and neutral sex characteristics. Transmen reported more dissatisfaction with secondary and neutral sex characteristics at T1 than T0, but improvement in both from T1 to T2. Age was a significant covariate with secondary sex characteristics (the only significant demographic covariate with any outcome indicator in the study), indicating that older individuals were more dissatisfied at T0, but the age gap in body satisfaction narrowed over time ($F(1, 42) = 8.18$; $P < .01$).

Psychological Functioning

As presented in Table 3, significant linear effects showed improvement over time in global functioning (CGAS), CBCL/ABCL total, internalizing and externalizing *T* scores, and YSR/ASR total and internalizing *T* scores. Quadratic effects revealed decreases from T0 to T1 followed by increases from T1 to T2 in depression and YSR/ASR internalizing *T* scores. Quadratic trends revealed decreases from T0 to T1, followed by increases from T1 to T2 in depression and YSR/ASR internalizing *T* scores. For all CBCL/ABCL and YSR/ASR indicators except YSR/ASR externalizing, the percentage in the clinical range dropped significantly (McNemar's test, *P* value <0.05) from T0 to T1, from T0 to T2, or from T1 to T2.

Over time, transmen showed reduced anger, anxiety, and CBCL/ABCL externalizing *T* scores, whereas transwomen showed stable or slightly more symptomatology on these measures. Transwomen improved in CBCL/ABCL total *T* scores in a quadratic fashion (all the improvement between T1 and T2),

TABLE 3 Psychological Functioning of Adolescents at Intake (T0), While on Puberty Suppression (T1), and After Gender Reassignment (T2)

	N^a	T0	T1	T2	T0–T2	Time	Time × Sex
					t test	Linear Effect Quadratic Effect	Linear Effect Quadratic Effect
		Mean (SD)	Mean (SD)	Mean (SD)	*P*	*P*	*P*
Global functioning (CGAS)	32	71.13 (10.46)	74.81 (9.86)	79.94 (11.56)	<.001	<.001	.89
						.61	.68
MtF	15	74.33 (7.53)	78.20 (9.56)	82.40 (8.28)	<.001		
FtM	17	67.65 (11.87)	70.65 (9.89)	76.29 (14.48)	.02		
Depression (BDI)	32	7.89 (7.52)	4.10 (6.17)	5.44 (8.40)	.21	.23	.66
						.04	.49
MtF	12	4.73 (4.20)	2.25 (3.54)	3.38 (4.40)	.12		
FtM	20	10.09 (8.34)	5.05 (7.08)	6.95 (9.83)	.32		
Anger (TPI)	32	17.55 (5.72)	17.22 (5.61)	16.01 (5.28)	.20	.15	.04
						.52	.12
MtF	12	14.17 (3.01)	14.00 (3.36)	5.58 (3.92)	.18		
FtM	20	19.55 (5.96)	19.25 (5.69)	16.56 (6.06)	.05		
Anxiety (STAI)	32	39.57 (10.53)	37.52 (9.87)	37.61 (10.39)	.45	.42	.05
						.47	.52
MtF	12	31.87 (7.42)	31.71 (8.36)	35.83 (10.22)	.14		
FtM	20	44.41 (9.06)	41.59 (9.03)	39.20 (10.53)	.12		
CBCL–ABCL							
Total *T* score	40	60.20 (12.66)	54.70 (11.58)	48.10 (9.30)	<.001	<.001	.25
% Clinical		38_x	20_y	5_y		.68	.03
MtF	15	57.40 (12.76)	49.67 (12.29)	48.13 (12.58)	.002		
FtM	25	61.88 (12.56)	57.72 (10.23)	48.08 (6.95)	<.001		
Int *T* score	40	60.83 (12.36)	54.42 (10.58)	50.45 (10.04)	<.001	<.001	.91
% Clinical		30_x	12.5_y	10_y		.42	.33
MtF	15	59.40 (10.03)	50.93 (11.15)	48.73 (12.61)	<.001		
FtM	25	61.68 (13.70)	56.52 (9.86)	51.48 (8.25)	<.001		
Ext *T* score	40	57.85 (13.73)	53.85 (12.77)	47.85 (8.59)	<.001	<.001	.19
% Clinical		40_x	25_x	2.5_y		.43	.12
MtF	15	52.53 (14.11)	47.87 (12.07)	46.33 (10.95)	.10		
FtM	25	61.04 (12.71)	57.44 (12.01)	48.76 (6.89)	<.001		
YSR-ASR							
Total *T* score	43	54.72 (12.08)	49.16 (11.16)	48.53 (9.46)	.005	.005	.28
% Clinical		30_x	14_{xy}	7_y		.07	.75
MtF	17	50.65 (12.19)	45.94 (12.24)	47.24 (12.28)	.28		
FtM	26	57.38 (11.47)	51.27 (10.08)	49.38 (7.21)	.01		
Int *T* score	43	55.47 (13.08)	48.65 (12.33)	50.07 (11.15)	.03	.03	.87
% Clinical		30_x	9.3_y	11.6_{xy}		.008	.73
MtF	17	54.00 (12.31)	47.59 (14.26)	48.12 (12.54)	.04		
FtM	26	56.42 (13.86)	49.35 (11.13)	51.35 (10.19)	.17		
Ext *T* score	43	52.77 (12.47)	49.44 (9.59)	49.44 (9.37)	.14	.14	.005
% Clinical		21_x	11.6_x	7_x		.09	.14
MtF	17	46.00 (11.58)	44.71 (9.53)	50.24 (11.18)	.17		
FtM	26	57.16 (11.14)	52.54 (8.43)	48.92 (8.18)	.006		

FtM, female to male transgender; MtF, male to female transgender.

$_{xy}$ Percent clinical range, shared subscripts indicate no significant difference in values. In no case was an increase in percent in the clinical range significant from 1 time point to any other time point, indicating an overall decline or stability of clinical symptoms over time.

[a] Participants who had complete data at all 3 waves were included. Some assessments were added to the study later, yielding fewer total participants for those scales.

whereas transmen improved steadily across the 3 time points (linear effect only).

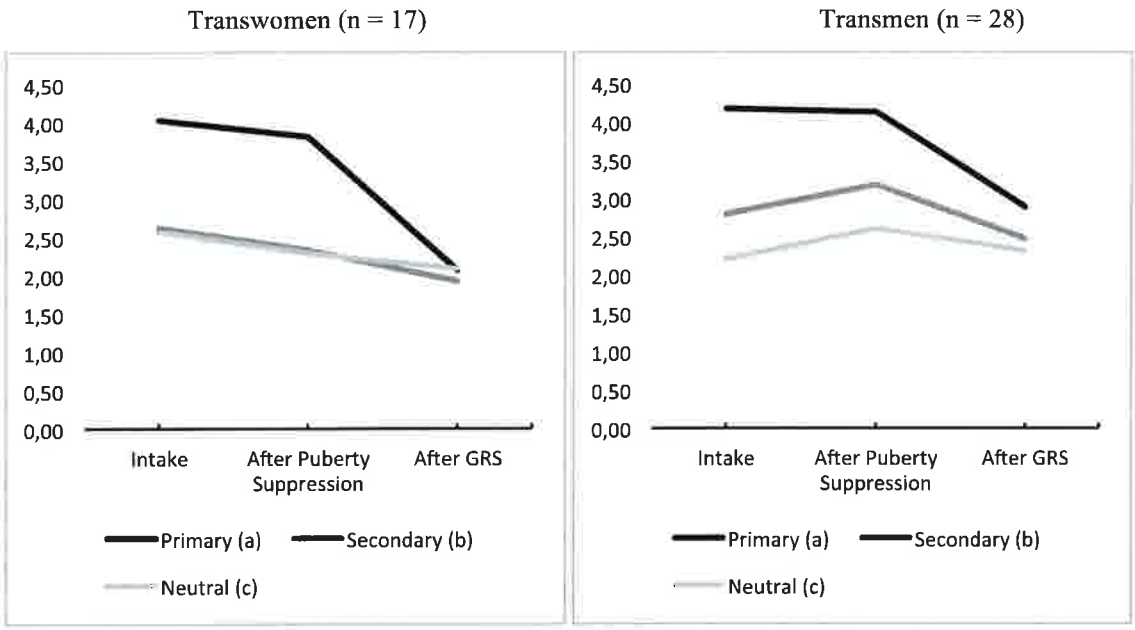
Objective Well-Being

At T2, the participants were vocationally similar to the Dutch population except they were slightly more likely to live with parents (67% vs 63%), and more likely, when studying, to be pursuing higher education (58% vs 31%).[33]

Families were supportive of the transitioning process: 95% of mothers, 80% of fathers, and 87% of siblings. Most (79%) young adults reported having 3 or more friends, were satisfied with their male (82%) and female peers (88%), and almost all (95%) had received support from friends regarding their gender reassignment. After their GRS, many participants (89%) reported having been never or seldom called names or harassed. The majority (71%) had experienced social transitioning as easy.

Subjective Well-Being

None of the participants reported regret during puberty suppression, CSH



Eta Squared for Linear and Quadratic Effects

(a) Primary sex characteristics
Time: .79 ($P < .001$), .66 ($P < .001$),
Time × sex: .14 ($P = .01$), .01 ($P = .45$),

(b) Secondary sex characteristics
Time: .31($P < .001$), .30 ($P < .001$),
Time × sex: .06 ($P = .10$), .22 ($P < .001$)

(c) Neutral body characteristics
Time: .07($P < .001$), .09 ($P = .29$)
Time × sex: .16 ($P = .007$), .15 ($P = .01$)

FIGURE 1
BIS[23] for transwomen and transmen at T0 (pretreatment, at intake), T1 (during treatment, at initiation of cross-gender hormones), and T2 (post-treatment, 1 year after GRS).

treatment, or after GRS. Satisfaction with appearance in the new gender was high, and at T2 no one reported being treated by others as someone of their assigned gender. All young adults reported they were very or fairly satisfied with their surgeries.

Mean scores on WHOQOL-BREF, the SWLS, and the SHS are presented in Table 4, together with scores from large validation and reliability studies of these measures,[17,19,34] revealing similar scores in all areas except WHOQOL-Environment subdomain, which was higher for the participants than the norm. There were some differences across gender; transwomen scored higher than transmen on the SWLS (mean = 27.7; SD = 5.0 vs mean = 23.2; SD = 6.0; t (52) = 2.82; $P < .01$) and on the psychological subdomain of the WHOQOL (mean = 15.77; SD = 2.0 vs mean = 13.92; SD = 2.5; t (53) = 2.95; $P < .01$).

Correlations With Residual Change Scores

The residual change scores of secondary sex characteristics, global functioning, depression, anger, anxiety, and YSR total, internalizing and externalizing from T0 to T2, were significantly correlated with the 6 T2 quality of life indicators. Most correlation coefficients were within the moderate to large magnitude (eg, 0.30–0.60), except depression, which was highly correlated (0.60–0.80) (see Table 5).

DISCUSSION

Results of this first long-term evaluation of puberty suppression among transgender adolescents after CSH treatment and GRS indicate that not only was GD resolved, but well-being was in many respects comparable to peers.

The effectiveness of CSH and GRS for the treatment of GD in adolescents is in line with findings in adult transsexuals.[35,36] Whereas some studies show that poor surgical results are a determinant of postoperative psychopathology and of dissatisfaction and regret,[37,38] all young adults in this study were generally satisfied with their physical appearance and none regretted treatment. Puberty suppression had caused their bodies to

TABLE 4 Subjective Well-Being: Quality of Life, Satisfaction With Life, and Subjective Happiness Mean Scores With Scores From Validation Studies

	N	Mean (SD)	Range	Validation Studies Scores Mean (SD)	Comparison *P*
WHOQOL[a] Physical	55	15.22 (2.49)	8.6–20.0	15.0 (2.9)[b]	.56
WHOQOL Psychological	55	14.66 (2.44)	6.67–20.0	14.3 (2.8)[b]	.24
WHOQOL Social Relations	55	14.91 (2.35)	9.3–20.00	14.5 (3.4)[b]	.18
WHOQOL Environment	55	15.47 (2.06)	10.5–20.00	13.7 (2.6)[b]	<.001
SWLS	54	24.98 (6.0)	9.0–35.0	26.18 (5.7)[c]	.16
SHS	54	4.73 (0.77)	2.75–6.0	4.89 (1.1)[d]	.17

[a] WHOQOL, Bref, Skevington et al.[16]
[b] International field trial, ages 21 to 30 years, Skevington et al.[16]
[c] Dutch young adults, Arindell et al.[33]
[d] US Public College Students, Lyubomirsky.[18]

not (further) develop contrary to their experienced gender.

Psychological functioning improved steadily over time, resulting in rates of clinical problems that are indistinguishable from general population samples (eg, percent in the clinical range dropped from 30% to 7% on the YSR/ASR[30]) and quality of life, satisfaction with life, and subjective happiness comparable to same-age peers.[17,19,34] Apparently the clinical protocol of a multidisciplinary team with mental health professionals, physicians, and surgeons gave these formerly gender dysphoric youth the opportunity to develop into well-functioning young adults. These individuals, of whom an even higher percentage than the general population were pursuing higher education, seem different from the transgender youth in community samples with high rates of mental health disorders, suicidality and self-harming behavior, and poor access to health services.[21,22,39,40]

In this study, young adults who experienced relatively greater improvements in psychological functioning were more likely to also report higher levels of subjective postsurgical well-being. This finding suggests value to the protocol that involves monitoring the adolescents' functioning, physically and psychologically, over many years, and providing more support whenever necessary.

This clinic-referred sample perceived the Environmental subdomain (with items like "access to health and social care" and "physical safety and security") of the WHOQOL-BREF as even better than the Dutch standardization sample.[17] Whereas in some other contexts transgender youth may experience gender-related abuse and victimization,[22,41,42] 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.

Both genders benefitted from the clinical approach, although transwomen showed more improvement in body image satisfaction (secondary sex characteristics) and in psychological functioning (anger and anxiety). None of the transmen in this study had yet had a phalloplasty because of waiting lists or

TABLE 5 Correlations Between Residual Change in Psychological Functioning Over Time and Young Adult Subjective Well-Being

	WHOQOL BREF					
	Physical	Psychological	Social	Environment	SWLS	SHS
Gender dysphoria (UGDS)	0.01 (.97)	0.05 (.75)	−0.09 (.57)	−0.02 (.89)	0.06 (.71)	0.30 (.04)
Body image subscales (BIS)						
Primary sex characteristics	−0.22 (.14)	−0.25 (.09)	−0.35 (.02)	−0.04 (.78)	−0.22 (.14)	−0.21 (.17)
Secondary sex characteristics	−0.39 (.006)	−0.45 (<.001)	−0.47 (<.001)	−0.34 (.02)	−0.35 (.02)	−0.26 (.08)
Neutral body characteristics	−0.21 (.16)	−0.27 (.07)	−0.15 (.32)	−0.28 (.06)	−0.26 (.08)	−0.16 (.28)
Psychological functioning						
Global functioning (CGAS)	0.60 (<.001)	0.52 (.002)	0.52 (.002)	0.27 (.14)	0.58 (<.001)	0.50 (.004)
Depression (BDI)	−0.76 (<.001)	−0.72 (<.001)	−0.51 (.002)	−0.49 (.003)	−0.61 (<.001)	−0.77 (<.001)
Trait anger (TPI)	−0.37 (.03)	−0.18 (.31)	−0.22 (.20)	−0.29 (.09)	−0.33 (.07)	−0.35 (.05)
Trait anxiety (STAI)	−0.58 (<.001)	−0.64 (<.001)	−0.38 (.03)	−0.44 (.01)	−0.49 (.004)	−0.57 (<.001)
CBCL–ABCL						
Total *T* score	−0.20 (.20)	−0.12 (.45)	−0.07 (.65)	−0.14 (.35)	−0.32 (.03)	−0.16 (.29)
Internalizing *T* score	−0.29 (.06)	−0.29 (.06)	−0.23 (.14)	−0.12 (.44)	−0.48 (<.001)	−0.36 (.02)
Externalizing *T* score	−0.13 (.40)	−0.05 (.75)	0.16 (.29)	−0.20 (.19)	−0.15 (.36)	0.00 (.99)
Youth Self Report (YSR–ASR)						
Total *T* score	−0.53 (<.001)	−0.45 (.002)	−0.33 (.03)	−0.42 (.005)	−0.52 (<.001)	−0.55 (<.001)
Internalizing *T* score	−0.62 (<.001)	−0.61 (<.001)	−0.47 (<.001)	−0.40 (.007)	−0.66 (<.001)	−0.60 (<.001)
Externalizing *T* score	−0.23 (.13)	−0.10 (.53)	−0.07 (.67)	−0.37 (.02)	−0.22 (.15)	−0.35 (.02)

P values are in parentheses.

a desire for improved surgery techniques. This finding warrants further study of the specific concerns of young transmen.

Despite promising findings, there were various limitations. First, the study sample was small and came from only 1 clinic. Second, this study did not focus on physical side effects of treatment. Publications on physical parameters of the same cohort of adolescents are submitted or in preparation. A concurring finding exists in the 22-year follow-up of the well-functioning first case now at age 35 years who has no clinical signs of a negative impact of earlier puberty suppression on brain development, metabolic and endocrine parameters, or bone mineral density.[43] Third, despite the absence of pretreatment differences on measured indicators, a selection bias could exist between adolescents of the original cohort that participated in this study compared with nonparticipants.

Age criteria for puberty suppression and CSH are under debate, although they worked well for adolescents in the current study. Especially in natal females, puberty will often start before the age of 12 years. Despite the fact that developing evidence suggests that cognitive and affective cross-gender identification, social role transition, and age at assessment are related to persistence of childhood GD into adolescence, predicting individual persistence at a young age will always remain difficult.[44] The age criterion of 16 years for the start of CSH may be problematic especially for transwomen, as growth in height continues as long as cross-sex steroids are not provided (causing the growth plates to close). Therefore, psychological maturity and the capacity to give full informed consent may surface as the required criteria for puberty suppression and CSH[45] in cases that meet other eligibility criteria.

CONCLUSIONS

Results of this study provide first evidence that, after CSH and GRS, a treatment protocol including puberty suppression leads to improved psychological functioning of transgender adolescents. While enabling them to make important age-appropriate developmental transitions, it contributes to a satisfactory objective and subjective well-being in young adulthood. Clinicians should realize that it is not only early medical intervention that determines this success, but also a comprehensive multidisciplinary approach that attends to the adolescents' GD as well as their further well-being and a supportive environment.

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