No. 23-16026 c/w No. 23-16030

IN THE UNITED STATES COURT OF APPEALS
FOR THE NINTH CIRCUIT

HELEN DOE, parent and next friend of Jane Doe; et al.,

Plaintiffs-Appellees,

v.

THOMAS C. HORNE, in his official capacity as State Superintendent of Public Instruction; et al.,

Defendants-Appellants,

and

WARREN PETERSEN, Senator, President of the Arizona State Senate; BEN TOMA, Representative, Speaker of the Arizona House of Representatives,

Intervenor-Defendants-Appellants.

On Appeal from the United States District Court
for the District of Arizona

EXCERPTS OF RECORD – VOLUME 3

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IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF ARIZONA
TUCSON DIVISION

Jane Doe, *et al.*, Plaintiffs, v. Thomas C. Horne, in his official capacity as State Superintendent of Public Instruction, *et al.*, Defendants.	Case No. 4:23-cv-00185-JGZ **Declaration of Dr. Gregory A. Brown, Ph.D., FACSM, in Support of [Intervenors' Proposed] Opposition to Plaintiffs' Motion for a Preliminary Injunction**

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Personal Qualifications and Disclosure

I serve as Professor of Exercise Science in the Department of Kinesiology and Sport Sciences at the University of Nebraska Kearney, where I teach classes in Exercise Physiology among other topics. I am also the Director of the General Studies program. I have served as a tenured (and nontenured) professor at universities since 2002.

In August 2002, I received a Doctor of Philosophy degree from Iowa State University, where I majored in Health and Human Performance, with an emphasis in the Biological Bases of Physical Activity. In May 1999, I received a Master of Science degree from Iowa State University, where I majored in Exercise and Sport Science, with an emphasis in Exercise Physiology.

I have received many awards over the years, including the Mortar Board Faculty Excellence Honors Award, College of Education Outstanding Scholarship / Research Award, and the College of Education Award for Faculty Mentoring of Undergraduate Student Research. I have authored more than 50 refereed publications and more than 70 refereed presentations in the field of Exercise Science. I have authored chapters for multiple books in the field of Exercise Science. And I have served as a peer reviewer for over 30 professional journals, including *The American Journal of Physiology*, the *International Journal of Exercise Science*, the *Journal of Strength and Conditioning Research*, *Therapeutic Advances in Endocrinology and Metabolism, Sports Medicine*, and *The Journal of Applied Physiology*.

My areas of research have included the endocrine response to testosterone prohormone supplements in men and women, the effects of testosterone prohormone supplements on health and the adaptations to strength training in men, the effects of energy drinks on the physiological response to exercise, assessment of various athletic training modes in males and females, and sex-based differences in athletic performance. Articles that I have published that are closely related to topics that I discuss in this expert report include:

- Studies of the effect of ingestion of a testosterone precursor on circulating

testosterone levels in young men. Douglas S. King, Rick L. Sharp, Matthew D. Vukovich, Gregory A. Brown, et al., *Effect of Oral Androstenedione on Serum Testosterone and Adaptations to Resistance Training in Young Men: A Randomized Controlled Trial*, JAMA 281: 2020-2028 (1999); G. A. Brown, M. A. Vukovich, et al., *Effects of Anabolic Precursors on Serum Testosterone Concentrations and Adaptations to Resistance Training in Young Men*, Int J Sport Nutr Exerc Metab 10: 340-359 (2000).

- A study of the effect of ingestion of that same testosterone precursor on circulating testosterone levels in young women. G. A. Brown, J. C. Dewey, et al., *Changes in Serum Testosterone and Estradiol Concentrations Following Acute Androstenedione Ingestion in Young Women*, Horm Metab Res 36: 62-66 (2004.)
- A study finding (among other things) that body height, body mass, vertical jump height, maximal oxygen consumption, and leg press maximal strength were higher in a group of physically active men than comparably active women, while the women had higher percent body fat. G. A. Brown, Michael W. Ray, et al., *Oxygen Consumption, Heart Rate, and Blood Lactate Responses to an Acute Bout of Plyometric Depth Jumps in College-Aged Men And Women*, J. Strength Cond Res 24: 2475-2482 (2010).
- A study finding (among other things) that height, body mass, and maximal oxygen consumption were higher in a group of male NCAA Division 2 distance runners, while women NCAA Division 2 distance runners had higher percent body fat. Furthermore, these male athletes had a faster mean competitive running speed (~3.44 min/km) than women (~3.88 min/km), even though the men ran 10 km while the women ran 6 km. Katherine Semin, Alvah C. Stahlnecker, Kate A. Heelan, G. A. Brown, et al, *Discrepancy Between Training, Competition and Laboratory Measures of Maximum Heart Rate in NCAA Division 2 Distance Runners*, Journal of Sports Science and Medicine 7: 455-460 (2008).
- A presentation at the 2021 American Physiological Society New Trends in Sex and

Gender Medicine Conference entitled "Transwomen Competing in Women's Sports: What We Know and What We Don't".

- I have also authored an August 2021 entry for the American Physiological Society Physiology Educators Community of Practice Blog (PECOP Blog) titled "The Olympics, Sex, and Gender in the Physiology Classroom, and a May 2023 entry for the PECOP Blog titled "The Olympics, sex, and gender in the physiology classroom (part 2): Are there sex based differences in athletic performance before puberty?" I have also authored an April 17, 2023 post for the Center on Sport Policy and Conduct titled "Should Transwomen be allowed to Compete in Women's Sports? A view from an Exercise Physiologist."
- A presentation at the 2022 annual meeting of the American College of Sports Medicine titled "Comparison of Running Performance Between Division and Sex in NCAA Outdoor Track Running Championships 2010-2019." And a presentation at the 2023 annual meeting of the American College of Sports Medicine titled "Boys and Girls Differ in Running and Jumping Track and Field Event Performance Before Puberty."

A list of my published scholarly work for the past 10 years appears as an Appendix.

Purpose of this Declaration

I have been asked by counsel for Proposed Intervenors Senator Warren Petersen, President of the Arizona Senate, and Representative Ben Toma, Speaker of the Arizona House of Representatives in the matter of *Doe and Roe v. Horne et al.* to offer my opinions about the following: (a) whether males have inherent advantages in athletic performance over females, and if so the scale and physiological basis of those advantages, to the extent currently understood by science and (b) whether the sex-based performance advantage enjoyed by males is eliminated if feminizing hormones are administered to male athletes who identify as transgender (and in the case of prepubertal children, whether puberty blockers eliminate the advantage). In this declaration, when I use the terms "boy" or "male," I am referring to biological males based on the individual's reproductive biology and genetics as determined at birth. Similarly, when I use the terms "girl" or "female," I am referring to biological females based on the individual's reproductive biology and genetics as determined at birth. When I use the term transgender, I am referring to persons who are males or females, but who identify as a member of the opposite sex.

I have previously provided expert information in cases similar to this one in the form of written declarations and depositions in the cases of *Soule vs. CIAC* in the state of Connecticut, *B.P.J. vs. West Virginia State Board of Education* in the state of West Virginia, and *L.E. vs. Lee* in the state of Tennessee, and in the form of a written declaration in the case of *Hecox vs. Little* in the state of Idaho. I have not previously testified as an expert in any trials.

The opinions I express in this declaration are my own, and do not necessarily reflect the opinions of my employer, the University of Nebraska.

I have been compensated for my time serving as an expert in this case at the rate of $200 per hour. My compensation does not depend on the outcome in the case.

Overview

In this declaration, I explore three important questions relevant to current discussions and policy decisions concerning inclusion of transgender individuals in women's athletic competitions. Based on my professional familiarity with exercise physiology and my review of the currently available science, including that contained in the many academic sources I cite in this report, I set out and explain three basic conclusions:

- At the level of (a) elite, (b) collegiate, (c) scholastic, and (d) recreational competition, men, adolescent boys, or male children, have an advantage over equally aged, gifted, and trained women, adolescent girls, or female children in almost all athletic events;
- Biological male physiology is the basis for the performance advantage that men, adolescent boys, or male children have over women, adolescent girls, or female children in almost all athletic events; and
- The administration of androgen inhibitors and cross-sex hormones to men or adolescent boys after the onset of male puberty does not eliminate the performance advantage that men and adolescent boys have over women and adolescent girls in almost all athletic events. Likewise, there is no published scientific evidence that the administration of puberty blockers to males before puberty eliminates the pre-existing athletic advantage that prepubertal males have over prepubertal females in almost all athletic events.

In short summary, men, adolescent boys, and prepubertal male children perform better in almost all sports than equally aged, trained, and gifted women, adolescent girls, and prepubertal female children because of their inherent physiological advantages. In general, men, adolescent boys, and prepubertal male children, can run faster, output more muscular power, jump higher, and possess greater muscular endurance than equally aged, trained, and gifted women, adolescent girls, and prepubertal female children. These advantages become greater during and after male puberty, but they exist before puberty.

Further, while after the onset of puberty males are on average taller and heavier than females, a male performance advantage over females has been measured in weightlifting competitions even between males and females matched for body mass.

Male advantages in measurements of body composition, tests of physical fitness, and athletic performance have also been shown in children before puberty. These advantages are magnified during puberty, triggered in large part by the higher testosterone concentrations in men, and adolescent boys, after the onset of male puberty. Under the influence of these higher testosterone levels, adolescent boys and young men develop even more muscle mass, greater muscle strength, less body fat, higher bone mineral density, greater bone strength, higher hemoglobin concentrations, larger hearts and larger coronary blood vessels, and larger overall statures than women. In addition, maximal oxygen consumption (VO_2max), which correlates to ~30-40% of success in endurance sports, is higher in both elite and average men and boys than in comparable women and girls when measured in regard to absolute volume of oxygen consumed and when measured relative to body mass.

Although androgen deprivation (that is, testosterone suppression) may modestly decrease some physiological advantages that men and adolescent boys have over equally aged, trained, and gifted women and adolescent girls, it cannot fully or even largely eliminate those physiological advantages once an individual has passed through male puberty.

Evidence and Conclusions

I. The scientific reality of biological sex

1. The scientific starting point for the issues addressed in this report is the biological fact of dimorphic sex in the human species. It is now well recognized that dimorphic sex is so fundamental to human development that, as stated in a recent position paper issued by the Endocrine Society, it "must be considered in the design and analysis of human and animal research. . . . Sex is dichotomous, with sex determination in the fertilized zygote stemming from unequal expression of sex chromosomal genes." (Bhargava et al. 2021 at 220). As stated by Sax (2002 at 177), "More than 99.98% of humans are either male or female." All humans who do not suffer from some genetic or developmental disorder are unambiguously male or female.
2. Although sex and gender are used interchangeably in common conversation, government documents, and in the scientific literature, the American Psychological Association defines sex as "physical and biological traits" that "distinguish between males and females" whereas gender "implies the psychological, behavioral, social, and cultural aspects of being male or female (i.e., masculinity or femininity)" (https://dictionary.apa.org, accessed May 5, 2023). The concept that sex is an important biological factor determined at conception is a well-established scientific fact that is supported by statements from a number of respected organizations including, but not limited to, the Endocrine Society (Bhargava et al. 2021 at 220), the American Physiological Society (Shah 2014), the Institute of Medicine, and the National Institutes of Health (Miller 2014 at H781-82). Collectively, these and other organizations have stated that every cell has a sex and every system in the body is influenced by sex. Indeed, "sex often influences gender, but gender cannot influence sex." (Bhargava 2021 at 228.)
3. To further explain: "The classical biological definition of the **2 sexes** is that females have ovaries and make larger female gametes (eggs), whereas males have testes and make smaller male gametes (sperm) … the definition can be extended to the ovaries

and testes, and in this way the categories—female and male—can be applied also to individuals who have gonads but do not make gametes … sex is dichotomous because of the different roles of each sex in reproduction." (Bhargava 2021 at 221.) Furthermore, "sex determination begins with the inheritance of XX or XY chromosomes" (Bhargava 2021 at 221.) And, "Phenotypic sex differences develop in XX and XY embryos as soon as transcription begins. The categories of X and Y genes that are unequally represented or expressed in male and female mammalian zygotes … cause phenotypic sex differences" (Bhargava 2021 at 222.)

4. Although disorders of sexual development (DSDs) are sometimes confused with discussions of transgender individuals, the two are different phenomena. DSDs are disorders of physical development. Many DSDs are "associated with genetic mutations that are now well known to endocrinologists and geneticists." (Bhargava 2021 at 225) By contrast, a sense of transgender identity is usually not associated with any physical disorder, and "a clear biological causative underpinning of gender identity remains to be demonstrated." (Bhargava 2021 at 226.) The importance of distinguishing between the two is exemplified by the World Athletics Council updating "…the eligibility regulations for transgender and DSD athletes to compete in the female category" in March 2023. (World Athletics)
5. Further demonstrating the biological importance of sex, Gershoni and Pietrokovski (2017) detail the results of an evaluation of "18,670 out of 19,644 informative protein-coding genes in men versus women" and reported that "there are over 6500 protein-coding genes with significant S[ex]D[ifferential] E[xpression] in at least one tissue. Most of these genes have SDE in just one tissue, but about 650 have SDE in two or more tissues, 31 have SDE in more than five tissues, and 22 have SDE in nine or more tissues" (Gershoni 2017 at 2-3.) Some examples of tissues identified by these authors that have SDE genes include breast mammary tissue, skeletal muscle, skin, thyroid gland, pituitary gland, subcutaneous adipose, lung, and heart left ventricle. Based on these observations the authors state "As expected, Y-linked

genes that are normally carried only by men show SDE in many tissues" (Gershoni 2017 at 3.) A stated by Heydari et al. (2022, at 1), "Y chromosome harbors male-specific genes, which either solely or in cooperation with their X-counterpart, and independent or in conjunction with sex hormones have a considerable impact on basic physiology and disease mechanisms in most or all tissues development." As stated out by O'Connor (2023, at 2, quoting Institute of Medicine) "not every difference observed between male and female cells can be attributed to differences in exposure to sex hormones."

6. In a review of 56 articles on the topic of sex-based differences in skeletal muscle, Haizlip et al., (2015) state that "More than 3,000 genes have been identified as being differentially expressed between male and female skeletal muscle." (Haizlip 2015 at 30.) Furthermore, the authors state that "Overall, evidence to date suggests that skeletal muscle fiber-type composition is dependent on species, anatomical location/function, and sex" (Haizlip 2015 at 30.) The differences in genetic expression between males and females influence the skeletal muscle fiber composition (i.e. fast twitch and fast twitch sub-type and slow twitch), the skeletal muscle fiber size, the muscle contractile rate, and other aspects of muscle function that influence athletic performance. As the authors review the differences in skeletal muscle between males and females they conclude, "Additionally, all of the fibers measured in men have significantly larger cross-sectional areas (CSA) compared with women." (Haizlip 2015 at 31.) The authors also explore the effects of thyroid hormone, estrogen, and testosterone on gene expression and skeletal muscle function in males and females. One major conclusion by the authors is that "The complexity of skeletal muscle and the role of sex adding to that complexity cannot be overlooked." (Haizlip 2015 at 37.) The evaluation of SDE in protein coding genes helps illustrate that the differences between men and women are intrinsically part of the chromosomal and genetic makeup of humans which can influence many tissues that are inherent to the athletic competitive advantages of men compared to women.

II. Biological men, or adolescent boys, have large, well-documented performance advantages over women and adolescent girls in almost all athletic contests.

7. It should scarcely be necessary to invoke scientific experts to "prove" that men are on average larger, stronger, and faster than women. All of us, along with our siblings and our peers and perhaps our children, have passed through puberty, and we have watched that differentiation between the sexes occur. This is common human experience and knowledge.

8. Nevertheless, these differences have been extensively studied and measured. I cited many of these studies in the first paper on this topic that I prepared, which was submitted in litigation in January 2020. Since then, in light of current controversies, several authors have compiled valuable collections or reviews of data extensively documenting this objective fact about the human species, as manifest in almost all sports, each of which I have reviewed and found informative. These include Coleman (2020), Hilton & Lundberg (2021), World Rugby (2020), Harper (2021), Hamilton (2021), and a "Briefing Book" prepared by the Women's Sports Policy Working Group (2021). The important paper by Handelsman et al. (2018) also gathers scientific evidence of the systematic and large male athletic advantage.

9. These papers and many others document that men, adolescent boys, and prepubertal male children, substantially outperform comparably aged, gifted, and trained women, adolescent girls and prepubertal female children, in competitions involving running speed, swimming speed, cycling speed, jumping height, jumping distance, and strength (to name a few, but not all, of the performance differences). As I discuss later, it is now clear that these performance advantages for men, adolescent boys, and prepubertal male children, are inherent to the biological differences between the sexes.

10. In fact, I am not aware of any scientific evidence today that disproves that after puberty men possess large advantages in athletic performance over women–so large that they are generally insurmountable for comparably gifted and trained athletes at

every level (i.e. (a) elite, (b) collegiate, (c) scholastic, and (d) recreational competition). And I am not aware of any scientific evidence today that disproves that these measured performance advantages are at least largely the result of physiological differences between men and women which have been measured and are reasonably well understood.

11. My use of the term "advantage" in this paper must not be read to imply any normative judgment. The adult female physique is simply different from the adult male physique. Obviously, it is optimized in important respects for the difficult task of childbearing. On average, women require far fewer calories for healthy survival. Evolutionary biologists can and do theorize about the survival value or "advantages" provided by these and other distinctive characteristics of the female physique, but I will leave that to the evolutionary biologists. I use "advantage" to refer merely to performance advantages in athletic competitions.

12. I find in the literature a widespread consensus that the large performance and physiological advantages possessed by males–rather than social considerations or considerations of identity–are precisely the *reason* that most athletic competitions are separated by sex, with women treated as a "protected class." To cite only a few statements accepting this as the justification:

- Handelsman et al. (2018) wrote, "Virtually all elite sports are segregated into male and female competitions. The main justification is to allow women a chance to win, as women have major disadvantages against men who are, on average, taller, stronger, and faster and have greater endurance due to their larger, stronger, muscles and bones as well as a higher circulating hemoglobin level." (803)
- Millard-Stafford et al. (2018) wrote "Current evidence suggests that women will not swim or run as fast as men in Olympic events, which speaks against eliminating sex segregation in these individual sports" (530) "Given the historical context (2% narrowing in swimming over 44 y), a reasonable

assumption might be that no more than 2% of the current performance gap could still potentially be attributed to sociocultural influences.", (533) and "Performance gaps between US men and women stabilized within less than a decade after federal legislation provided equal opportunities for female participation, but only modestly closed the overall gap in Olympic swimming by 2% (5% in running)." (533) Dr. Millard-Stafford, a full professor at Georgia Tech, holds a Ph.D. in Exercise Physiology and is a past President of the American College of Sports Medicine.

- In 2021, Hilton et al. wrote, "most sports have a female category the purpose of which is the protection of both fairness and, in some sports, safety/welfare of athletes who do not benefit from the physiological changes induced by male levels of testosterone from puberty onwards." (204)
- In 2020 the Swiss High Court ("Tribunal Fédéral") observed that "in most sports . . . women and men compete in two separate categories, because the latter possess natural advantages in terms of physiology."[1]
- The members of the Women's Sports Policy Working Group wrote that "If sports were not sex-segregated, female athletes would rarely be seen in finals or on victory podiums," and that "We have separate sex sport and eligibility criteria based on biological sex because this is the only way we can assure that female athletes have the same opportunities as male athletes not only to participate but to win in competitive sport. . . . If we did not separate athletes on the basis of biological sex–if we used any other physical criteria–we would never see females in finals or on podiums." (WSPWG Briefing Book 2021 at 5, 20.)
- In 2020, the World Rugby organization stated that "the women's category exists to ensure protection, safety and equality for those who do not benefit from the

[1] "dans la plupart des sports . . . les femmes et les hommes concourent dans deux catégories séparées, ces derniers étant naturellement avantagés du point de vue physique." Tribunal Fédéral decision of August 25, 2020, Case 4A_248/2019, 4A_398/2019, at §9.8.3.3.

biological advantage created by these biological performance attributes." (World Rugby Transgender Women Guidelines 2020.)

- In 2021 Harper et al. stated "…the small decrease in strength in transwomen after 12–36 months of GAHT [Gender Affirming Hormone Therapy] suggests that transwomen likely retain a strength advantage over cisgender women." (7) and "…observations in trained transgender individuals are consistent with the findings of the current review in untrained transgender individuals, whereby 30 months of GAHT may be sufficient to attenuate some, but not all, influencing factors associated with muscular endurance and performance." (8)
- Hamilton et al (2021), "If a biologically male athlete self-identifies as a female, legitimately with a diagnosis of gender dysphoria or illegitimately to win medals, the athlete already possesses a physiological advantage that undermines fairness and safety. This is not equitable, nor consistent with the fundamental principles of the Olympic Charter and could be a potential danger to the health and safety of athletes." (840)
- Hamilton et al. (2021), in a consensus statement for the International Federation of Sports Medicine (FIMS) concluded that "Transwomen have the right to compete in sports. However, cisgender women have the right to compete in a protected category." (1409)

13. While the sources I mention above gather more extensive scientific evidence of this uncontroversial truth, I provide here a brief summary of representative facts concerning the male advantage in athletic performance.

A. Men are stronger.

14. Males exhibit greater strength throughout the body. Both Handelsman et al. (2018) and Hilton & Lundberg (2021) have gathered multiple literature references that document this fact in various muscle groups.

15. Men have in the neighborhood of 60%-100% greater **arm strength** than women.

(Handelsman 2018 at 812.)[2] One study of elbow flexion strength (basically, bringing the fist up towards the shoulder) in a large sample of men and women found that men exhibited 109% greater isometric strength, and 89% higher strength in a single repetition. (Hilton 2021 at 204, summarizing Hubal (2005) at Table 2.)

16. **Grip strength** is often used as a useful proxy for strength more generally. In one study, men showed on average 57% greater grip strength than women. (Bohannon 2019.) A wider meta-analysis of multiple grip-strength studies not limited to athletic populations found that 18- and 19-year-old males exhibited in the neighborhood of 2/3 greater grip strength than females. (Handelsman 2017 Figure 3, summarizing Silverman 2011 Table 1.)[3]

17. Liguori et al. (2021), in the *ACSM's Guidelines for Exercise Testing and Prescription* which is the flagship textbook for the American College of Sports Medicine and is considered the industry standard for information on evaluating physical fitness in adults, demonstrates that across all age groups and percentiles when comparing males and females, male handgrip strength is 66.2% higher than females (Table 3.10 at 95). To help illustrate this sex-based difference in handgrip strength, a 20–24-year-old male who ranks in the 95th percentile has 55 kg for handgrip strength in the dominant hand while a 20–24-year-old female who ranks in the 95th percentile has 34 kg for handgrip strength in the dominant hand. For comparison, a 20–24-year-old male with a handgrip strength of 34 kg would be in the 10th percentile for males.

18. In an evaluation of maximal isometric handgrip strength in 1,654 healthy men, 533

[2] Handelsman expresses this as women having 50% to 60% of the "upper limb" strength of men. Handelsman cites Sale, *Neuromuscular function*, for this figure and the "lower limb" strength figure. Knox et al., *Transwomen in elite sport* (2018) are probably confusing the correct way to state percentages when they state that "differences lead to decreased trunk and lower body strength by 64% and 72% respectively, in women" (397): interpreted literally, this would imply that men have **almost 4x as much** lower body strength as do women.

[3] Citing Silverman, *The secular trend for grip strength in Canada and the United States*, J. Ports Sci. 29:599-606 (2011).

healthy women aged 20-25 years and 60 "highly trained elite female athletes from sports known to require high hand-grip forces (judo, handball)," Leyk et al. (2007) observed that, "The results of female national elite athletes even indicate that the strength level attainable by extremely high training will rarely surpass the 50th percentile of untrained or not specifically trained men." (Leyk 2007 at 415.)

19. Liguori et al. (2021), in the *ACSM's Guidelines for Exercise Testing and Prescription* indicates that when measuring upper body strength using bench press and expressing strength as the maximal weight lifted relative to body weight, males exhibit 64% greater strength (Table 3.11 at 96-97). To help illustrate this sex-based difference in upper body strength, an under 20-year-old male who ranks in the 95th percentile can bench press 1.76 kg for every kg of body mass while an under 20-year-old female who ranks in the 95th percentile can bench press 0.88 kg for every kg of body mass. For comparison, an under 20-year-old male with a bench press strength of 0.88 kg per kg of body mass would be between the 15th and 20th percentile for males.
20. Men have in the neighborhood of 25%-60% greater **leg strength** than women. (Handelsman 2018 at 812.) In another measure, men exhibit 54% greater knee extension torque and this male leg strength advantage is consistent across the lifespan. (Neder 1999 at 120-121.)
21. Liguori et al. (2021), in the *ACSM's Guidelines for Exercise Testing and Prescription* (Table 3.12 at 98), across all age groups and percentiles when comparing males and females, when measuring leg press strength as the maximal weight lifted relative to body weight, males exhibit 39% greater strength. To help illustrate this sex-based difference in lower body strength, a 20–29-year-old male who ranks in the 90th percentile can leg press 2.27 kg for every kg of body mass while a 20–29-year-old female who ranks in the 90th percentile can leg press 1.82 kg for every kg of body mass. For comparison, a 20–29-year-old male who can leg press 1.82 kg for every kg of body mass would be between the 30th and 40th

percentiles for males.

22. When male and female Olympic weightlifters of the same body weight are compared, the top males lift weights between 30% and 40% greater than the females of the same body weight. But when top male and female performances are compared in powerlifting, without imposing any artificial limitations on bodyweight, the male record is 65% higher than the female record. (Hilton 2021 at 203.)

23. In another measure that combines many muscle groups as well as weight and speed, moderately trained males generated 162% greater punching power than females even though men do not possess this large an advantage in any single bio-mechanical variable. (Morris 2020.) This objective reality was subjectively summed up by women's mixed-martial arts fighter Tamikka Brents, who suffered significant facial injuries when she fought against a biological male who identified as female and fought under the name of Fallon Fox. Describing the experience, Brents said:

> "I've fought a lot of women and have never felt the strength that I felt in a fight as I did that night. I can't answer whether it's because she was born a man or not because I'm not a doctor. I can only say, I've never felt so overpowered ever in my life, and I am an abnormally strong female in my own right."[4]

B. Men run faster.

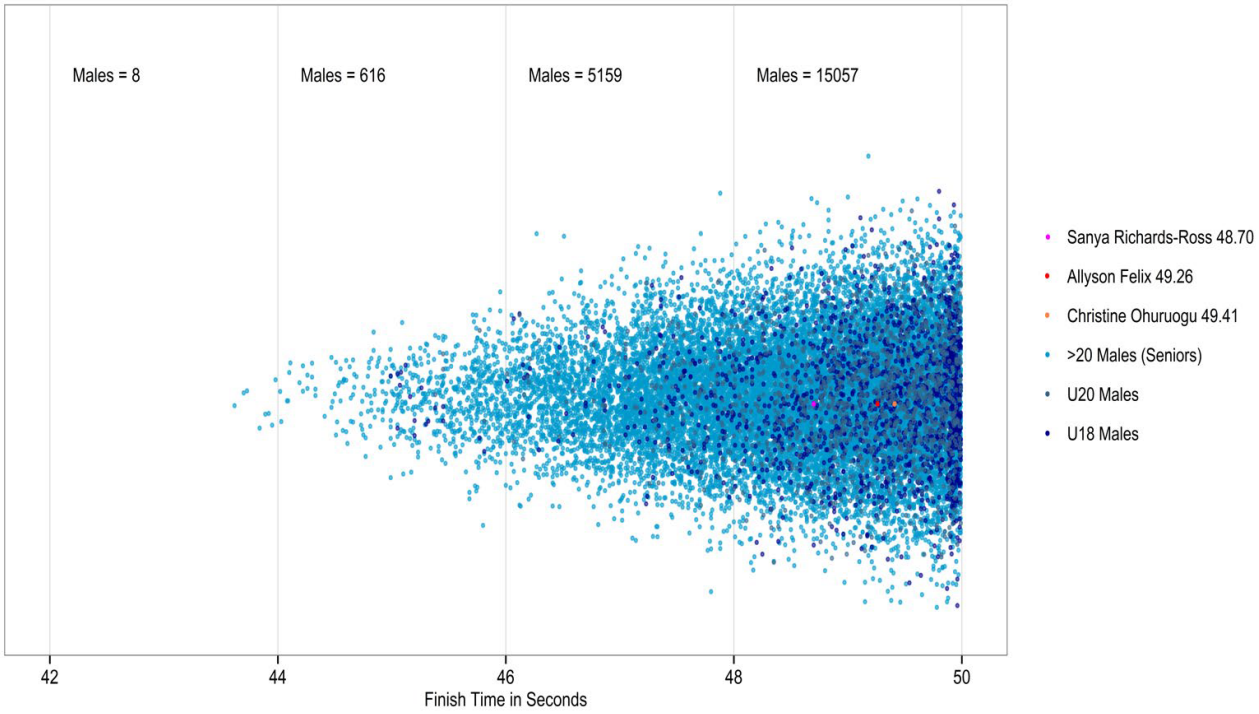
24. Many scholars have detailed the wide performance advantages enjoyed by men in running speed. One can come at this reality from a variety of angles.

25. Multiple authors report a male speed advantage in the neighborhood of 10%-13% in a variety of events, with a variety of study populations. Handelsman et al. 2018 at 813 and Handelsman 2017 at 70 both report a male advantage of about 10% by age 17. Thibault et al. 2010 at 217 similarly reported a stable 10% performance

[4] http://whoatv.com/exclusive-fallon-foxs-latest-opponent-opens-up-to-whoatv/ (last accessed May 5, 2023).

advantage across multiple events at the Olympic level. Tønnessen et al. (2015 at 1-2) surveyed the data and found a consistent male advantage of 10%-12% in running events after the completion of puberty. They document this for both short sprints and longer distances. One group of authors found that the male advantage increased dramatically in ultra-long-distance competition (Lepers & Knechtle 2013.)

26. A great deal of current interest has been focused on track events. It is worth noting that a recent analysis of publicly available sports federation and tournament records found that men enjoy the *least* advantage in running events, as compared to a range of other events and metrics, including jumping, pole vaulting, tennis serve speed, golf drives, baseball pitching speed, and weightlifting. (Hilton 2021 at 201-202.) Nevertheless, as any serious runner will recognize, the approximately 10% male advantage in running is an overwhelming difference. Dr. Hilton calculates that "approximately 10,000 males have personal best times that are faster than the current Olympic 100m female champion." (Hilton 2021 at 204.) Professors Doriane Coleman, Jeff Wald, Wickliffe Shreve, and Richard Clark dramatically illustrated this by compiling the data and creating the figure below (last accessed on May 5, 2023, at https://bit.ly/35yOyS4), which shows that the *lifetime best performances* of three female Olympic champions in the 400m event—including Team USA's Sanya Richards-Ross and Allyson Felix—would not match the performances of "literally thousands of boys and men, including thousands who would be considered second tier in the men's category" *just in 2017 alone*: (data were drawn from the International Association of Athletics Federations (IAAF) website which provides complete, worldwide results for individuals and events, including on an annual and an all-time basis).



27. Professor Coleman and her colleague Wicklyffe Shreve also created the table below (last accessed on May 5, 2023, at https://bit.ly/37E1s2X), which "compares the number of men—males over 18—competing in events reported to the International Association of Athletics Federation whose results in each event in 2017 would have ranked them above the very best elite woman that year."

TABLE 2 – World's Best Woman v. Number of Men Outperforming

Event	Best Women's Result	Best Men's Result	# of Men Outperforming
100 Meters	10.71	9.69	2,474
200 Meters	21.77	19.77	2,920
400 Meters	49.46	43.62	4,341
800 Meters	1:55.16*	1:43.10	3,992+
1500 Meters	3:56.14	3:28.80	3,216+
3000 Meters	8:23.14	7:28.73	1307+
5000 Meters	14:18.37	12:55.23	1,243
High Jump	2.06 meters	2.40 meters	777
Pole Vault	4.91 meters	6.00 meters	684
Long Jump	7.13 meters	8.65 meters	1,652
Triple Jump	14.96 meters	18.11 meters	969

28. The male advantage becomes insuperable well before the developmental changes of puberty are complete. Dr. Hilton documents that even "schoolboys"–defined as age 15 and under–have beaten the female world records in running, jumping, and throwing events. (Hilton 2021 at 204.)

29. Similarly, Coleman and Shreve created the table below (last accessed on May 5, 2023, at https://bit.ly/37E1s2X), which "compares the number of boys—males under the age of 18—whose results in each event in 2017 would rank them above the single very best elite [adult] woman that year:" data were drawn from the International Association of Athletics Federations (IAAF) website

TABLE 1 – World's Best Woman v. Under 18 Boys

Event	Best Women's Result	Best Boys' Result	# of Boys Outperforming
100 Meters	10.71	10.15	124+
200 Meters	21.77	20.51	182
400 Meters	49.46	45.38	285
800 Meters	1:55.16*	1:46.3	201+
1500 Meters	3:56.14	3:37.43	101+
3000 Meters	8:23.14	7:38.90	30
5000 Meters	14:18.37	12:55.58	15
High Jump	2.06 meters	2.25 meters	28
Pole Vault	4.91 meters	5.31 meters	10
Long Jump	7.13 meters	7.88 meters	74
Triple Jump	14.96 meters	17.30 meters	47

30. In an analysis I have performed of running events (consisting of the 100 m, 200 m, 400 m, 800 m, 1500 m, 5000 m, and 10000 m) in the Division I, Division II, and Division III NCAA Outdoor track championships for the years of 2010-2019, the average performance across all events of the 1st place man was 14.1% faster than the 1st place woman, with the smallest difference being a 10.2% advantage for men in the Division I 100 m race. The average 8th place man across all events (the last place to earn the title of All American) was 11.2% faster than 1st place woman, with the smallest difference being a 6.5% advantage for men in the Division I 100 m race. Importantly, the only overlap between men's and women's performance occurred only when a male performed exceptionally poorly (Brown et al. presented at the 2022 Annual Meeting of the American College of Sports Medicine.)

31. Athletic.net® is an internet-based resource providing "results, team, and event management tools to help coaches and athletes thrive." Among the resources available on Athletic.net are event records that can be searched nationally or by state age group, school grade, and state. Higerd (2021) in an evaluation of high school

track running performance records from five states (CA, FL, MN, NY, WA), over three years (2017 – 2019) observed that males were 14.38% faster than females in the 100M (at 99), 16.17% faster in the 200M (at 100), 17.62% faster in the 400M (at 102), 17.96% faster in the 800M (at 103), 17.81% faster in the 1600M (at 105), and 16.83% faster in the 3200M (at 106).

C. Men jump higher and farther.

32. Jumping involves both leg strength and speed as positive factors, with body weight of course a factor working against jump height. Despite their substantially greater body weight, males enjoy an even greater advantage in jumping than in running. Handelsman 2018 at 813, looking at youth and young adults, and Thibault 2010 at 217, looking at Olympic performances, both found male advantages in the range of 15%-20%. See also Tønnessen 2015 (approximately 19%); Handelsman 2017 (19%); Hilton 2021 at 201 (18%). Looking at the vertical jump called for in volleyball, research on elite volleyball players found that males jumped on average 50% higher during an "attack" at the net than did females. (Sattler 2015; see also Hilton 2021 at 203 (33% higher vertical jump).)

33. Higerd (2021) in an evaluation of high school high jump performance available through the track and field database athletic.net®, which included five states (CA, FL, MN, NY, WA), over three years (2017 – 2019) (at 82) observed that in 23,390 females and 26,843 males, females jumped an average of 1.35 m and males jumped an average of 1.62 m, for an 18.18% performance advantage for males (at 96). In an evaluation of long jump performance in 45,705 high school females and 54,506 high school males, the females jumped an average of 4.08 m and males jumped an average of 5.20 m, for a 24.14% performance advantage for males (at 97).

34. The combined male advantage of body height and jump height means, for example, that a total of seven women in the WNBA have ever dunked a basketball in the

regulation 10 foot hoop,[5] while the ability to dunk appears to be almost universal among NBA players: "Since the 1996–97 season (the earliest data is available from Basketball-Reference.com), 1,801 different [NBA] players have combined for 210,842 regular-season dunks, and 1,259 out of 1,367 players (or 92%) who have played at least 1,000 minutes have dunked at least once."[6]

D. Men throw, hit, and kick faster and farther.

35. Strength, arm-length, and speed combine to give men a large advantage over women in throwing. This has been measured in a number of studies.

36. One study of elite male and female baseball pitchers showed that men throw baseballs 35% faster than women—81 miles/hour for men vs. 60 miles/hour for women. (Chu 2009.) By age 12, "boys' throwing velocity is already between 3.5 and 4 standard deviation units higher than the girls'." (Thomas 1985 at 276.) By age seventeen, the *average* male can throw a ball farther than 99% of seventeen-year-old females. (Lombardo 2018; Chu 2009; Thomas 1985 at 268.) Looking at publicly available data, Hilton & Lundberg found that in both baseball pitching and the field hockey "drag flick," the *record* ball speeds achieved by males are more than 50% higher than those achieved by females. (Hilton 2021 at 202-203.)

37. Men achieve serve speeds in tennis more that 15% faster than women; and likewise in golf achieve ball speeds off the tee more than 15% faster than women. (Hilton 2021 at 202.)

38. More specifically, Marshall and Llewellyn (at 957) reported that female collegiate golfers at an NCAA Division III school have an average drive distance that is 46 yards (16.5%) fewer than males, a maximal drive distance of 33.2 yards (11.1%) fewer, an average club head speed that is 21.9 mph (20.4%) slower, and a maximum

[5] https://www.espn.com/wnba/story/_/id/32258450/2021-wnba-playoffs-brittney-griner-owns-wnba-dunking-record-coming-more.

[6] https://www.si.com/nba/2021/02/22/nba-non-dunkers-patty-mills-tj-mcconnell-steve-novak-daily-cover

club head speed that is 18 mph (15.3%) slower. Using 3D motion analysis to evaluate the kinematics of 7 male and 5 female golfers with a mean handicap of 6, Egret (at 463) concluded that "The results of this study show that there is a specific swing for women." Horan used 3D motion analysis to evaluate the kinematics of 19 male and 19 female golfers with a handicap less than or equal to 4 and concluded "the results suggest that male and female skilled golfers have different kinematics for thorax and pelvis motion" and "What might be considered optimal swing characteristics for male golfers should not be generalized to female golfers." (at 1456).

39. Males are able to throw a javelin more than 30% farther than females. (Lombardo 2018 Table 2; Hilton 2021 at 203.)

40. Men serve and spike volleyballs with higher velocity than women, with a performance advantage in the range of 29-34%. (Hilton 2021 at 204 Fig. 1.)

41. Men are also able to kick balls harder and faster. A study comparing collegiate soccer players found that males kick the ball with an average 20% greater velocity than females. (Sakamoto 2014.)

E. Males exhibit faster reaction times.

42. Interestingly, men enjoy an additional advantage over women in reaction time–an attribute not obviously related to strength or metabolism (e.g. $V0_2max$). "Reaction time in sports is crucial in both simple situations such as the gun shot in sprinting and complex situations when a choice is required. In many team sports this is the foundation for tactical advantages which may eventually determine the outcome of a game." (Dogan 2009 at 92.) "Reaction times can be an important determinant of success in the 100m sprint, where medals are often decided by hundredths or even thousandths of a second." (Tønnessen 2013 at 885.)

43. The existence of a sex-linked difference in reaction times is consistent over a wide range of ages and athletic abilities. (Dykiert 2012.) Even by the age of 4 or 5, in a ruler-drop test, males have been shown to exhibit 4% to 6% faster reaction times

than females. (Latorre-Roman 2018.) In high school athletes taking a common baseline "ImPACT" test, males showed 3% faster reaction times than females. (Mormile 2018.) Researchers have found a 6% male advantage in reaction times of both first-year medical students (Jain 2015) and world-class sprinters (Tønnessen 2013).

44. Most studies of reaction times use computerized tests which ask participants to hit a button on a keyboard or to say something in response to a stimulus. One study on NCAA athletes measured "reaction time" by a criterion perhaps more closely related to athletic performance–that is, how fast athletes covered 3.3 meters after a starting signal. Males covered the 3.3 meters 10% faster than females in response to a visual stimulus, and 16% faster than females in response to an auditory stimulus. (Spierer 2010.)

45. Researchers have speculated that sex-linked differences in brain structure, as well as estrogen receptors in the brain, may be the source of the observed male advantage in reaction times, but at present this remains a matter of speculation and hypothesis. (Mormile at 19; Spierer at 962.)

III. Men have large measured physiological differences compared to women which demonstrably or likely explain their performance advantages.

46. No single physiological characteristic alone accounts for all or any one of the measured advantages that men enjoy in athletic performance. However, scientists have identified and measured a number of physiological factors that contribute to superior male performance.

A. Men are taller and heavier than women

47. In some sports, such as basketball and volleyball, height itself provides competitive advantage. While some women are taller than some men, based on data from 20 countries in North America, Europe, East Asia, and Australia, the 50th percentile for body height for women is 164.7 cm (5 ft 5 inches) and the 50th percentile for body height for men is 178.4 cm (5 ft 10 inches). Helping to illustrate the inherent height

difference between men and women, from the same data analysis, the 95th percentile for body height for women is 178.9 cm (5 feet 10.43 inches), which is only 0.5 cm taller than the 50th percentile for men (178.4 cm; 5 feet 10.24 inches), while the 95th percentile for body height for men is 193.6 cm (6 feet 4.22 inches). Thus, while some women are taller than some men, the tallest men are taller than the tallest women (Roser 2013.)

48. To look at a specific athletic population, an evaluation of NCAA Division I basketball players compared 68 male guards and 59 male forwards to 105 female guards and 91 female forwards, and found that on average the male guards were 187.4 ± 7.0 cm tall and weighed 85.2 ± 7.4 kg while the female guards were 171.6 ± 5.0 cm tall and weighed 68.0 ± 7.4 kg. The male forwards were 201.7 ± 4.0 cm tall and weighed 105.3 ± 5.9 kg while the female forwards were 183.5 ± 4.4 cm tall and weighed 82.2 ± 12.5 kg. (Fields 2018 at 3.)

B. Males have larger and longer bones, stronger bones, and different bone configuration.

49. Obviously, males on average have longer bones. "Sex differences in height have been the most thoroughly investigated measure of bone size, as adult height is a stable, easily quantified measure in large population samples. Extensive twin studies show that adult height is highly heritable with predominantly additive genetic effects that diverge in a sex-specific manner from the age of puberty onwards." (Handelsman 2018 at 818.) "Pubertal testosterone exposure leads to an ultimate average greater height in men of 12–15 centimeters, larger bones, greater muscle mass, increased strength and higher hemoglobin levels." (Gooren 2011 at 653.)

50. "Men have distinctively greater bone size, strength, and density than do women of the same age." (Handelsman 2018 at 818.)

51. "[O]n average men are 7% to 8% taller with longer, denser, and stronger bones, whereas women have shorter humerus and femur cross-sectional areas being 65% to 75% and 85%, respectively, those of men." (Handelsman 2018 at 818.)

52. Greater height, leg, and arm length themselves provide obvious advantages in several sports. But male bone geometry also provides less obvious advantages. "The major effects of men's larger and stronger bones would be manifest via their taller stature as well as the larger fulcrum with greater leverage for muscular limb power exerted in jumping, throwing, or other explosive power activities." (Handelsman 2018 at 818.)
53. Male advantage in bone size is not limited to length, as larger bones provide the mechanical framework for larger muscle mass. "From puberty onwards, men have, on average, 10% more bone providing more surface area. The larger surface area of bone accommodates more skeletal muscle so, for example, men have broader shoulders allowing more muscle to build. This translates into 44% less upper body strength for women, providing men an advantage for sports like boxing, weightlifting and skiing. In similar fashion, muscle mass differences lead to decreased trunk and lower body strength by 64% and 72%, respectively in women. These differences in body strength can have a significant impact on athletic performance, and largely underwrite the significant differences in world record times and distances set by men and women." (Knox 2019 at 397.)
54. Meanwhile, distinctive aspects of the female pelvis geometry cut against athletic performance. "[T]he widening of the female pelvis during puberty, balancing the evolutionary demands of obstetrics and locomotion, retards the improvement in female physical performance." (Handelsman 2018 at 818.) "[T]he major female hormones, oestrogens, can have effects that disadvantage female athletic performance. For example, women have a wider pelvis changing the hip structure significantly between the sexes. Pelvis shape is established during puberty and is driven by oestrogen. The different angles resulting from the female pelvis leads to decreased joint rotation and muscle recruitment ultimately making them slower." (Knox 2019 at 397.)
55. There are even sex-based differences in foot size and shape. Wunderlich &

Cavanaugh (2001) observed that a "foot length of 257 mm represents a value that is … approximately the 20th percentile men's foot lengths and the 80th percentile women's foot lengths." (607) and "For a man and a woman, both with statures of 170 cm (5 feet 7 inches), the man would have a foot that was approximately 5 mm longer and 2 mm wider than the woman." (608). Based on these, and other analyses, they conclude that "female feet and legs are not simply scaled-down versions of male feet but rather differ in a number of shape characteristics, particularly at the arch, the lateral side of the foot, the first toe, and the ball of the foot." (605) Further, Fessler et al. (2005) observed that "female foot length is consistently smaller than male foot length" (44) and concludes that "proportionate foot length is smaller in women" (51) with an overall conclusion that "Our analyses of genetically disparate populations reveal a clear pattern of sexual dimorphism, with women consistently having smaller feet proportionate to stature than men." (53)

56. Beyond simple performance, the greater density and strength of male bones provide higher protection against stresses associated with extreme physical effort: "[S]tress fractures in athletes, mostly involving the legs, are more frequent in females, with the male protection attributable to their larger and thicker bones." (Handelsman 2018 at 818.)

C. Males have much larger muscle mass.

57. The fact that, on average, men have substantially larger muscles than women is as well known to common observation as men's greater height. But the male advantage in muscle size has also been extensively measured. The differential is large.

58. "On average, women have 50% to 60% of men's upper arm muscle cross-sectional area and 65% to 70% of men's thigh muscle cross-sectional area, and women have 50% to 60% of men's upper limb strength and 60% to 80% of men's leg strength. Young men have on average a skeletal muscle mass of >12 kg greater than age-matched women at any given body weight." (Handelsman 2018 at 812. See also Gooren 2011 at 653, Thibault 2010 at 214.)

59. "There is convincing evidence that the sex differences in muscle mass and strength are sufficient to account for the increased strength and aerobic performance of men compared with women and is in keeping with the differences in world records between the sexes." (Handelsman 2018 at 816.)

60. As stated in the National Strength and Conditioning Association's *Guide to Tests and Assessments* "Sport performance is highly dependent on the health- and skill-related components of fitness (power, speed, agility, reaction time, balance, and Body Composition coordination) in addition to the athlete's technique and level of competency in sport-specific motor skills. All fitness components depend on body composition to some extent. An increase in lean body mass contributes to strength and power development. … Thus, an increase in lean body mass enables the athlete to generate more force in a specific period of time. A sufficient level of lean body mass also contributes to speed, quickness, and agility performance (in the development of force applied to the ground for maximal acceleration and deceleration)." (https://www.nsca.com/education/articles/kinetic-select/sport-performance-and-body-composition/ last accessed May 10, 2023)

61. Once again, looking at specific and comparable populations of athletes, an evaluation of NCAA Division I basketball players consisting of 68 male guards and 59 male forwards, compared to 105 female guards and 91 female forwards, reported that on average the male guards had 77.7 ± 6.4 kg of fat free mass and 7.4 ± 3.1 kg fat mass while the female guards had 54.6 ± 4.4 kg fat free mass and 13.4 ± 5.4 kg fat mass. The male forwards had 89.5 ± 5.9 kg fat free mass and 15.9 ± 5.6 kg fat mass while the female forwards had 61.8 ± 5.9 kg fat free mass and 20.5 ± 7.7 kg fat mass. (Fields 2018 at 3.)

D. Females have a larger proportion of body fat.

62. While women have smaller muscles, they have proportionately more body fat, in general a negative for athletic performance. "Oestrogens also affect body composition by influencing fat deposition. Women, on average, have higher

percentage body fat, and this holds true even for highly trained healthy athletes (men 5%–10%, women 8%–15%). Fat is needed in women for normal reproduction and fertility, but it is not performance-enhancing. This means men with higher muscle mass and less body fat will normally be stronger kilogram for kilogram than women." (Knox 2019 at 397.)

63. Looking once again to Liguri (2021) in the *ACSM's Guidelines for Exercise Testing and Prescription* (Tables 3.4 and 3.5 at 73 and 74), a 20–29-year-old male in the 99th percentile will have 4.2% body fat, while a 20–29-year-old female in the 99th percentile will have 11.4% body fat, meaning the female has 170% more fat relative to body mass than the male. Comparing a 20–29-year-old male and female in the 50th percentile (that is "average") the male will have 16.7% body fat and the female will have 21.8% body fat, meaning that the female has 30% more fat relative to total body mass than the male.

64. "[E]lite females have more (<13 vs. <5 %) body fat than males. Indeed, much of the difference in [maximal oxygen uptake] between males and females disappears when it is expressed relative to lean body mass. . . . Males possess on average 7–9 % less percent body fat than females." (Lepers 2013 at 853.)

65. Knox et al. observe that both female pelvis shape and female body fat levels "disadvantage female athletes in sports in which speed, strength and recovery are important," (Knox 2019 at 397), while Tønnessen et al. describe the "ratio between muscular power and total body mass" as "critical" for athletic performance. (Tønnessen 2015 at 7.)

E. Males are able to metabolize and release energy to muscles at a higher rate due to larger heart and lung size, and higher hemoglobin concentrations.

66. While advantages in bone size, muscle size, and body fat are easily perceived and understood by laymen, scientists also measure and explain the male athletic advantage at a more abstract level through measurements of metabolism, or the ability to deliver energy to muscles throughout the body.

67. Energy release at the muscles depends centrally on the body's ability to deliver oxygen to the muscles, where it is essential to the complex chain of biochemical reactions that make energy available to power muscle fibers. Men have multiple distinctive physiological attributes that together give them a large advantage in oxygen delivery.

68. Oxygen is taken into the blood in the lungs. Men have greater capability to take in oxygen for multiple reasons. "**[L]ung capacity** [is] larger in men because of a lower diaphragm placement due to Y-chromosome genetic determinants." (Knox 2019 at 397.) Supporting larger lung capacity, men have "greater cross-sectional area of the trachea"; that is, they can simply move more air in and out of their lungs in a given time. (Hilton 2021 at 201.)

69. More, male lungs provide superior oxygen exchange even for a given volume: "The greater lung volume is complemented by testosterone-driven **enhanced alveolar multiplication** rate during the early years of life. Oxygen exchange takes place between the air we breathe and the bloodstream at the alveoli, so more alveoli allows more oxygen to pass into the bloodstream. Therefore, the greater lung capacity allows more air to be inhaled with each breath. This is coupled with an improved uptake system allowing men to absorb more oxygen." (Knox 2019 at 397.)

70. "Once in the blood, oxygen is carried by haemoglobin. **Haemoglobin concentrations** are directly modulated by testosterone so men have higher levels and can carry more oxygen than women." (Knox 2019 at 397.) "It is well known that levels of circulating hemoglobin are androgen-dependent and consequently higher in men than in women by 12% on average…. Increasing the amount of hemoglobin in the blood has the biological effect of increasing oxygen transport from lungs to tissues, where the increased availability of oxygen enhances aerobic energy expenditure." (Handelsman 2018 at 816.) (See also Lepers 2013 at 853; Handelsman 2017 at 71.) "It may be estimated that as a result the average maximal oxygen transfer will be ~10% greater in men than in women, which has a direct

impact on their respective athletic capacities." (Handelsman 2018 at 816.)

71. But the male metabolic advantage is further multiplied by the fact that men are also able to **circulate more blood per second** than are women. "Oxygenated blood is pumped to the active skeletal muscle by the heart. The left ventricle chamber of the heart is the reservoir from which blood is pumped to the body. The larger the left ventricle, the more blood it can hold, and therefore, the more blood can be pumped to the body with each heartbeat, a physiological parameter called 'stroke volume'. The female heart size is, on average, 85% that of a male resulting in the stroke volume of women being around 33% less." (Knox 2018 at 397.) Hilton cites different studies that make the same finding, reporting that men on average can pump 30% more blood through their circulatory system per minute ("cardiac output") than can women. (Hilton 2021 at 202.)

72. Finally, at the cell where the energy release is needed, men appear to have yet another advantage. "Additionally, there is experimental evidence that testosterone increases . . . **mitochondrial biogenesis**, myoglobin expression, and IGF-1 content, which may augment energetic and power generation of skeletal muscular activity." (Handelsman 2018 at 811.)

73. "Putting all of this together, men have a much more efficient cardiovascular and respiratory system." (Knox 2019 at 397.) A widely accepted measurement that reflects the combined effects of all these respiratory, cardiovascular, and metabolic advantages is referred to as "$V0_2$max," which refers to the maximum rate at which an individual can consume oxygen during aerobic exercise.[7] Looking at 11 separate studies, including both trained and untrained individuals, Pate et al. concluded that men have a 50% higher $V0_2$max than women on average, and a 25% higher $V0_2$max

[7] $V0_2$max is "based on hemoglobin concentration, total blood volume, maximal stroke volume, cardiac size/mass/compliance, skeletal muscle blood flow, capillary density, and mitochondrial content." International Statement, *The Role of Testosterone in Athletic Performance* (January 2019), available at https://law.duke.edu/sites/default/files/centers/sportslaw/Experts_T_Statement_2019.pdf.

in relation to body weight. (Pate 1984 at 92. See also Hilton 2021 at 202.)

IV. The role of testosterone in the development of male advantages in athletic performance.

74. The following tables of reference ranges for circulating testosterone in males and females are presented to help provide context for some of the subsequent information regarding athletic performance and physical fitness in children, youth, and adults, and regarding testosterone suppression in transwomen and athletic regulations. These data were obtained from the Mayo Clinic Laboratories (available at https://www.mayocliniclabs.com/test-catalog/overview/83686#Clinical-and-Interpretive, accessed May 5, 2023).

Reference ranges for serum testosterone concentrations in males and females.

Age	Males	Females
0 – 5 months	2.6 – 13.9 nmol/l	0.7 – 2.8 nmol/l
6 months – 9 years	0.2 – 0.7 nmol/l	0.2 – 0.7 nmol/l
10 – 11 years	0.2 – 4.5 nmol/l	0.2 – 1.5 nmol/l
12 -13 years	0.2 – 27.7 nmol/l	0.2 – 2.6 nmol/l
14 years	0.2 – 41.6 nmol/l	0.2 – 2.6 nmol/l
15 – 16 years	3.5 – 41.6 nmol/l	0.2 – 2.6 nmol/l
17 – 18 years	10.4 – 41.6 nmol/l	0.7 – 2.6 nmol/l
19 years and older	8.3 – 32.9 nmol/l	0.3 – 2.1 nmol/l

Please note that testosterone concentrations are sometimes expressed in units of ng/dl, and 1 nmol/l = 28.85 ng/dl.

75. Tanner Stages can be used to help evaluate the onset and progression of puberty and may be more helpful in evaluating normal testosterone concentrations than age in adolescents. "Puberty onset (transition from Tanner stage I to Tanner stage II) occurs for boys at a median age of 11.5 years and for girls at a median age of 10.5 years. . . . Progression through Tanner stages is variable. Tanner stage V (young adult) should be reached by age 18." (https://www.mayocliniclabs.com/test-

catalog/overview/83686#Clinical-and-Interpretive, accessed May 5, 2023).

Reference Ranges for serum testosterone concentrations by Tanner stage

Tanner Stage	**Males**	**Females**
I (prepubertal)	0.2 – 0.7 nmol/l	0.7 – 0.7 nmol/l
II	0.3 – 2.3 nmo/l	0.2 – 1.6 nmol/l
III	0.9 – 27.7 nmol/l	0.6 – 2.6 nmol/l
IV	2.9 – 41.6 nmol/l	0.7 – 2.6 nmol/l
V (young adult)	10.4 – 32.9 nmol/	0.4 – 2.1 nmol/l

76. Senefeld et al. (2020 at 99) state that "Data on testosterone levels in children and adolescents segregated by sex are scarce and based on convenience samples or assays with limited sensitivity and accuracy." They therefore "analyzed the timing of the onset and magnitude of the divergence in testosterone in youths aged 6 to 20 years by sex using a highly accurate assay" (isotope dilution liquid chromatography tandem mass spectrometry). Senefeld observed a significant difference beginning at age 11, which is to say about fifth grade.

Serum testosterone concentrations (nmol/L) in youths aged 6 to 20 years measured using isotope dilution liquid chromatography tandem mass spectrometry (Senefeld et al. ,2020, at 99)

	Boys			Girls		
Age (y)	**5th**	**50th**	**95th**	**5th**	**50th**	**95th**
6	0.0	0.1	0.2	0.0	0.1	0.2
7	0.0	0.1	0.2	0.0	0.1	0.3
8	0.0	0.1	0.3	0.0	0.1	0.3
9	0.0	0.1	0.3	0.1	0.2	0.6
10	0.1	0.2	2.6	0.1	0.3	0.9
11	0.1	0.5	11.3	0.2	0.5	1.3
12	0.3	3.6	17.2	0.2	0.7	1.4
13	0.6	9.2	21.5	0.3	0.8	1.5
14	2.2	11.9	24.2	0.3	0.8	1.6
15	4.9	13.2	25.8	0.4	0.8	1.8
16	5.2	14.9	24.1	0.4	0.9	2.0
17	7.6	15.4	27.0	0.5	1.0	2.0
18	9.2	16.3	25.5	0.4	0.9	2.1
19	8.1	17.2	27.9	0.4	0.9	2.3
20	6.5	17.9	29.9	0.4	1.0	3.4

A. Boys exhibit advantages in athletic performance even before puberty.

77. It is often said or assumed that boys enjoy no significant athletic advantage over girls before puberty. However, this is not true. Writing in their seminal work on the physiology of elite young female athletes, McManus and Armstrong (2011) reviewed the differences between boys and girls regarding bone density, body composition, cardiovascular function, metabolic function, and other physiologic factors that can influence athletic performance. They stated, “At birth, boys tend to

have a greater lean mass than girls. This difference remains small but detectable throughout childhood with about a 10% greater lean mass in boys than girls prior to puberty." (28) "Sexual dimorphism underlies much of the physiologic response to exercise," and most importantly these authors concluded that, "Young girl athletes are not simply smaller, less muscular boys." (23)

78. Certainly, boys' physiological and performance advantages increase rapidly from the beginning of puberty until around age 17-19. But much data and multiple studies show that significant physiological differences, and significant male athletic performance advantages in certain areas, exist before significant developmental changes associated with male puberty have occurred.

79. Starting at birth, girls have more body fat and less fat-free mass than boys. Davis et al. (2019) in an evaluation of 602 infants reported that at birth and age 5 months, infant boys have larger total body mass, body length, and fat-free mass while having lower percent body fat than infant girls. In an evaluation of 20 boys and 20 girls ages 3-8 years old, matched for age, height, and body weight Taylor et al. (Taylor 1997) reported that the "boys had significantly less fat, a lower % body fat and a higher bone-free lean tissue mass than the girls" when "expressed as a percentage of the average fat mass of the boys", the girls' fat mass was 52% higher than the boys "…while the bone-free lean tissue mass was 9% lower" (at 1083.) In an evaluation of 376 prepubertal [Tanner Stage 1] boys and girls, Taylor et al. (2010) observed that the boys had 21.6% more lean mass, and 13% less body fat (when expressed as percent of total body mass) than did the girls. In an evaluation of bone mineral density in 1,432 boys and 1,483 girls who were an average of 6.2 years old Medina-Gomez (2016) observed that the boys had 7.6% more lean body mass, 15.6% less fat mass, and ~5% higher bone mineral density than the girls (Table 1, at 1102), and concluded that (at 1099), "bone sexual dimorphism is already present at 6 years of age, with boys having stronger bones than girls, the relation of which is influenced by body composition." In a review of 22 peer reviewed publications

on the topic, Staiano and Katzmarzyk (2012) conclude that "… girls have more T[otal]B[ody]F[at] than boys throughout childhood and adolescence." (at 4.)

80. In the seminal textbook, *Growth, Maturation, and Physical Activity*, Malina et al. (2004) present a summary of data from Gauthier et al. (1983) which present data from "a national sample of Canadian children and youth" demonstrating that from ages 7 to 17, boys have a higher aerobic power output than do girls of the same ages when exercise intensity is measured using heart rate (Malina at 242.) That is to say, that at a heart rate of 130 beats per minute, or 150, or 170, a 7 to 17 year old boy should be able to run, bike, or swim faster than a similarly aged girl.

81. Considerable data from school-based fitness testing exists showing that prepubertal boys outperform comparably aged girls in tests of muscular strength, muscular endurance, and running speed. These sex-based differences in physical fitness are relevant to the current issue of sex-based sports categories because, as stated by Lesinski et al. (2020), in an evaluation "of 703 male and female elite young athletes aged 8–18" (1) "fitness development precedes sports specialization" (2) and further observed that "males outperformed females in C[ounter]M[ovement]J[ump], D[rop]J[ump], C[hange]o[f]D[irection speed] performances and hand grip strength." (5).

82. Tambalis et al. (2016) states that "based on a large data set comprising 424,328 test performances" (736) using standing long jump to measure lower body explosive power, sit and reach to measure flexibility, timed 30 second sit ups to measure abdominal and hip flexor muscle endurance, 10 x 5 meter shuttle run to evaluate speed and agility, and multi-stage 20 meter shuttle run test to estimate aerobic performance (738). "For each of the fitness tests, performance was better in boys compared with girls ($p < 0.001$), except for the S[it and] R[each] test ($p < 0.001$)." (739) In order to illustrate that the findings of Tambalis (2016) are not unique to children in Greece, the authors state "Our findings are in accordance with recent studies from Latvia [ ] Portugal [ ] and Australia [Catley & Tomkinson

(2013)]."(744).

83. The 20-m multistage fitness test is a commonly used maximal running aerobic fitness test used in the Eurofit Physical Fitness Test Battery and the FitnessGram Physical Fitness test. It is also known as the 20-meter shuttle run test, PACER test, or beep test (among other names; this is not the same test as the shuttle run in the Presidential Fitness Test). This test involves continuous running between two lines 20 meters apart in time to recorded beeps. The participants stand behind one of the lines facing the second line and begin running when instructed by the recording. The speed at the start is quite slow. The subject continues running between the two lines, turning when signaled by the recorded beeps. After about one minute, a sound indicates an increase in speed, and the beeps will be closer together. This continues each minute (level). If the line is reached before the beep sounds, the subject must wait until the beep sounds before continuing. If the line is not reached before the beep sounds, the subject is given a warning and must continue to run to the line, then turn and try to catch up with the pace within two more 'beeps'. The subject is given a warning the first time they fail to reach the line (within 2 meters) and eliminated after the second warning.

84. To illustrate the sex-based performance differences observed by Tambalis, I have prepared the following table showing the number of laps completed in the 20 m shuttle run for children ages 6-18 years for the low, middle, and top decile (Tambalis 2016 at 740 & 742), and have calculated the percent difference between the boys and girls using the same equation as Millard-Stafford (2018).

Performance difference between boys and girls ÷ Girls performance

Number of laps completed in the 20m shuttle run for children ages 6-18 years

	Male			Female			Male-Female % Difference		
	10th	50th	90th	10th	50th	90th	10th	50th	90th
Age	%ile	%ile	%ile	%ile	%ile	%ile	%ile	%ile	%ile
6	4	14	31	4.0	12.0	26.0	0.0%	16.7%	19.2%
7	8	18	38	8.0	15.0	29.0	0.0%	20.0%	31.0%
8	9	23	47	9.0	18.0	34.0	0.0%	27.8%	38.2%
9	11	28	53	10.0	20.0	40.0	10.0%	40.0%	32.5%
10	12	31	58	11.0	23.0	43.0	9.1%	34.8%	34.9%
11	15	36	64	12.0	26.0	48.0	25.0%	38.5%	33.3%
12	15	39	69	12.0	26.0	49.0	25.0%	50.0%	40.8%
13	16	44	76	12.0	26.0	50.0	33.3%	69.2%	52.0%
14	19	50	85	12.0	26.0	50.0	58.3%	92.3%	70.0%
15	20	53	90	12.0	25.0	47.0	66.7%	112.0%	91.5%
16	20	54	90	11.0	24.0	45.0	81.8%	125.0%	100.0%
17	18	50	86	10.0	23.0	50.0	80.0%	117.4%	72.0%
18	13	48	87	8.0	23.0	39.5	62.5%	108.7%	120.3%

85. The Presidential Fitness Test was widely used in schools in the United States from the late 1950s until 2013 (when it was phased out in favor of the Presidential Youth Fitness Program and FitnessGram, both of which focus on health-related physical fitness and do not present data in percentiles). Students participating in the Presidential Fitness Test could receive "The National Physical Fitness Award" for performance equal to the 50th percentile in five areas of the fitness test, "while performance equal to the 85th percentile could receive the Presidential Physical Fitness Award." Tables presenting the 50th and 85th percentiles for the Presidential Fitness Test for males and females ages 6 – 17, and differences in performance

between males and females, for curl-ups, shuttle run, 1 mile run, push-ups, and pull-ups appear in the Appendix.

86. For both the 50th percentile (The National Physical Fitness Award) and the 85th percentile (Presidential Physical Fitness Award), with the exception of curl-ups in 6-year-old children, boys outperform girls. The difference in pull-ups for the 85th percentile for ages 7 through 17 are particularly informative with boys outperforming girls by 100% – 1200%, highlighting the advantages in upper body strength in males.

87. A very recent literature review commissioned by the five United Kingdom governmental Sport Councils concluded that while "[i]t is often assumed that children have similar physical capacity regardless of their sex, . . . large-scale data reports on children from the age of six show that young males have significant advantage in cardiovascular endurance, muscular strength, muscular endurance, speed/agility and power tests," although they "score lower on flexibility tests." (UK Sports Councils' Literature Review 2021 at 3.)

88. Hilton et al., also writing in 2021, reached the same conclusion: "An extensive review of fitness data from over 85,000 Australian children aged 9–17 years old showed that, compared with 9-year-old females, 9-year-old males were faster over short sprints (9.8%) and 1 mile (16.6%), could jump 9.5% further from a standing start (a test of explosive power), could complete 33% more push-ups in 30 [seconds] and had 13.8% stronger grip." (Hilton 2021 at 201, summarizing the findings of Catley & Tomkinson 2013.)

89. The following data are taken from Catley & Tomkinson (2013 at 101) showing the low, middle, and top decile for 1.6 km run (1.0 mile) run time for 11,423 girls and boys ages 9-17.

1.6 km run (1.0 mile) run time for 11,423 girls and boys ages 9-17

	Male			Female			Male-Female % Difference		
	10th	50th	90th	10th	50th	90th	10th	50th	90th
Age	%ile	%ile	%ile	%ile	%ile	%ile	%ile	%ile	%ile
9	684	522	423	769.0	609.0	499.0	11.1%	14.3%	15.2%
10	666	511	420	759.0	600.0	494.0	12.3%	14.8%	15.0%
11	646	500	416	741.0	586.0	483.0	12.8%	14.7%	13.9%
12	621	485	408	726.0	575.0	474.0	14.5%	15.7%	13.9%
13	587	465	395	716.0	569.0	469.0	18.0%	18.3%	15.8%
14	556	446	382	711.0	567.0	468.0	21.8%	21.3%	18.4%
15	531	432	373	710.0	570.0	469.0	25.2%	24.2%	20.5%
16	514	423	366	710.0	573.0	471.0	27.6%	26.2%	22.3%
17	500	417	362	708.0	575.0	471.0	29.4%	27.5%	23.1%

90. Tomkinson et al. (2018) performed a similarly extensive analysis of literally millions of measurements of a variety of strength and agility metrics from the "Eurofit" test battery on children from 30 European countries. They provide detailed results for each metric, broken out by decile. Sampling the low, middle, and top decile, 9-year-old boys performed better than 9-year-old girls by between 6.5% and 9.7% in the standing broad jump; from 11.4% to 16.1% better in handgrip; and from 45.5% to 49.7% better in the "bent-arm hang." (Tomkinson 2018.)

91. The Bent Arm Hang test is a measure of upper body muscular strength and endurance used in the Eurofit Physical Fitness Test Battery. To perform the Bent Arm Hang, the child is assisted into position with the body lifted to a height so that the chin is level with the horizontal bar (like a pull up bar). The bar is grasped with the palms facing away from body and the hands shoulder width apart. The timing starts when the child is released. The child then attempts to hold this position for as

long as possible. Timing stops when the child's chin falls below the level of the bar, or the head is tilted backward to enable the chin to stay level with the bar.

92. Using data from Tomkinson (2018; table 7 at 1452), the following table sampling the low, middle, and top decile for bent arm hang for 9- to 17-year-old children can be constructed:

Bent Arm Hang time (in seconds) for children ages 9 - 17 years

	Male			Female			Male-Female % Difference		
Age	10th %ile	50th %ile	90th %ile	10th %ile	50th %ile	90th %ile	10th %ile	50th %ile	90th %ile
9	2.13	7.48	25.36	1.43	5.14	16.94	48.95%	45.53%	49.70%
10	2.25	7.92	26.62	1.42	5.15	17.06	58.45%	53.79%	56.04%
11	2.35	8.32	27.73	1.42	5.16	17.18	65.49%	61.24%	61.41%
12	2.48	8.79	28.99	1.41	5.17	17.22	75.89%	70.02%	68.35%
13	2.77	9.81	31.57	1.41	5.18	17.33	96.45%	89.38%	82.17%
14	3.67	12.70	38.39	1.40	5.23	17.83	162.14%	142.83%	115.31%
15	5.40	17.43	47.44	1.38	5.35	18.80	291.30%	225.79%	152.34%
16	7.39	21.75	53.13	1.38	5.63	20.57	435.51%	286.32%	158.29%
17	9.03	24.46	54.66	1.43	6.16	23.61	531.47%	297.08%	131.51%

93. Evaluating these data, a 9-year-old boy in the 50th percentile (that is to say a 9-year-old boy of average upper body muscular strength and endurance) will perform better in the bent arm hang test than 9 through 17-year-old girls in the 50th percentile. Similarly, a 9-year-old boy in the 90th percentile will perform better in the bent arm hang test than 9 through 17-year-old girls in the 90th percentile.

94. Using data from Tomkinson et al. (2017; table 1 at 1549), the following table sampling the low, middle, and top decile for running speed in the last stage of the 20 m shuttle run for 9- to 17-year-old children can be constructed.

20 m shuttle Running speed (km/h at the last completed stage)

	Male			Female			Male-Female % Difference		
	10th	50th	90th	10th	50th	90th	10th	50th	90th
Age	%ile	%ile	%ile	%ile	%ile	%ile	%ile	%ile	%ile
9	8.94	10.03	11.13	8.82	9.72	10.61	1.36%	3.19%	4.90%
10	8.95	10.13	11.31	8.76	9.75	10.74	2.17%	3.90%	5.31%
11	8.97	10.25	11.53	8.72	9.78	10.85	2.87%	4.81%	6.27%
12	9.05	10.47	11.89	8.69	9.83	10.95	4.14%	6.51%	8.58%
13	9.18	10.73	12.29	8.69	9.86	11.03	5.64%	8.82%	11.42%
14	9.32	10.96	12.61	8.70	9.89	11.07	7.13%	10.82%	13.91%
15	9.42	11.13	12.84	8.70	9.91	11.11	8.28%	12.31%	15.57%
16	9.51	11.27	13.03	8.71	9.93	11.14	9.18%	13.49%	16.97%
17	9.60	11.41	13.23	8.72	9.96	11.09	10.09%	14.56%	19.30%

95. Evaluating these data, a 9-year-old boy in the 50th percentile (that is to say a 9-year-old boy of average running speed) will run faster in the final stage of the 20 m shuttle run than 9 through 17-year-old girls in the 50th percentile. Similarly, a 9-year-old boy in the 90th percentile will run faster in the final stage of the 20-m shuttle run than 9 through 15, and 17-year-old girls in the 90th percentile and will be 0.01 km/h (0.01%) slower than 16-year-old girls in the 90th percentile.
96. Just using these two examples for bent arm hang and 20-m shuttle running speed (Tomkinson 2107, Tomkinson 2018) based on large sample sizes (thus having tremendous statistical power) it becomes apparent that a 9-year-old boy will be very likely to outperform similarly trained girls of his own age and older in athletic events involving upper body muscle strength and/or running speed.
97. Another report published in 2014 analyzed physical fitness measurements of 10,302 children aged 6 -10.9 years of age, from the European countries of Sweden,

Germany, Hungary, Italy, Cyprus, Spain, Belgium, and Estonia. (De Miguel-Etayo et al. 2014.) The authors observed "… that boys performed better than girls in speed, lower- and upper-limb strength and cardiorespiratory fitness." (57) The data showed that for children of comparable fitness (i.e. 99th percentile boys vs. 99th percentile girls, 50th percentile boys vs. 50th percentile girls, etc.) the boys outperform the girls at every age in measurements of handgrip strength, standing long jump, 20-m shuttle run, and predicted VO_2max (pages 63 and 64, respectively). For clarification, VO_2max is the maximal oxygen consumption, which correlates to 30-40% of success in endurance sports.

98. The standing long jump, also called the Broad Jump, is a common and easy to administer test of explosive leg power used in the Eurofit Physical Fitness Test Battery and in the NFL Combine. In the standing long jump, the participant stands behind a line marked on the ground with feet slightly apart. A two-foot take-off and landing is used, with swinging of the arms and bending of the knees to provide forward drive. The participant attempts to jump as far as possible, landing on both feet without falling backwards. The measurement is taken from takeoff line to the nearest point of contact on the landing (back of the heels) with the best of three attempts being scored.

99. Using data from De Miguel-Etayo et al. (2014, table 3 at 61), which analyzed physical fitness measurements of 10,302 children aged 6 -10.9 years of age, from the European countries of Sweden, Germany, Hungary, Italy, Cyprus, Spain, Belgium, and Estonia, the following table sampling the low, middle, and top decile for standing long jump for 6- to 9-year-old children can be constructed:

Standing Broad Jump (cm) for children ages 6-9 years

	Male			Female			Male-Female % Difference		
	10th	50th	90th	10th	50th	90th	10th	50th	90th
Age	**%ile**	**%ile**	**%ile**	**%ile**	**%ile**	**%ile**	**%ile**	**%ile**	**%ile**
6-<6.5	77.3	103.0	125.3	69.1	93.8	116.7	11.9%	9.8%	7.4%
6.5-<7	82.1	108.0	130.7	73.6	98.7	121.9	11.5%	9.4%	7.2%
7-<7.5	86.8	113.1	136.2	78.2	103.5	127.0	11.0%	9.3%	7.2%
7.5-<8	91.7	118.2	141.6	82.8	108.3	132.1	10.7%	9.1%	7.2%
8-<8.5	96.5	123.3	146.9	87.5	113.1	137.1	10.3%	9.0%	7.1%
8.5-<9	101.5	128.3	152.2	92.3	118.0	142.1	10.0%	8.7%	7.1%

100. Another study of Eurofit results for over 400,000 Greek children reported similar results. "[C]ompared with 6-year-old females, 6-year-old males completed 16.6% more shuttle runs in a given time and could jump 9.7% further from a standing position." (Hilton 2021 at 201, summarizing findings of Tambalis et al. 2016.)

101. Silverman (2011) gathered hand grip data, broken out by age and sex, from a number of studies. Looking only at the nine direct comparisons within individual studies tabulated by Silverman for children aged 7 or younger, in eight of these the boys had strength advantages of between 13 and 28 percent, with the remaining outlier recording only a 4% advantage for 7-year-old boys. (Silverman 2011 Table 1.)

102. To help illustrate the importance of one specific measure of physical fitness in athletic performance, Pocek (2021) stated that to be successful, volleyball "players should distinguish themselves, besides in skill level, in terms of above-average body height, upper and lower muscular power, speed, and agility. Vertical jump is a fundamental part of the spike, block, and serve." (8377) Pocek further

stated that "relative vertical jumping ability is of great importance in volleyball regardless of the players' position, while absolute vertical jump values can differentiate players not only in terms of player position and performance level but in their career trajectories." (8382)

103. Using data from Ramírez-Vélez (2017; table 2 at 994) which analyzed vertical jump measurements of 7,614 healthy Colombian schoolchildren aged 9 - 17.9 years of age the following table sampling the low, middle, and top decile for vertical jump can be constructed:

Vertical Jump Height (cm) for children ages 9 - 17 years

	Male			**Female**			**Male-Female % Difference**		
	10th	**50th**	**90th**	**10th**	**50th**	**90th**	**10th**	**50th**	**90th**
Age	**%ile**	**%ile**	**%ile**	**%ile**	**%ile**	**%ile**	**%ile**	**%ile**	**%ile**
9	18.0	24.0	29.5	16.0	22.3	29.0	12.5%	7.6%	1.7%
10	19.5	25.0	32.0	18.0	24.0	29.5	8.3%	4.2%	8.5%
11	21.0	27.0	32.5	19.5	25.0	31.0	7.7%	8.0%	4.8%
12	22.0	27.5	34.5	20.0	25.5	31.5	10.0%	7.8%	9.5%
13	23.0	30.5	39.0	19.0	25.5	32.0	21.1%	19.6%	21.9%
14	23.5	32.0	41.5	20.0	25.5	32.5	17.5%	25.5%	27.7%
15	26.0	35.5	43.0	20.2	26.0	32.5	28.7%	36.5%	32.3%
16	28.0	36.5	45.1	20.5	26.5	33.0	36.6%	37.7%	36.7%
17	28.0	38.0	47.0	21.5	27.0	35.0	30.2%	40.7%	34.3%

104. Similarly, using data from Taylor (2010; table 2, at 869) which analyzed vertical jump measurements of 1,845 children aged 10 -15 years in primary and secondary schools in the East of England, the following table sampling the low, middle, and top decile for vertical jump can be constructed:

Vertical Jump Height (cm) for children 10 -15 years

Male				Female			Male-Female % Difference		
	10th	50th	90th	10th	50th	90th	10th	50th	90th
Age	%ile	%ile	%ile	%ile	%ile	%ile	%ile	%ile	%ile
10	16.00	21.00	29.00	15.00	22.00	27.00	6.7%	-4.5%	7.4%
11	20.00	27.00	34.00	19.00	25.00	32.00	5.3%	8.0%	6.3%
12	23.00	30.00	37.00	21.00	27.00	33.00	9.5%	11.1%	12.1%
13	23.00	32.00	40.00	21.00	26.00	34.00	9.5%	23.1%	17.6%
14	26.00	36.00	44.00	21.00	28.00	34.00	23.8%	28.6%	29.4%
15	29.00	37.00	44.00	21.00	28.00	39.00	38.1%	32.1%	12.8%

105. As can be seen from the data from Ramírez-Vélez (2017) and Taylor (2010), males consistently outperform females of the same age and percentile in vertical jump height. Both sets of data show that an 11-year-old boy in the 90th percentile for vertical jump height will outperform girls in the 90th percentile at ages 11 and 12, and will be equal to girls at ages 13, 14, and possibly 15. These data indicate that an 11-year-old would be likely to have an advantage over girls of the same age and older in sports such as volleyball where "absolute vertical jump values can differentiate players not only in terms of player position and performance level but in their career trajectories." (Pocek 2021 at 8382.)

106. Boys also enjoy an advantage in throwing well before puberty. "Boys exceed girls in throwing velocity by 1.5 standard deviation units as early as 4 to 7 years of age. . . The boys exceed the girls [in throwing distance] by 1.5 standard deviation units as early as 2 to 4 years of age." (Thomas 1985 at 266.) This means that the average 4- to 7-year-old boy can out-throw approximately 87% of all girls of his age.

107. Record data from USA Track & Field indicate that boys outperform girls in

track events even in the youngest age group for whom records are kept (age 8 and under).[8]

American Youth Outdoor Track & Field Record times in age groups 8 and under (time in seconds)

Event	Boys	Girls	Difference
100M	13.65	13.78	0.95%
200M	27.32	28.21	3.26%
400M	62.48	66.10	5.79%
800M	148.59	158.11	6.41%
1500M	308.52	314.72	2.01%
Mean			3.68%

108. Looking at the best times within a single year shows a similar pattern of consistent advantage for even young boys. I consider the 2018 USATF Region 8 Junior Olympic Championships for the youngest age group (8 and under).[9]

2018 USATF Region 8 Junior Olympic Championships for the 8 and under age group

Event	Boys	Girls	Difference
100M	15.11	15.64	3.51%
200M	30.79	33.58	9.06%
400M	71.12	77.32	8.72%
800M	174.28	180.48	3.56%
1500M	351.43	382.47	8.83%
Mean			6.74%

[8]http://legacy.usatf.org/statistics/records/view.asp?division=american&location=outdoor%20track%20%26%20field&age=youth&sport=TF

[9] https://www.athletic.net/TrackAndField/meet/384619/results/m/1/100m

[9] https://www.athletic.net/CrossCountry/Division/List.aspx?DivID=62211

109. Using Athletic.net[9], for 2021 Cross Country and Track & Field data for boys and girls in the 7-8, 9-10, and 11-12 year old age group club reports, and for 5th, 6th, and 7th grade for the whole United States I have compiled the tables for 3000 m events, and for the 100-m, 200-m, 400-m, 800-m, 1600-m, 3000-m, long jump, and high jump Track and Field data to illustrate the differences in individual athletic performance between boys and girls, all of which appear in the Appendix. The pattern of males outperforming females was consistent across events, with rare anomalies, only varying in the magnitude of difference between males and females.

110. Similarly, using Athletic.net, for 2022 Track & Field data for boys and girls in the 6th grade for the state of Arizona, I have compiled tables, which appear below, comparing the performance of boys and girls for the 100-m, 200-m, 400-m, 800-m, 1600-m, and 3200-m running events in which the 1st place boy was consistently faster than the 1st place girl (with the exception of the 1600-m in which the first place girl was 0.9% faster) and the average performance of the top 10 boys was consistently faster than the average performance for the top 10 girls. Based on the finishing times for the 1st place boy and the 1st place girl in the 6th grade in Arizona in the 400-m race, the boy was 7.1 seconds (10.9%) faster than the girl. Extrapolating the running time to a running pace, the boy would be expected to finish 49 m in front of the fastest girl in a single lap race on a standard 400-m track, or almost the length of ½ of a football field. In comparison, the 1st place boy would finish 8 m in front of the 2nd place boy, and the 1st place girl would finish 10 m in front of the 2nd place girl.

Top 10 Arizona boys and girls 6th grade outdoor track for 2022 (time in seconds)

	100 m			200 m			400 m		
	Boys	**Girls**		**Boys**	**Girls**		**Boys**	**Girls**	
1	12.60	12.71	Difference	25.53	26.01	Difference	58.40	65.54	Difference
2	13.14	13.44	between #1	26.84	28.20	between #1	59.59	67.04	between #1
3	13.35	13.60	boy and # 1	27.30	28.77	boy and # 1	61.74	68.27	boy and # 1
4	13.44	14.14	girl	27.44	29.10	girl	62.32	68.64	girl
5	13.44	14.15	0.9%	28.61	29.52	1.8%	63.14	69.87	10.9%
6	13.47	14.4		28.68	30.06		66.38	70.12	
7	13.54	14.41	Average	29.04	30.15	Average	66.46	80.22	Average
8	13.59	14.44	difference	29.14	30.17	difference	66.50	70.73	difference
9	13.78	14.50	boys vs girls	29.17	30.19	boys vs girls	67.35	72.09	boys vs girls
10	13.84	14.53	4.4%	29.59	30.34	3.8%	67.36	72.43	9.3%

	800 m			1600 m			3200 m		
	Boys	**Girls**		**Boys**	**Girls**		**Boys**	**Girls**	
1	146.67	154.55	Difference	333.71	331.01	Difference	793.27	835.76	Difference
2	149.47	157.70	between #1	335.23	340.22	between #1	816.60	904.96	between #1
3	150.70	159.31	boy and # 1	338.70	351.70	boy and # 1	818.87	947.81	boy and # 1
4	151.29	165.49	girl	340.97	360.44	girl	840.17	1064.43	girl
5	152.56	167.00	5.1%	344.90	362.47	-0.9%	842.58	1090.2	5.1%
6	153.70	169.89		350.19	369.10		859.92		
7	158.30	170.00	Average	352.20	371.88	Average	861.74		Average
8	158.45	172.40	difference	360.30	375.66	difference	866.30		difference
9	158.70	173.64	boys vs girls	361.31	382.29	boys vs girls	Only 8	Only 5	boys vs girls
10	159.83	173.90	7.5%	364.00	384.00	4.1%	times	times	13.5%
							listed	listed	

111. As serious runners will recognize, differences of 3%, 5%, or 8% are not easily overcome. During track competition the difference between first and second place, or second and third place, or third and fourth place (and so on) is often 0.5 - 0.7%, with some contests being determined by as little as 0.01%.

112. I performed an analysis of running events (consisting of the 100-m, 200-m, 400-m, 800-m, 1500-m, 5000-m, and 10,000-m) in the Division I, Division II, and Division III NCAA Outdoor championships for the years of 2010-2019: the mean difference between 1st and 2nd place was 0.48% for men and 0.86% for women. The mean difference between 2nd and 3rd place was 0.46% for men and 0.57% for women. The mean difference between 3rd place and 4th place was 0.31% for men and 0.44% for women. The mean difference between 1st place and 8th place (the last place to earn the title of All American) was 2.65% for men and 3.77% for women. (Brown et al. Unpublished observations, presented at the 2022 Annual Meeting of the American College of Sports Medicine.)

113. A common response to empirical data showing pre-pubertal performance advantages in boys is the argument that the performance of boys may represent a social–cultural bias for boys to be more physically active, rather than representing inherent sex-based differences in pre-pubertal physical fitness. However, the younger the age at which such differences are observed, and the more egalitarian the culture within which they are observed, the less plausible this hypothesis becomes. Eiberg et al. (2005) measured body composition, VO_2max, and physical activity in 366 Danish boys and 332 Danish girls between the ages of 6 and 7 years old. Their observations indicated that VO_2max was 11% higher in boys than girls. When expressed relative to body mass the boys' VO_2max was still 8% higher than the girls. The authors stated that "…no differences in haemoglobin or sex hormones[10] have been reported in this age group," yet "… when children with the

[10] This term would include testosterone and estrogens.

same VO_2max were compared, boys were still more active, and in boys and girls with the same P[hysical] A[ctivity] level, boys were fitter." (728). These data indicate that in pre-pubertal children, in a very egalitarian culture regarding gender roles and gender norms, boys still have a measurable advantage in regards to aerobic fitness when known physiological and physical activity differences are accounted for.

114. And, as I have mentioned above, even by the age of 4 or 5, in a ruler-drop test, boys exhibit 4% to 6% faster reaction times than girls. (Latorre-Roman 2018.)

115. When looking at the data on testosterone concentrations previously presented, along with the data on physical fitness and athletic performance presented, boys have advantages in athletic performance and physical fitness before there are marked differences in testosterone concentrations between boys and girls.

116. For the most part, the data I review above relate to pre-pubertal children. Today, we also face the question of inclusion in female athletics of males who have undergone "puberty suppression." The UK Sport Councils Literature Review notes that, "In the UK, so-called 'puberty blockers' are generally not used until Tanner maturation stage 2-3 (i.e. after puberty has progressed into early sexual maturation)." (9.) While it is outside my expertise, my understanding is that current practice with regard to administration of puberty blockers is similar in the United States. Tanner stages 2 and 3 generally encompass an age range from 10 to 14 years old, with significant differences between individuals. Like the authors of the UK Sports Council Literature Review, I am "not aware of research" directly addressing the implications for athletic capability of the use of puberty blockers. (UK Sport Councils Literature Review at 9.) As Handelsman documents, the male advantage begins to increase rapidly–along with testosterone levels–at about age 11, or "very closely aligned to the timing of the onset of male puberty." (Handelsman 2017.) It seems likely that males who have undergone puberty suppression will have physiological and performance advantages over females somewhere between those

possessed by pre-pubertal boys, and those who have gone through full male puberty, with the degree of advantage in individual cases depending on that individual's development and the timing of the start of puberty blockade.

117. Tack et al. (2018) observed that in 21 transgender-identifying biological males, administration of antiandrogens for 5-31 months (commencing at 16.3 ± 1.21 years of age), resulted in nearly, but not completely, halting of normal age-related *increases* in muscle strength. Importantly, muscle strength did not decrease after administration of antiandrogens. Rather, despite antiandrogens, these individuals retained higher muscle mass, lower percent body fat, higher body mass, higher body height, and higher grip strength than comparable girls of the same age. (Supplemental tables).

118. Klaver et al. (2018 at 256) demonstrated that the use of puberty blockers did not eliminate the differences in lean body mass between biological male and female teenagers. Subsequent use of puberty blockers combined with cross-sex hormone use (in the same subjects) still did not eliminate the differences in lean body mass between biological male and female teenagers. Furthermore, by 22 years of age, the use of puberty blockers, and then puberty blockers combined with cross sex hormones, and then cross hormone therapy alone for over 8 total years of treatment still had not eliminated the difference in lean body mass between biological males and females.

119. Nokoff et al. (2021) observed that teenage natal males who identified as female, (average of 13.7 ± 1.7 years) and who were on puberty blockers for an average of 11.3 ± 7 months, had numerically higher percent lean body mass and lower percent body fat than the comparison group of natal females (figure 1 at 116). (These authors did not statistically compare the natal males who identified as female to the natal females).

120. Navabi et al. (2021) observed that teenage natal males who identify as female (average of 15.4 ± 2.0 years), had 9.5 kg more lean body mass than did teenage natal

females (15.2 ± 1.8 years) who identified as male (at 4). After 355.2 ± 96.7 days of puberty blockers the natal males who identified as female still had 5.7 kg more lean body mass than did the natal females who identified as male (at 5). It is worth noting that the natal males lost 2.57 kg lean body mass and the natal females gained 1.21 kg lean body mass.

121. Nokoff et al. (2020) observed that in 14 teenage natal males who identified as female (average of 16.3 ± 1.4 years) and "were taking an average estradiol dose of 1.5 ± 1.0 mg/day with an average treatment duration of 12.3 ± 9.9 months (5 on oral, 9 on sublingual). Four were on a GnRHa at the time of the study visit and a total of 6 had been on a GnRHa in the past. Seven were on spironolactone for androgen blockade and 1 was on IM medroxyprogesterone acetate for puberty suppression." (at e707) the natal males had higher lean body mass and lower body fat than the comparison group of natal females (at e708).

122. The effects of puberty blockers on growth and development, including muscle mass, fat mass, or other factors that influence athletic performance, have been minimally researched. As stated by Roberts and Carswell (2021), "No published studies have fully characterized the impact of [puberty blockers on] final adult height or current height in an actively growing TGD youth." (1680). Likewise, "[n]o published literature provides guidance on how to best predict the final adult height for TGD youth receiving GnRHa and gender- affirming hormonal treatment." (1681). Thus, the effect of prescribing puberty blockers to a male child before the onset of puberty on the physical components of athletic performance is largely unknown. There is not any scientific evidence that such treatment eliminates the pre-existing performance advantages that prepubertal males have over prepubertal females.

123. Schulmeister et al. (2022) evaluated natal males with an average age of 11.9 (range 10.2 – 14.5) years at the start of puberty blockade and concluded that "youth treated with GnRHa for 12 months have growth rates similar to those of prepubertal

youth" (at 5).

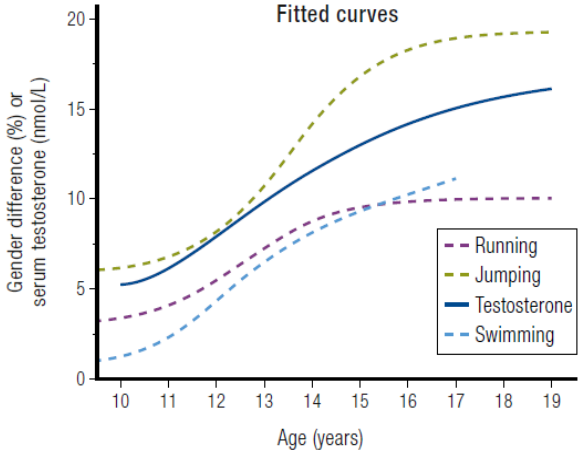
124. In Boogers et al. (2022), the researchers studied the effects of puberty suppression followed by cross-sex hormone therapy on the adult height of natal males who identify as female. Analyzing retrospective data collected from 1972 to 2018, they concluded that "although P[uberty] S[upression] and [cross-sex hormones] alter the growth pattern, they have little effect on adult height." (9) In other words, natal males who followed a normal course of puberty suppression followed by cross-sex hormone therapy reached an adult height at or near their predicted height in the absence of such therapy.

125. The findings from Schulmeister et al. (2022) and Boogers et al. (2022) are relevant to the question of whether puberty suppression eliminates sex-based performance advantages because these finding provide evidence that an important component of that advantage - male vs. female height - is not eliminated, or even meaningfully affected, by an ordinary course of puberty suppression or puberty suppression followed by cross-sex hormone therapy.

B. The rapid increase in testosterone across male puberty drives characteristic male physiological changes and the increasing performance advantages.

126. While boys exhibit some performance advantage even before puberty, it is both true and well known to common experience that the male advantage increases rapidly, and becomes much larger, as boys undergo puberty and become men. Empirically, this can be seen by contrasting the modest advantages reviewed immediately above against the large performance advantages enjoyed by men that I have detailed in Section II.

127. Multiple studies (along with common observation) document that the male performance advantage begins to increase during the early years of puberty, and then increases rapidly across the middle years of puberty (about ages 12-16). (Tønnessen 2015; Handelsman 2018 at 812-813.) Since it is well known that testosterone levels increase by more than an order of magnitude in boys across puberty, it is unsurprising that Handelsman finds that these increases in male performance advantage correlate to increasing testosterone levels, as presented in his chart reproduced below. (Handelsman 2018 at 812-13.)



128. Handelsman further finds that certain characteristic male changes including boys' increase in muscle mass do not begin at all until "circulating testosterone concentrations rise into the range of males at mid-puberty, which are higher than in women at any age." (Handelsman 2018 at 810.)

129. Knox et al. (2019) agree that "[i]t is well recognised that testosterone contributes to physiological factors including body composition, skeletal structure, and the cardiovascular and respiratory systems across the life span, with significant influence during the pubertal period. These physiological factors underpin strength, speed, and recovery with all three elements required to be competitive in almost all sports." (Knox 2019 at 397.) "High testosterone levels and prior male physiology provide an all-purpose benefit, and a substantial advantage. As the IAAF says, 'To

the best of our knowledge, there is no other genetic or biological trait encountered in female athletics that confers such a huge performance advantage.'" (Knox 2019 at 399.)

130. However, the undisputed fact that high (that is, normal male) levels of testosterone drive the characteristically male physiological changes that occur across male puberty does not at all imply that artificially *depressing* testosterone levels after those changes occur will reverse all or most of those changes so as to eliminate the male athletic advantage. This is an empirical question. As it turns out, the answer is that while some normal male characteristics can be changed by means of testosterone suppression, others cannot be, and all the reliable evidence indicates that males retain large athletic advantages even after long-term testosterone suppression.

V. The available evidence shows that suppression of testosterone in a male after puberty has occurred does <u>not</u> substantially eliminate the male athletic advantage.

131. The 2011 "NCAA Policy on Transgender Student-Athlete Participation" requires only that males who identify as transgender be on unspecified and unquantified "testosterone suppression treatment" for "one calendar year" prior to competing in women's events. In supposed justification of this policy, the NCAA's Office of Inclusion asserts that, "It is also important to know that any strength and endurance advantages a transgender woman arguably may have as a result of her prior testosterone levels dissipate after about one year of estrogen or testosterone-suppression therapy." (NCAA 2011 at 8.)

132. Similarly, writing in 2018, Handelsman et al. could speculate that even though some male advantages established during puberty are "fixed and irreversible (bone size)," "[t]he limited available prospective evidence . . . suggests that the advantageous increases in muscle and hemoglobin due to male circulating testosterone concentrations are induced or reversed during the first 12 months."

(Handelsman 2018 at 824.)

133. But these assertions or hypotheses of the NCAA and Handelsman are now strongly contradicted by the available science. In this section, I examine what is known about whether suppression of testosterone in males can eliminate the male physiological and performance advantages over females.

A. Empirical studies find that males retain a strong performance advantage even after lengthy testosterone suppression.

134. As my review in Section II indicates, a very large body of literature documents the large performance advantage enjoyed by males across a wide range of athletics. To date, only a limited number of studies have directly measured the effect of testosterone suppression and the administration of female hormones on the athletic performance of males. These studies report that testosterone suppression for a full year (and in some cases much longer) does not come close to eliminating male advantage in strength (hand grip, leg strength, and arm strength) or running speed.

Hand Grip Strength

135. As I have noted, hand grip strength is a well-accepted proxy for general strength. Multiple separate studies, from separate groups, report that males retain a large advantage in hand strength even after testosterone suppression to female levels.

136. In a longitudinal study, Van Caenegem et al. reported that males who underwent standard testosterone suppression protocols lost only 7% hand strength after 12 months of treatment, and only a cumulative 9% after two years. (Van Caenegem 2015 at 42.) As I note above, on average men exhibit in the neighborhood of 60% greater hand grip strength than women, so these small decreases do not remotely eliminate that advantage. Van Caenegem et al. document that their sample of males who elected testosterone suppression began with less strength than a control male population. Nevertheless, after one year of suppression, their study population still had hand grip only 21% less than the control male population, and

thus still far higher than a female population. (Van Caenegem 2015 at 42.)

137. Scharff et al. (2019) measured grip strength in a large cohort of male-to-female subjects from before the start of hormone therapy through one year of hormone therapy. The hormone therapy included suppression of testosterone to less than 2 nml/L "in the majority of the transwomen," (1024), as well as administration of estradiol (1021). These researchers observed a small decrease in grip strength in these subjects over that time (Fig. 2), but mean grip strength of this group remained far higher than mean grip strength of females—specifically, "After 12 months, the median grip strength of transwomen [male-to-female subjects] still falls in the 95th percentile for age-matched females." (1026).

138. Still a third longitudinal study, looking at teen males undergoing testosterone suppression, "noted no change in grip strength after hormonal treatment (average duration 11 months) of 21 transgender girls." (Hilton 2021 at 207, summarizing Tack 2018.)

139. A fourth study (Auer et al. 2016) reported no change in handgrip strength in 13 transwomen below the age of 45 years following 12 months of cross sex hormone therapy (Table 1, at 3).

140. A fifth study (Yun et al. 2021) observed that handgrip strength in the right hand decreased from 31.5 ± 5.8 kg to 29.9 ± 7.4 kg and in the left hand decreased from 31.8 ± 6.5 kg to 30.1 ± 6.9 kg during 6 months of cross sex hormone therapy in 11 males aged 28.5 ± 8.1 years who identify as women or nonbinary (Table 4, at 63). It is worth noting that the reduced grip strength in these male bodied individuals would rate in 75th percentile for females (Liguri, at 95).

141. Lapauw et al. (2008) looked at the extreme case of testosterone suppression by studying a population of 23 biologically male individuals who had undergone at least two years of testosterone suppression, followed by sex reassignment surgery that included "orchidectomy" (that is, surgical castration), and then at least an additional three years before the study date. Comparing this group against a control

of age- and height-matched healthy males, the researchers found that the individuals who had gone through testosterone suppression and then surgical castration had an average hand grip (41 kg) that was 24% weaker than the control group of healthy males. But this remains at least 25% *higher* than the average hand-grip strength of biological females as measured by Bohannon et al. (2019).

142. Alvares et al (2022) is a cross-sectional study on cardiopulmonary capacity and muscle strength in biological males who identify as female and have undergone long-term cross-sex hormone therapy. All of the study subjects that were biological males who identify as female had testosterone suppressed through medication (cyproterone acetate) or gonadectomy. (Supplementary materials) And they had taken exogenous estrogen for an average of 14.4 years with a standard deviation of 3.5 years. Compared to a control group of cisgender women, the study subjects exhibited 18% higher handgrip strength, confirming the findings of previous studies but extending the information to a longer time period. It is worth noting that the grip strength in these male bodied individuals would rate between the 90th and 95th percentile for females (Liguri, at 95).

143. Summarizing these and a few other studies measuring strength loss (in most cases based on hand grip) following testosterone suppression, Harper et al. (2021) conclude that "strength loss with 12 months of [testosterone suppression] . . . ranged from non-significant to 7%. . . . [T]he small decrease in strength in transwomen after 12-36 months of [testosterone suppression] suggests that transwomen likely retain a strength advantage over cisgender women." (Hilton 2021 at 870.)

Arm Strength

144. Lapauw et al. (2008) found that 3 years after surgical castration, preceded by at least two years of testosterone suppression, biologically male subjects had 33% less bicep strength than healthy male controls. (Lapauw (2008) at 1018.) Given that healthy men exhibit between 89% and 109% greater arm strength than healthy women, this leaves a very large residual arm strength advantage over biological

women.

145. Roberts et al. have published an interesting longitudinal study, one arm of which considered biological males who began testosterone suppression and cross-sex hormones while serving in the United States Air Force. (Roberts 2020.) One measured performance criterion was pushups per minute, which, while not exclusively, primarily tests arm strength under repetition. *Before* treatment, the biological male study subjects who underwent testosterone suppression could do 45% more pushups per minute than the average for all Air Force women under the age of 30 (47.3 vs. 32.5). *After* between one and two years of testosterone suppression, this group could still do 33% more pushups per minute. (Table 4.) Further, the body weight of the study group did not decline at all after one to two years of testosterone suppression (in fact rose slightly) (Table 3), and was approximately 24 pounds (11.0 kg) higher than the average for Air Force women under the age of 30. (Roberts 2020 at 3.) This means that the individuals who had undergone at least one year of testosterone suppression were not only doing 1/3 more pushups per minute, but were lifting significantly more weight with each pushup.

146. After two years of testosterone suppression, the study sample in Roberts et al. was only able to do 6% more pushups per minute than the Air Force female average. But their weight remained unchanged from their pre-treatment starting point, and thus about 24 pounds higher than the Air Force female average. As Roberts et al. explain, "as a group, transwomen weigh more than CW [cis-women]. Thus, transwomen will have a higher power output than CW when performing an equivalent number of push-ups. Therefore, our study may underestimate the advantage in strength that transwomen have over CW." (Roberts 2020 at 4.)

147. Chiccarelli et al. (2022) also published a longitudinal study which considered biological males who began testosterone suppression and cross-sex hormones while serving in the United States Air Force and concluded "Transgender females'

performance … remained superior in push-ups at the study's 4-year endpoint." (at 1) with the transwomen completing 16% more pushups than comparable women after 4 years of GAHT.

148. It is interesting that Roberts et al. (2020) and Chiccarelli et al. (2022) were comparing the same performance measurements in the same population and came to differing conclusions, which may be due to different sample sizes and study durations

Leg Strength

149. Wiik et al. (2020), in a longitudinal study that tracked 11 males from the start of testosterone suppression through 12 months after treatment initiation, found that isometric strength levels measured at the knee "were maintained over the [study period]."[11] (808) "At T12 [the conclusion of the one-year study], the absolute levels of strength and muscle volume were greater in [male-to-female subjects] than in . . . CW [women who had not undergone any hormonal therapy]." (Wiik 2020 at 808.) In fact, Wiik et al. reported that "muscle strength after 12 months of testosterone suppression was comparable to baseline strength. As a result, transgender women remained about 50% stronger than . . . a reference group of females." (Hilton 2021 at 207, summarizing Wiik 2020.)

150. Lapauw et al. (2008) found that 3 years after surgical castration, preceded by at least two years of testosterone suppression, subjects had peak knee torque only 25% lower than healthy male controls. (Lapauw 2008 at 1018.) Again, given that healthy males exhibit 54% greater maximum knee torque than healthy females, this leaves these individuals with a large average strength advantage over females even years after sex reassignment surgery.

Running and Swimming speed

151. The most striking finding of the recent Roberts et al. study concerned running

[11] Isometric strength measures muscular force production for a given amount of time at a specific joint angle but with no joint movement.

speed over a 1.5 mile distance–a distance that tests midrange endurance. Before suppression, the MtF study group ran 21% faster than the Air Force female average. After at least 2 year of testosterone suppression, these subjects still ran 12% faster than the Air Force female average. (Roberts 2020 Table 4.)

152. Chiccarelli (2022) reported that "Transgender females' performance showed statistically significantly better performance than cisgender females until 2 years of GAHT in run times…" (at 1) and yet the 1.5 mile run time was, on average, 45 seconds (5%) faster in the transwomen at years 2 and 3 than the Air Force female average.

153. The specific experience of the well-known case of NCAA athlete Cece Telfer is consistent with the more statistically meaningful results of Roberts et al., further illustrating that male-to-female transgender treatment does not negate the inherent athletic performance advantages of a post-pubertal male. In 2016 and 2017 Cece Telfer competed as Craig Telfer on the Franklin Pierce University men's track team, being ranked 200th and 390th (respectively) against other NCAA Division II men. "Craig" Telfer did not qualify for the National Championships in any events. Telfer did not compete in the 2018 season while undergoing testosterone suppression (per NCAA policy). In 2019 Cece Telfer competed on the Franklin Pierce University *women's* team, qualified for the NCAA Division II Track and Field National Championships, and placed 1st in the women's 400 meter hurdles and placed third in the women's 100 meter hurdles. (For examples of the media coverage of this please see https://www.washingtontimes.com/news/2019/jun/3/cece-telfer-franklin-pierce-transgender-hurdler-wi/ (last accessed May 5, 2023). https://triblive.com/sports/biological-male-wins-ncaa-womens-track-championship/ (last accessed May 25, 2023.)

154. The table below shows the best collegiate performance times from the combined 2015 and 2016 seasons for Cece Telfer when competing as a man in men's events, and the best collegiate performance times from the 2019 season when

competing as a woman in women's events. Comparing the times for the running events (in which male and female athletes run the same distance) there is no statistical difference between Telfer's "before and after" times. Calculating the difference in time between the male and female times, Telfer performed an average of 0.22% *faster* as a female. (Comparing the performance for the hurdle events (marked with H) is of questionable validity due to differences between men's and women's events in hurdle heights and spacing, and distance for the 110m vs. 100 m.) While this is simply one example, and does not represent a controlled experimental analysis, this information provides some evidence that male-to-female transgender treatment does not negate the inherent athletic performance advantages of a postpubertal male. (These times were obtained from https://www.tfrrs.org/athletes/6994616/Franklin_Pierce/CeCe_Telfer.html and https://www.tfrrs.org/athletes/5108308.html, last accessed May 5, 2023).

As Craig Telfer (male athlete)		**As Cece Telfer (female athlete)**	
Event	Time (seconds)	Event	Time (seconds)
55	7.01	55	7.02
60	7.67	60	7.63
100	12.17	100	12.24
200	24.03	200	24.30
400	55.77	400	54.41
55 H †	7.98	55 H†	7.91
60 H †	8.52	60 H†	8.33
110 H†	15.17	100 H†	13.41*
400 H‡	57.34	400 H‡	57.53**

* women's 3rd place, NCAA Division 2 National Championships

** women's 1st place, NCAA Division 2 National Championships

† men's hurdle height is 42 inches with differences in hurdle spacing between men and women

‡ men's hurdle height is 36 inches, women's height is 30 inches with the same spacing between hurdles

155. Harper (2015) has often been cited as "proving" that testosterone suppression eliminates male advantage. And indeed, hedged with many disclaimers, the author in that article does more or less make that claim with respect to "distance races," while emphasizing that "the author makes no claims as to the equality of performances, pre and post gender transition, in any other sport." (Harper 2015 at 8.) However, Harper (2015) is in effect a collection of unverified anecdotes, not science. It is built around self-reported race times from just eight self-selected transgender runners, recruited "mostly" online. How and on what websites the subjects were recruited is not disclosed, nor is anything said about how those not recruited online were recruited. Thus, there is no information to tell us whether these eight runners could in any way be representative, and the recruitment pools and methodology, which could bear on ideological bias in their self-reports, is not disclosed.

156. Further, the self-reported race times relied on by Harper (2015) *span 29 years*. It is well known that self-reported data, particularly concerning emotionally or ideologically fraught topics, is unreliable, and likewise that memory of distant events is unreliable. Whether the subjects were responding from memory or from written records, and if so what records, is not disclosed, and does not appear to be known to the author. For six of the subjects, the author claims to have been able to verify "approximately half" of the self-reported times. Which scores these are is not disclosed. The other two subjects responded only anonymously, so nothing about their claims could be or was verified. In short, neither the author nor the reader knows whether the supposed "facts" on which the paper's analysis is based are true.

157. Even if we could accept them at face value, the data are largely meaningless. Only two of the eight study subjects reported (undefined) "stable training patterns," and even with consistent training, athletic performance generally declines with age.

As a result, when the few data points span 29 years, it is not possible to attribute declines in performance to asserted testosterone suppression. Further, distance running is usually not on a track, and race times vary significantly depending on the course and the weather. Only one reporting subject who claimed a "stable training pattern" reported "before and after" times on the same course within three years' time," which the author acknowledges would "represent the best comparison points."

158. Harper (2015) to some extent acknowledges its profound methodological flaws, but seeks to excuse them by the difficulty of breaking new ground. The author states that, "The first problem is how to formulate a study to create a meaningful measurement of athletic performance, both before and after testosterone suppression. No methodology has been previously devised to make meaningful measurements." (2) This statement was not accurate at the time of publication, as there are innumerable publications with validated methodology for comparing physical fitness and/or athletic performance between people of different ages, sexes, and before and after medical treatment, any of which could easily have been used with minimal or no adaptation for the purposes of this study. Indeed, well before the publication of Harper (2015), several authors that I have cited in this review had performed and published disciplined and methodologically reliable studies of physical performance and physiological attributes "before and after" testosterone suppression.

159. More recently, and to her credit, Harper has acknowledged the finding of Roberts (2020) regarding the durable male advantage in running speed in the 1.5 mile distance, even after two years of testosterone suppression. She joins with co-authors in acknowledging that this study of individuals who (due to Air Force physical fitness requirements) "could at least be considered exercise trained," agrees that Roberts' data shows that "transwomen ran significantly faster during the 1.5 mile fitness test than ciswomen," and declares that this result is "consistent with the

findings of the current review in untrained transgender individuals" that even 30 months of testosterone suppression does not eliminate all male advantages "associated with muscle endurance and performance." (Harper 2021 at 8.) The Harper (2021) authors conclude overall "that strength may be well preserved in transwomen during the first 3 years of hormone therapy," and that [w]hether transgender and cisgender women can engage in meaningful sport [in competition with each other], even after [testosterone suppression], is a highly debated question." (Harper 2021 at 1, 8.)

160. Higerd (2021) "[a]ssess[ed] the probability of a girls' champion being biologically male" by evaluating 920,11 American high school track and field performances available through the track and field database Athletic.net in five states (CA, FL, MN, NY, WA), over three years (2017 – 2019),in eight events; high jump, long jump, 100M, 200M, 400M, 800M, 1600M, and 3200M and estimated that "there is a simulated 81%-98% probability of transgender dominance occurring in the female track and field event" and further concluded that "in the majority of cases, the entire podium (top of the state) would be MTF [transgender athletes]" (at xii).

161. The well-publicized case of Lia Thomas is also worth noting. University of Pennsylvania swimmer Lia Thomas began competing in the women's division in the fall of 2021, after previously competing for U. Penn. in the men's division. Thomas has promptly set school, pool, and/or league women's records in 200-yard freestyle, 500 yard freestyle, and 1650 yard freestyle competitions, beating the nearest female in the 1650 yard by an unheard-of 38 seconds.

162. Senefeld et al. (2023) compared "the performance times of a transgender woman (male sex, female gender identity) who competed in both men's and women's NCAA freestyle swimming and contextualized her performances relative to the performances of both world class and contemporary NCAA swimmers" (at 1035) and observed that this athlete [presumably Lia Thomas based on performance

times and the timing of this article] was unranked in 2018-2019 in the 100-yard, ranked 551st in the 200-yard, 65th in the 500-yard 32nd in the 1650-yards men's freestyle. After following the NCAA protocol for testosterone suppression and competing as a woman in 2021-2022, this swimmer was ranked 13th in the 100-yard, 3rd in the 200-yard, 1st in the 500-yard, and 13th in the 1650-yard women's freestyle. The performance times swimming as a female, when compared to swimming as a male, were 0.5% slower in the 100-yard, 2.6% slower in the 200-yard, 5.6% slower in the 500-yard, and 7.3% slower in the 1650-yard events than when swimming as a male (at 1034). The authors concluded "…these data suggest there may be a prolonged "legacy effect" (greater than 2 yr) associated with endogenous male testosterone concentrations or male puberty on freestyle swimming performances after feminizing GAHT, particularly for shorter event distances (100, 200, and 500 yards), which are closely associated with anthropometrics and maximal skeletal muscle strength and power" (at 1036).

B. Testosterone suppression does not reverse important male physiological advantages.

163. We see that, once a male has gone through male puberty, later testosterone suppression (or even castration) leaves large strength and performance advantages over females in place. It is not surprising that this is so. What is now a fairly extensive body of literature has documented that many of the specific male physiological advantages that I reviewed in Section II are not reversed by testosterone suppression after puberty, or are reduced only modestly, leaving a large advantage over female norms still in place.

164. Handelsman has well documented that the large increases in physiological and performance advantages characteristic of men develop in tandem with, and are likely driven by, the rapid and large increases in circulating testosterone levels that males experience across puberty, or generally between the ages of about 12 through 18. (Handelsman 2018.) Some have misinterpreted Handelsman as suggesting that

all of those advantages are and remain entirely dependent–on an ongoing basis–on *current* circulating testosterone levels. This is a misreading of Handelsman, who makes no such claim. As the studies reviewed above demonstrate, it is also empirically false with respect to multiple measures of performance. Indeed, Handelsman himself, referring to the Roberts et al. (2020) study which I describe below, has recently written that "transwomen treated with estrogens after completing male puberty experienced only minimal declines in physical performance over 12 months, substantially surpassing average female performance for up to 8 years." (Handelsman 2020.)

165. As to individual physiological advantages, the more accurate and more complicated reality is reflected in a statement titled "The Role of Testosterone in Athletic Performance," published in 2019 by several dozen sports medicine experts and physicians from many top medical schools and hospitals in the U.S. and around the world. (Levine et al. 2019.) This expert group concurs with Handelsman regarding the importance of testosterone to the male advantage, but recognizes that those advantages depend not only on *current* circulating testosterone levels in the individual, but on the "exposure in biological males to much higher levels of testosterone during growth, development, and throughout the athletic career." (*Emphasis added*.) In other words, both past and current circulating testosterone levels affect physiology and athletic capability.

166. Available research enables us to sort out, in some detail, which specific physiological advantages are immutable once they occur, which can be reversed only in part, and which appear to be highly responsive to later hormonal manipulation. The bottom line is that very few of the male physiological advantages I have reviewed in Section II above are largely reversible by testosterone suppression once an individual has passed through male puberty.

Skeletal Configuration

167. It is obvious that some of the physiological changes that occur during

"growth and development" across puberty cannot be reversed. Some of these irreversible physiological changes are quite evident in photographs that have recently appeared in the news of transgender competitors in female events. These include skeletal configuration advantages including:

- Longer and larger bones that give height, weight, and leverage advantages to men;
- More advantageous hip shape and configuration as compared to women.

Cardiovascular Advantages

168. Developmental changes for which there is no apparent means of reversal, and no literature suggesting reversibility, also include multiple contributors to the male cardiovascular advantage, including diaphragm placement, lung and trachea size, and heart size and therefore pumping capacity.[12]

169. In what is, to date, the only evaluation of VO_2max is a cross-sectional study on cardiopulmonary capacity and muscle strength in biological males who identify as female and have undergone long-term cross-sex hormone therapy (Alvares 2022). All of the study subjects that were biological males who identify as female had testosterone suppressed through medication (cyproterone acetate) or gonadectomy. (Supplementary materials) And they had taken exogenous estrogen for an average of 14.4 years with a standard deviation of 3.5 years. Compared to a control group of cisgender women, even after 14 years of testosterone suppression and estrogen administration the biological males who identify as female exhibited advantages in cardio-respiratory capacity measured as higher VO_2 peak and higher O_2 pulse, which suggests that male advantages are retained in events that are influenced by cardio-respiratory endurance (e.g. distance running, cycling, swimming, etc.).

170. On the other hand, the evidence is mixed as to hemoglobin concentration,

[12] "[H]ormone therapy will not alter … lung volume or heart size of the transwoman athlete, especially if [that athlete] transitions postpuberty, so natural advantages including joint articulation, stroke volume and maximal oxygen uptake will be maintained." (Knox 2019 at 398.)

which as discussed above is a contributing factor to $V0_2$ max. Harper (2021) surveyed the literature and found that "Nine studies reported the levels of Hgb [hemoglobin] or HCT [red blood cell count] in transwomen before and after [testosterone suppression], from a minimum of three to a maximum of 36 months post hormone therapy. Eight of these studies. . . found that hormone therapy led to a significant (4.6%–14.0%) decrease in Hgb/HCT ($p<0.01$), while one study found no significant difference after 6 months," but only one of those eight studies returned results at the generally accepted 95% confidence level. (Harper 2021 at 5-6 and Table 5.)

171. I have not found any study of the effect of testosterone suppression on the male advantage in mitochondrial biogenesis.

Muscle mass

172. Multiple studies have found that muscle mass decreases modestly or not at all in response to testosterone suppression. Knox et al. report that "healthy young men did not lose significant muscle mass (or power) when their circulating testosterone levels were reduced to 8.8 nmol/L (lower than the 2015 IOC guideline of 10 nmol/L) for 20 weeks." (Knox 2019 at 398.) Gooren found that "[i]n spite of muscle surface area reduction induced by androgen deprivation, after 1 year the mean muscle surface area in male-to- female transsexuals remained significantly greater than in untreated female-to-male transsexuals." (Gooren 2011 at 653.) An earlier study by Gooren found that after one year of testosterone suppression, muscle mass at the thigh was reduced by only about 10%, exhibited "no further reduction after 3 years of hormones," and "remained significantly greater" than in his sample of untreated women. (Gooren 2004 at 426-427.) Van Caenegem et al. found that muscle cross section in the calf and forearm decreased only trivially (4% and 1% respectively) after two years of testosterone suppression. (Van Caenegem 2015 Table 4.)

173. Taking measurements one month after start of testosterone suppression in

male-to-female (non-athlete) subjects, and again 3 and 11 months after start of feminizing hormone replacement therapy in these subjects, Wiik et al. found that total lean tissue (i.e. primarily muscle) did not decrease significantly across the entire period. Indeed, "some of the [subjects] did not lose any muscle mass at all." (Wiik 2020 at 812.) And even though they observed a small decrease in thigh muscle mass, they found that isometric strength levels measured at the knee "were maintained over the [study period]." (808) "At T12 [the conclusion of the one-year study], the absolute levels of strength and muscle volume were greater in [male-to-female subjects] than in [female-to-male subjects] and CW [women who had not undergone any hormonal therapy]." (808)

174. Alvares et al. (2022) In a cross-sectional study of 15 natal males aged 34.2 ± 5.2 years who had taken exogenous estrogen for an average of 14.4 ± 3.5 years, and compared to a control group of comparably aged females, the transwomen exhibited a 40% advantage in skeletal muscle mass confirming the findings of previous studies regarding the minimal reduction in muscle mass due to transgender hormone therapy, but extending the information to a longer time period (Table 3 at 5).

175. Other papers including Auer. et al (2016), Auer et al. (2018), Elbers et al. (1999), Gava et al. (2016), Haraldsen et al. (2007), Klaver et al. (2018), Klaver et al. (2017), Lapauw et al. (2008), Mueller et al. (2018), Wiercks (et al. (2014), and Yun et al. (2021) have evaluated the changes in body composition in males undergoing transgender hormone therapy with a common finding that there are large retained male advantages in lean body mass.

176. Hilton & Lundberg summarize an extensive survey of the literature as follows:

> "12 longitudinal studies have examined the effects of testosterone suppression on lean body mass or muscle size in transgender women. The collective evidence from these studies suggests that 12 months, which is the most commonly

> examined intervention period, of testosterone suppression to female typical reference levels results in a modest (approximately− 5%) loss of lean body mass or muscle size. . . .
>
> "Thus, given the large baseline differences in muscle mass between males and females (Table 1; approximately 40%), the reduction achieved by 12 months of testosterone suppression can reasonably be assessed as small relative to the initial superior mass. We, therefore, conclude that the muscle mass advantage males possess over females, and the performance implications thereof, are not removed by the currently studied durations (4 months, 1, 2 and 3 years) of testosterone suppression in transgender women. (Hilton 2021 at 205-207.)

177. When we recall that "women have 50% to 60% of men's upper arm muscle cross-sectional area and 65% to 70% of men's thigh muscle cross-sectional area" (Handelsman 2018 at 812), it is clear that Hilton's conclusion is correct. In other words, biologically male subjects possess substantially larger muscles than biologically female subjects after undergoing a year or even three years of testosterone suppression.

178. I note that outside the context of transgender athletes, the testosterone-driven increase in muscle mass and strength enjoyed by these male-to-female subjects would constitute a disqualifying doping violation under all league anti-doping rules with which I am familiar.

C. Responsible voices internationally are increasingly recognizing that suppression of testosterone in a male after puberty has occurred does not substantially reverse the male athletic advantage.

179. The previous very permissive NCAA policy governing transgender participation in women's collegiate athletics was adopted in 2011, and the previous

IOC guidelines were adopted in 2015. At those dates, much of the scientific analysis of the actual impact of testosterone suppression had not yet been performed, much less any wider synthesis of that science. In fact, a series of important peer-reviewed studies and literature reviews have been published only very recently, since I prepared my first paper on this topic, in early 2020.

180. These new scientific publications reflect a remarkably consistent consensus: once an individual has gone through male puberty, testosterone suppression does not substantially eliminate the physiological and performance advantages that that individual enjoys over female competitors.

181. Importantly, I have found no peer-reviewed scientific paper, nor any respected scientific voice, that is now asserting the contrary–that is, that testosterone suppression can eliminate or even largely eliminate the male biological advantage once puberty has occurred.

182. I excerpt the key conclusions from important recent peer-reviewed papers below.

183. Roberts 2020: "In this study, we confirmed that . . . the pretreatment differences between transgender and cis gender women persist beyond the 12-month time requirement currently being proposed for athletic competition by the World Athletics and the IOC." (6)

184. Wiik 2020: The muscular and strength changes in males undergoing testosterone suppression "were modest. The question of when it is fair to permit a transgender woman to compete in sport in line with her experienced gender identity is challenging." (812)

185. Harper 2021: "[V]alues for strength, LBM [lean body mass], and muscle area in transwomen remain above those of cisgender women, even after 36 months of hormone therapy." (1)

186. Hilton & Lundberg 2021: "evidence for loss of the male performance advantage, established by testosterone at puberty and translating in elite athletes to

a 10–50% performance advantage, is lacking. . . . These data significantly undermine the delivery of fairness and safety presumed by the criteria set out in transgender inclusion policies . . .” (211)

187. Hamilton et al. 2021, “Response to the United Nations Human Rights Council’s Report on Race and Gender Discrimination in Sport: An Expression of Concern and a Call to Prioritize Research”: “There is growing support for the idea that development influenced by high testosterone levels may result in retained anatomical and physiological advantages . . . . If a biologically male athlete self-identifies as a female, legitimately with a diagnosis of gender dysphoria or illegitimately to win medals, the athlete already possesses a physiological advantage that undermines fairness and safety. This is not equitable, nor consistent with the fundamental principles of the Olympic Charter.” (840)

188. Hamilton et al. 2021, “Consensus Statement of the Fédération Internationale de Médecine du Sport” (International Federation of Sports Medicine, or FIMS), signed by more than 60 sports medicine experts from prestigious institutions around the world: The available studies “make it difficult to suggest that the athletic capabilities of transwomen individuals undergoing HRT or GAS are comparable to those of cisgender women.” The findings of Roberts et al. “question the required testosterone suppression time of 12 months for transwomen to be eligible to compete in women’s sport, as most advantages over ciswomen were not negated after 12 months of HRT.”

189. Heather (2022) is another peer-reviewed literature review examining the evidence to date on whether testosterone suppression eliminates the physiological building blocks of male athletic advantage. In this review, Dr. Heather studied the existing literature on male advantages in brain structure, muscle mass, bone structure, and the cardio-respiratory system, and the effects of testosterone suppression on those advantages. She concluded:

Given that the percentage difference between medal placings

> at the elite level is normally less than 1%, there must be confidence that an elite transwoman athlete retains no residual advantage from former testosterone exposure, where the inherent advantage depending on sport could be 10-30%. Current scientific evidence can not provide such assurances and thus, under abiding rulings, the inclusion of transwomen in the elite female division needs to be reconsidered for fairness to female-born athletes. (8)

190. Nokoff et al. (2023) is another peer-reviewed literature review examining the evidence to date on whether Gender Affirming Hormone Therapy in transwomen eliminates male sex-based athletic advantages and concludes that "reductions of lean body mass and muscle cross-sectional area in the first 12 to 36 months of GAHT … are associated with small reductions or no change in limb strength assessed by hand grip or knee flexion/extension." And "After pubertal change begin, sex segregation for sports involving endurance, power, and strength, … allow adolescent girls and women to excel."

191. Outside the forum of peer-reviewed journals, respected voices in sport are reaching the same conclusion.

192. The **Women's Sports Policy Working Group** identifies among its members and "supporters" many women Olympic medalists, former women's tennis champion and LGBTQ activist Martina Navratilova, Professor Doriane Coleman, a former All-American women's track competitor, transgender athletes Joanna Harper and Dr. Renee Richards, and many other leaders in women's sports and civil rights. I have referenced other published work of Joanna Harper and Professor Coleman. In early 2021 the Women's Sports Policy Working Group published a "Briefing Book" on the issue of transgender participation in women's sports,[13] in

[13] https://womenssportspolicy.org/wp-content/uploads/2021/02/Congressional-Briefing-WSPWG-Transgender-Women-Sports-2.27.21.pdf

which they reviewed largely the same body of literature I have reviewed above, and analyzed the implications of that science for fairness and safety in women's sports.

193. Among other things, the Women's Sports Policy Working Group concluded:

- "[T]he evidence is increasingly clear that hormones do not eliminate the legacy advantages associated with male physical development" (8) due to "the considerable size and strength advantages that remain even after hormone treatments or surgical procedures." (17)
- "[T]here is convincing evidence that, depending on the task, skill, sport, or event, trans women maintain male sex-linked (legacy) advantages even after a year on standard gender-affirming hormone treatment." (26, citing Roberts 2020.)
- "[S]everal peer-reviewed studies, including one based on data from the U.S. military, have confirmed that trans women retain their male sex-linked advantages even after a year on gender affirming hormones. . . . Because of these retained advantages, USA Powerlifting and World Rugby have recently concluded that it isn't possible fairly and safely to include trans women in women's competition." (32)

194. As has been widely reported, in 2020, after an extensive scientific consultation process, the **World Rugby** organization issued its Transgender Guidelines, finding that it would not be consistent with fairness or safety to permit biological males to compete in World Rugby women's matches, no matter what hormonal or surgical procedures they might have undergone. Based on their review of the science, World Rugby concluded:

- "Current policies regulating the inclusion of transgender women in sport are based on the premise that reducing testosterone to levels found in biological females is sufficient to remove many of the biologically-based performance advantages described above. However, peer-reviewed evidence suggests that this is not the case."
- "Longitudinal research studies on the effect of reducing testosterone to female

levels for periods of 12 months or more do not support the contention that variables such as mass, lean mass and strength are altered meaningfully in comparison to the original male-female differences in these variables. The lowering of testosterone removes only a small proportion of the documented biological differences, with large, retained advantages in these physiological attributes, with the safety and performance implications described previously."

- ". . . given the size of the biological differences prior to testosterone suppression, this comparatively small effect of testosterone reduction allows substantial and meaningful differences to remain. This has significant implications for the risk of injury . . . ."
- " . . . bone mass is typically maintained in transgender women over the course of at least 24 months of testosterone suppression, ... Height and other skeletal measurements such as bone length and hip width have also not been shown to change with testosterone suppression, and nor is there any plausible biological mechanism by which this might occur, and so sporting advantages due to skeletal differences between males and females appear unlikely to change with testosterone reduction.

195. In September 2021 the government-commissioned Sports Councils of the United Kingdom and its subsidiary parts (the five Sports Councils responsible for supporting and investing in sport across England, Wales, Scotland and Northern Ireland) issued a formal "Guidance for Transgender Inclusion in Domestic Sport" (UK Sport Councils 2021), following an extensive consultation process, and a commissioned "International Research Literature Review" prepared by the Carbmill Consulting group (UK Sport Literature Review 2021). The UK Sport Literature Review identified largely the same relevant literature that I review in this paper, characterizes that literature consistently with my own reading and description, and based on that science reaches conclusions similar to mine.

196. The UK Sport Literature Review 2021 concluded:

- "Sexual dimorphism in relation to sport is significant and the most important determinant of sporting capacity. The challenge to sporting bodies is most evident in the inclusion of transgender people in female sport." "[The] evidence suggests that parity in physical performance in relation to gender-affected sport cannot be achieved for transgender people in female sport through testosterone suppression. Theoretical estimation in contact and collision sport indicate injury risk is likely to be increased for female competitors." (10)
- "From the synthesis of current research, the understanding is that testosterone suppression for the mandated one year before competition will result in little or no change to the anatomical differences between the sexes, and a more complete reversal of some acute phase metabolic pathways such as haemoglobin levels although the impact on running performance appears limited, and a modest change in muscle mass and strength: The average of around 5% loss of muscle mass and strength will not reverse the average 40-50% difference in strength that typically exists between the two sexes." (7)
- "These findings are at odds with the accepted intention of current policy in sport, in which twelve months of testosterone suppression is expected to create equivalence between transgender women and females." (7)

197. Taking into account the science detailed in the UK Sport Literature Review 2021, the UK Sports Councils have concluded:

- "[T]he latest research, evidence and studies made clear that there are retained differences in strength, stamina and physique between the average woman compared with the average transgender woman or non-binary person registered male at birth, with or without testosterone suppression." (3)
- "Competitive fairness cannot be reconciled with self-identification into the female category in gender-affected sport." (7)
- "As a result of what the review found, the Guidance concludes that the inclusion of transgender people into female sport cannot be balanced regarding

transgender inclusion, fairness and safety in gender-affected sport where there is meaningful competition. This is due to retained differences in strength, stamina and physique between the average woman compared with the average transgender woman or non-binary person assigned male at birth, with or without testosterone suppression." (6)

- "Based upon current evidence, testosterone suppression is unlikely to guarantee fairness between transgender women and natal females in gender-affected sports. . . . Transgender women are on average likely to retain physical advantage in terms of physique, stamina, and strength. Such physical differences will also impact safety parameters in sports which are combat, collision or contact in nature." (7)

198. On January 15, 2022 the American Swimming Coaches Association (ASCA) issued a statement stating, "The American Swimming Coaches Association urges the NCAA and all governing bodies to work quickly to update their policies and rules to maintain fair competition in the women's category of swimming. ASCA supports following all available science and evidenced-based research in setting the new policies, and we strongly advocate for more research to be conducted" and further stated "The current NCAA policy regarding when transgender females can compete in the women's category can be unfair to cisgender females and needs to be reviewed and changed in a transparent manner." (https://swimswam.com/asca-issues-statement-calling-for-ncaa-to-review-transgender-rules/; Accessed January 16, 2022.)

199. On January 19, 2022, the NCAA Board of Governors approved a change to the policy on transgender inclusion in sport and stated that "…the updated NCAA policy calls for transgender participation for each sport to be determined by the policy for the national governing body of that sport, subject to ongoing review and recommendation by the NCAA Committee on Competitive Safeguards and Medical Aspects of Sports to the Board of Governors. If there is no

N[ational]G[overning]B[ody] policy for a sport, that sport's international federation policy would be followed. If there is no international federation policy, previously established IOC policy criteria would be followed" (https://www.ncaa.org/news/2022/1/19/media-center-board-of-governors-updates-transgender-participation-policy.aspx; Accessed January 20, 2022.)

200. On February 1, 2022, because "…a competitive difference in the male and female categories and the disadvantages this presents in elite head-to-head competition … supported by statistical data that shows that the top-ranked female in 2021, on average, would be ranked 536th across all short course yards (25 yards) male events in the country and 326th across all long course meters (50 meters) male events in the country, among USA Swimming members," USA Swimming released its Athlete Inclusion, Competitive Equity and Eligibility Policy. The policy is intended to "provide a level-playing field for elite cisgender women, and to mitigate the advantages associated with male puberty and physiology." (USA Swimming Releases Athlete Inclusion, Competitive Equity and Eligibility Policy, available at https://www.usaswimming.org/news/2022/02/01/usa-swimming-releases-athlete-inclusion-competitive-equity-and-eligibility-policy.) The policy states:

- For biologically male athletes seeking to compete in the female category in certain "elite" level events, the athlete has the burden of demonstrating to a panel of independent medical experts that:
    - "From a medical perspective, the prior physical development of the athlete as Male, as mitigated by any medical intervention, does not give the athlete a competitive advantage over the athlete's cisgender Female competitors" and
    - There is a presumption that the athlete is not eligible unless the athlete "demonstrates that the concentration of testosterone in the athlete's serum has been less than 5 nmol/L . . . continuously for a period of at least thirty-six (36) months before the date of the Application." This

> presumption may be rebutted "if the Panel finds, in the unique circumstances of the case, that [the athlete's prior physical development does not give the athlete a competitive advantage] notwithstanding the athlete's serum testosterone results (e.g., the athlete has a medical condition which limits bioavailability of the athlete's free testosterone)." (USA Swimming Athlete Inclusion Procedures at 43.)

201. FINA, the international aquatics (swimming and diving) federation, issued a new policy in June 2022 allowing biological males to compete in the female category of aquatics only if they can establish that they "had male puberty suppressed beginning at Tanner Stage 2 or before age 12, whichever is later, and they have since continuously maintained their testosterone levels in serum (or plasma) below 2.5 nmol/L." FINA Policy on Eligibility for the Men's and Women's Categories § F.4.b.ii. A biologically male athlete who cannot meet these criteria is prohibited from competing in the female category. Id.

- This policy is based on the review of the scientific literature conducted by an independent panel of experts in physiology, endocrinology, and human performance, including specialists in transgender medicine. This panel concluded:

> [I]f gender-affirming male-to-female transition consistent with the medical standard of care is initiated after the onset of puberty, it will blunt some, but not all, of the effects of testosterone on body structure, muscle function, and other determinants of performance, but there will be persistent legacy effects that will give male-to-female transgender athletes (transgender women) a relative performance advantage over biological females. A biological female athlete cannot overcome that advantage through training or nutrition.

> Nor can they take additional testosterone to obtain the same advantage, because testosterone is a prohibited substance under the World Anti-Doping Code. (2)

202. In June 2022, British Triathlon adopted a new policy limiting competition in the female category to "people who are the female sex at birth." British Triathlon Transgender Policy § 7.2.

- This policy is based on its review of the scientific literature and conclusions that "the scientific community broadly agrees that the majority of the physiological/biological advantages brought about by male puberty are retained (either wholly or partially) by transwomen post transition" and that testosterone suppression does not "sufficiently remove[] the retained sporting performance advantage of transwomen." British Triathlon Transgender Policy § 2 (emphasis in original).

203. In June 2022, UCI, the world cycling federation, changed its eligibility criteria for males who identify as female competing in the female category from 12 months of testosterone suppression to the level of 5 nmol/L to 24 months of testosterone suppression to the level of 2.5 nmol/L. UCI Rules § 13.5.015.

- In releasing the new policy, UCI cited a position paper by Prof. Xavier Bigard (2022), which concluded that the "potential [male] advantage on muscle strength / power cannot be erased before a period of 24 months." (15) Notably, Prof. Bigard did not assert that the best available evidence shows that male advantage is actually erased after 24 months; he merely asserted that the evidence shows that male advantage is not erased before 24 months.
- It was reported by Sean Ingle in the Guardian on Thursday, May 4, 2023, that UCI may reconsider its transgender participation policy after a male who identifies as a female won the Tour of the Gila in New Mexico “The UCI also hears the voices of female athletes and their concerns about an equal playing field for competitors, and will take into account all elements, including the

evolution of scientific knowledge."

204. In July 2022, England's Rugby Football Union and Rugby Football League both approved new policies limiting the female category to players whose sex recorded at birth is female for contact rugby for the under 12 age group and above. Rugby Football League Gender Participation Policy § 4.2(d); Rugby Football Union Gender Participation Policy § 4.2(d).

- In August 2022, the Irish Rugby Football Union adopted the same policy. Irish Rugby Football Union Gender Participation Policy §§ 4.5(b) & (f).
- In September 2022, the Welsh Rugby Union also adopted the same policy.
- These bodies based their policy on a review of the scientific research, which showed that male advantage "cannot be sufficiently addressed even with testosterone suppression." Rugby Football Union Gender Participation Policy § 3.4; see also Rugby Football League Gender Participation Policy § 3.4; Irish Rigby Football Union Gender Participation Policy § 4.3.

205. In August 2022, the World Boxing Council issued a new policy requiring athletes to compete in accordance with their natal sex. World Boxing Council Statement/Guidelines Regarding Transgender Athletes Participation in Professional Combat Sports. The WBC concluded that any other policy would raise "serious health and safety concerns." Id.

206. In August 2022, World Triathlon issued a new policy limiting the female category to biological females and to biological males who have suppressed circulating testosterone to 2.5 nmol/L for at least 24 months and have not competed in the male category in at least 48 months. World Triathlon Transgender Policy Process § 3. Previously, it had followed the old IOC guidelines of requiring testosterone suppression to 10 nmol/L for at least 12 months.

- In issuing this policy, World Triathlon stated that "the potential advantage in muscle strength/power of Transgender women cannot be erased before two years of testosterone suppression." World Triathlon Transgender Policy Process § 3.

Notably, World Triathlon did not assert that two years of testosterone suppression actually erases male performance advantage, nor did it cite any evidence that would support such a proposition.

- Although World Triathlon listed sports scientists Drs. Emma Hilton and Ross Tucker as consultants in developing the new policy, both immediately criticized the policy as allowing male advantage into female triathlon competitions.
- Another sports scientist listed as a consultant to World Triathlon, Dr. Alun Williams, has opined that basing eligibility on circulating testosterone levels is not evidence-based policymaking because of the lack of evidence that testosterone suppression eliminates male performance advantage.

207. In March 2023, the World Athletics Council, the governing body for world class track & field competition issued new transgender and DSD (Disorders of Sex Development) regulations. The transgender participation policy is very similar to the policies of World Rugby, World Boxing, and FINA by stating "In regard to transgender athletes, the Council has agreed to exclude male-to-female transgender athletes who have been through male puberty from female World Rankings competition from 31 March 2023." And "For DSD athletes, the new regulations will require any relevant athletes to reduce their testosterone levels below a limit of 2.5 nmol/L for a minimum of 24 months to compete internationally in the female category in any event."

- These policies are particularly noteworthy as there is a clear separation of the concerns regarding athletes who are transgender and those who have a DSD.

Conclusions

The research and actual observed data show the following:

- At the level of (a) elite, (b) collegiate, (c) scholastic, and (d) recreational competition, men, adolescent boys, or male children, have an advantage over equally gifted, aged and trained women, adolescent girls, or female children in almost all athletic events;

- Biological male physiology is the basis for the performance advantage that men, adolescent boys, or male children have over women, adolescent girls, or female children in almost all athletic events; and
- The administration of androgen inhibitors and cross-sex hormones to men or adolescent boys after the onset of male puberty does not eliminate the performance advantage that men and adolescent boys have over women and adolescent girls in almost all athletic events. Likewise, there is no published scientific evidence that the administration of puberty blockers to males before puberty eliminates the pre-existing athletic advantage that prepubertal males have over prepubertal females in almost all athletic events.

For over a decade sports governing bodies (such as the IOC and NCAA) have wrestled with the question of transgender inclusion in female sports. The previous polices implemented by these sporting bodies had an underlying "premise that reducing testosterone to levels found in biological females is sufficient to remove many of the biologically-based performance advantages." (World Rugby 2020 at 13.) Disagreements centered around what the appropriate threshold for testosterone levels must be–whether the 10nmol/liter value adopted by the IOC in 2015, or the 5nmol/liter value adopted by the IAAF.

But the science that has become available within just the last few years contradicts that premise. Instead, as the UK Sports Councils, World Rugby, the FIMS Consensus Statement, and the Women's Sports Policy Working Group have all recognized the science is now sharply "at odds with the accepted intention of current policy in sport, in which twelve months of testosterone suppression is expected to create equivalence between transgender women and females" (UK Sports Literature Review 2021 at 7), and it is now "difficult to suggest that the athletic capabilities of transwomen individuals undergoing HRT or GAS are comparable to those of cisgender women." (Hamilton, FIMS Consensus Statement 2021.) It is important to note that while the 2021 "IOC Framework on Fairness, Inclusion, and Non-Discrimination on the Basis of Gender Identity and Sex Variations"

calls for an "evidence-based approach," that Framework does not actually reference *any* of the now extensive scientific evidence relating to the physiological differences between the sexes, and the inefficacy of hormonal intervention to eliminate male advantages relevant to most sports. Instead, the IOC calls on other sporting bodies to define criteria for transgender inclusion, while demanding that such criteria simultaneously ensure fairness, safety, and inclusion for all. The recently updated NCAA policy on transgender participation also relies on other sporting bodies to establish criteria for transgender inclusion while calling for fair competition and safety.

But what we currently know tells us that these policy goals—fairness, safety, and full transgender inclusion—are irreconcilable for many or most sports. Long human experience is now joined by large numbers of research papers that document that males outperform females in muscle strength, muscular endurance, aerobic and anaerobic power output, VO_2max, running speed, swimming speed, vertical jump height, reaction time, and most other measures of physical fitness and physical performance that are essential for athletic success. The male advantages have been observed in fitness testing in children as young as 3 years old, with the male advantages increasing immensely during puberty. To ignore what we know to be true about males' athletic advantages over females, based on mere hope or speculation that cross sex hormone therapy (puberty blockers, androgen inhibitors, or cross-sex hormones) might neutralize that advantage, when the currently available evidence says it does not, is not science and is not "evidence-based" policy-making.

Because of the recent research and analysis in the general field of transgender athletics, many sports organizations have revised their policies or are in the process of doing so. As a result, there is not any universally recognized policy among sports organizations, and transgender inclusion policies are in a state of flux, likely because of the increasing awareness that the goals of fairness, safety, and full transgender inclusion are irreconcilable.

Sports have been separated by sex for the purposes of safety and fairness for a

considerable number of years. The values of safety and fairness are endorsed by numerous sports bodies, including the NCAA and IOC. The existing evidence of durable physiological and performance differences based on biological sex provides a strong evidence-based rationale for keeping rules and policies for such sex-based separation in place (or implementing them as the case may be).

As set forth in detail in this report, there are physiological differences between males and females that result in males having a significant performance advantage over similarly gifted, aged, and trained females in nearly all athletic events before, during, and after puberty. There is not scientific evidence that any amount or duration of cross sex hormone therapy (puberty blockers, androgen inhibitors, or cross-sex hormones) eliminates all physiological advantages that result in males performing better than females in nearly all athletic events. Males who have received such therapy retain sufficient male physiological traits that enhance athletic performance vis-à-vis similarly aged females and are thus, from a physiological perspective, more accurately categorized as male and not female.

I swear or affirm under penalty of perjury that the foregoing is true and correct.

Dated: May 18, 2023 Signed: *<u>/s/ Dr. Gregory A. Brown, Ph.D., FACSM</u>*

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Appendix 1 – Data Tables

Presidential Physical Fitness Results[14]

Curl-Ups (# in 1 minute)

Male			Female		Male-Female Difference		%
Age	50th %ile	85th %ile	50th %ile	85th %ile	Age	50th %ile	85th %ile
6	22	33	23	32	**6**	-4.3%	3.1%
7	28	36	25	34	**7**	12.0%	5.9%
8	31	40	29	38	**8**	6.9%	5.3%
9	32	41	30	39	**9**	6.7%	5.1%
10	35	45	30	40	**10**	16.7%	12.5%
11	37	47	32	42	**11**	15.6%	11.9%
12	40	50	35	45	**12**	14.3%	11.1%
13	42	53	37	46	**13**	13.5%	15.2%
14	45	56	37	47	**14**	21.6%	19.1%
15	45	57	36	48	**15**	25.0%	18.8%
16	45	56	35	45	**16**	28.6%	24.4%
17	44	55	34	44	**17**	29.4%	25.0%

[14] This data is available from a variety of sources. including: https://gilmore.gvsd.us/documents/Info/Forms/Teacher%20Forms/Presidentialchallengetest.pdf

Shuttle Run (seconds)

	Male		Female		Male-Female Difference		%
	50th	85th	50th	85th		50th	85th
Age	%ile	%ile	%ile	%ile	Age	%ile	%ile
6	13.3	12.1	13.8	12.4	**6**	3.6%	2.4%
7	12.8	11.5	13.2	12.1	**7**	3.0%	5.0%
8	12.2	11.1	12.9	11.8	**8**	5.4%	5.9%
9	11.9	10.9	12.5	11.1	**9**	4.8%	1.8%
10	11.5	10.3	12.1	10.8	**10**	5.0%	4.6%
11	11.1	10	11.5	10.5	**11**	3.5%	4.8%
12	10.6	9.8	11.3	10.4	**12**	6.2%	5.8%
13	10.2	9.5	11.1	10.2	**13**	8.1%	6.9%
14	9.9	9.1	11.2	10.1	**14**	11.6%	9.9%
15	9.7	9.0	11.0	10.0	**15**	11.8%	10.0%
16	9.4	8.7	10.9	10.1	**16**	13.8%	13.9%
17	9.4	8.7	11.0	10.0	**17**	14.5%	13.0%

1 mile run (seconds)

	Male		Female		Male-Female Difference		%
	50th	85th	50th	85th		50th	85th
Age	%ile	%ile	%ile	%ile	Age	%ile	%ile
6	756	615	792	680	**6**	4.5%	9.6%
7	700	562	776	636	**7**	9.8%	11.6%
8	665	528	750	602	**8**	11.3%	12.3%
9	630	511	712	570	**9**	11.5%	10.4%

10	588	477	682	559	**10**	13.8%	14.7%
11	560	452	677	542	**11**	17.3%	16.6%
12	520	431	665	503	**12**	21.8%	14.3%
13	486	410	623	493	**13**	22.0%	16.8%
14	464	386	606	479	**14**	23.4%	19.4%
15	450	380	598	488	**15**	24.7%	22.1%
16	430	368	631	503	**16**	31.9%	26.8%
17	424	366	622	495	**17**	31.8%	26.1%

Pull Ups (# completed)

						Male-Female	**%**
Male			**Female**			**Difference**	
	50th	**85th**	**50th**	**85th**		**50th**	**85th**
Age	**%ile**	**%ile**	**%ile**	**%ile**	**Age**	**%ile**	**%ile**
6	1	2	1	2	**6**	0.0%	0.0%
7	1	4	1	2	**7**	0.0%	100.0%
8	1	5	1	2	**8**	0.0%	150.0%
9	2	5	1	2	**9**	100.0%	150.0%
10	2	6	1	3	**10**	100.0%	100.0%
11	2	6	1	3	**11**	100.0%	100.0%
12	2	7	1	2	**12**	100.0%	250.0%
13	3	7	1	2	**13**	200.0%	250.0%
14	5	10	1	2	**14**	400.0%	400.0%
15	6	11	1	2	**15**	500.0%	450.0%

16	7	11	1	1	**16**	600.0%	1000.0%
17	8	13	1	1	**17**	700.0%	1200.0%

Data Compiled from Athletic.Net

2021 National 3000 m cross country race time in seconds

	7-8 years old			9-10 years old			11-12 year old		
Rank	Boys	Girls		Boys	Girls		Boys	Girls	
1	691.8	728.4	Difference	607.7	659.8	Difference	608.1	632.6	Difference
2	722.5	739.0	#1 boy vs #	619.6	674.0	#1 boy vs #	608.7	639.8	#1 boy vs #
3	740.5	783.0	1 girl	620.1	674.7	1 girl	611.3	664.1	1 girl
4	759.3	783.5	5.0%	643.2	683.7	7.9%	618.6	664.4	3.9%
5	759.6	792.8		646.8	685.0		619.7	671.6	
6	760.0	824.1		648.0	686.4		631.2	672.1	
7	772.0	825.7	Average	648.8	687.0	Average	631.7	672.3	Average
8	773.0	832.3	difference	658.0	691.0	difference	634.9	678.4	difference
9	780.7	834.3	boys vs girls	659.5	692.2	boys vs girls	635.0	679.3	boys vs girls
10	735.1	844.4	6.2%	663.9	663.3	5.6%	635.1	679.4	6.3%

2021 National 100 m Track race time in seconds

	7-8 years old			9-10 years old			11-12 year old		
Rank	Boys	Girls		Boys	Girls		Boys	Girls	
1	13.06	14.24	Difference	10.87	12.10	Difference	11.37	12.08	Difference
2	13.54	14.41	#1 boy vs #	10.91	12.24	#1 boy vs #	11.61	12.43	#1 boy vs #
3	13.73	14.44	1 girl	11.09	12.63	1 girl	11.73	12.51	1 girl
4	14.10	14.48	8.3%	11.25	12.70	10.2%	11.84	12.55	5.9%
5	14.19	14.49		11.27	12.75		11.89	12.57	
6	14.31	14.58		11.33	12.80		11.91	12.62	
7	14.34	14.69	Average	11.42	12.83	Average	11.94	12.65	Average
8	14.35	14.72	difference	11.43	12.84	difference	11.97	12.71	difference
9	14.41	14.77	boys vs girls	11.44	12.88	boys vs girls	12.08	12.71	boys vs girls
10	14.43	14.86	3.6%	11.51	12.91	11.1%	12.12	12.75	5.7%

2021 National 200 m Track race time in seconds

	7-8 years old			9-10 years old			11-12 year old		
Rank	Boys	Girls		Boys	Girls		Boys	Girls	
1	24.02	28.72	Difference	21.77	25.36	Difference	20.66	25.03	Difference
2	24.03	28.87	#1 boy vs #	22.25	25.50	#1 boy vs #	22.91	25.18	#1 boy vs #
3	28.07	29.92	1 girl	22.48	25.55	1 girl	23.14	25.22	1 girl
4	28.44	29.95	16.4%	22.57	25.70	14.2%	23.69	25.49	17.5%
5	28.97	30.04		22.65	26.08		23.84	25.78	
6	29.26	30.09		22.77	26.22		24.23	25.89	
7	29.34	30.27	Average	23.11	26.79	Average	24.35	26.03	Average
8	29.38	30.34	difference	23.16	26.84	difference	24.58	26.07	difference
9	29.65	30.41	boys vs girls	23.28	26.91	boys vs girls	24.59	26.10	boys vs girls
10	29.78	30.54	6.1%	23.47	26.85	13.1%	24.61	26.13	7.9%

2021 National 400 m Track race time in seconds

	7-8 years old			9-10 years old			11-12 year old		
Rank	Boys	Girls		Boys	Girls		Boys	Girls	
1	66.30	67.12	Difference	49.29	56.80	Difference	51.96	55.70	Difference
2	66.88	67.67	#1 boy vs #	50.47	58.57	#1 boy vs #	55.52	57.08	#1 boy vs #
3	67.59	67.74	1 girl	52.28	60.65	1 girl	55.58	57.60	1 girl
4	68.16	68.26	1.2%	52.44	61.45	13.2%	55.59	57.79	6.7%
5	68.51	68.37		53.31	61.81		55.72	58.02	
6	69.13	71.02		53.65	62.03		55.84	58.25	
7	69.75	72.73	Average	53.78	62.32	Average	55.92	59.25	Average
8	69.80	73.25	difference	54.51	62.33	difference	57.12	59.27	difference
9	69.81	73.31	boys vs girls	55.84	62.34	boys vs girls	57.18	59.40	boys vs girls
10	70.32	73.48	2.4%	55.90	62.40	13.0%	57.22	59.49	4.2%

2021 National 800 m Track race time in seconds

	7-8 years old			9-10 years old			11-12 year old		
Rank	Boys	Girls		Boys	Girls		Boys	Girls	
1	152.2	157.9	Difference	120.8	141.4	Difference	127.8	138.5	Difference
2	155.2	164.6	#1 boy vs #	124.0	142.2	#1 boy vs #	129.7	143.1	#1 boy vs #
3	161.0	164.9	1 girl	125.1	148.8	1 girl	130.5	144.2	1 girl
4	161.1	165.9	3.6%	125.6	151.3	14.5%	133.2	144.2	7.7%
5	161.2	168.5		126.5	151.6		136.2	144.9	
6	161.6	169.9		136.5	152.5		136.5	145.0	
7	161.8	171.5	Average	137.1	153.1	Average	136.7	145.2	Average
8	162.2	173.1	difference	138.5	153.7	difference	136.7	145.6	difference
9	165.3	173.4	boys vs girls	139.5	153.8	boys vs girls	137.0	145.6	boys vs girls
10	166.9	174.7	4.5%	140.2	154.2	12.6%	137.9	145.8	6.9%

2021 National 1600 m Track race time in seconds

	7-8 years old			9-10 years old			11-12 year old		
Rank	Boys	Girls		Boys	Girls		Boys	Girls	
1	372.4	397.6	Difference	307.4	319.3	Difference	297.3	313.8	Difference
2	378.3	400.9	#1 boy vs #	313.7	322.2	#1 boy vs #	298.4	317.1	#1 boy vs #
3	378.4	405.6	1 girl	315.0	322.6	1 girl	307.0	319.9	1 girl
4	402.0	435.2	6.3%	318.2	337.5	3.7%	313.9	323.3	5.2%
5	406.4	445.0		318.4	345.2		319.2	325.3	
6	413.4	457.0		320.5	345.7		320.4	326.2	
7	457.4	466.0	Average	327.0	345.9	Average	321.1	327.0	Average
8	473.3	466.8	difference	330.3	347.1	difference	321.9	330.0	difference
9	498.3	492.3	boys vs girls	333.4	347.5	boys vs girls	325.5	331.1	boys vs girls
10	505.0	495.0	4.0%	347.0	355.6	4.7%	327.1	332.5	2.9%

2021 National 3000 m Track race time in seconds

	7-8 years old			9-10 years old			11-12 year old		
Rank	Boys	Girls		Boys	Girls		Boys	Girls	
1	794.2	859.9	Difference	602.3	679.2	Difference	556.6	623.7	Difference
2	856.3		#1 boy vs #	644.9	709.7	#1 boy vs #	591.6	649.5	#1 boy vs #
3			1 girl	646.6	714.2	1 girl	600.8	651.6	1 girl
4			7.6%	648.2	741.9	11.3%	607.1	654.9	10.8%
5	No further data	No Further Data		648.4	742.7		609.1	662.9	
6				652.8	756.6		611.5	664.1	
7			Average	658.9	760.2	Average	615.7	666.3	Average
8			difference	660.1	762.5	difference	617.3	666.8	difference
9			boys vs girls	662.7	780.2	boys vs girls	618.4	673.2	boys vs girls
10			NA%	671.6	792.3	12.7%	620.6	674.4	8.2%

2021 National Long Jump Distance (in inches)

	7-8 years old			9-10 years old			11-12 year old		
Rank	Boys	Girls		Boys	Girls		Boys	Girls	
1	156.0	176.0	Difference	256.8	213.8	Difference	224.0	201.3	Difference
2	156.0	163.8	#1 boy vs #	247.0	212.0	#1 boy vs #	222.5	197.3	#1 boy vs #
3	155.0	153.0	1 girl	241.0	210.8	1 girl	220.5	195.8	1 girl
4	154.3	152.0	-11.4%	236.3	208.8	20.1%	210.3	193.5	11.3%
5	154.0	149.5		231.5	207.0		210.0	193.3	
6	152.8	146.0		225.0	204.8		206.8	192.5	
7	151.5	144.5	Average	224.0	194.5	Average	206.0	192.3	Average
8	150.8	137.5	difference	224.0	192.5	difference	205.5	192.0	difference
9	150.5	137.0	boys vs girls	221.8	192.3	boys vs girls	205.0	191.3	boys vs girls
10		No	1.4%			13.2%			9.1%
		Further							
	150.5	Data		219.0	187.5		204.5	189.0	

2021 National High Jump Distance (in inches)

	7-8 years old			9-10 years old			11-12 year old		
Rank	Boys	Girls		Boys	Girls		Boys	Girls	
1	38.0	37.5	Difference	72.0	58.0	Difference	63.0	56.0	Difference
2	38.0	34.0	#1 boy vs #	70.0	58.0	#1 boy vs #	61.0	56.0	#1 boy vs #
3	36.0	32.0	1 girl	65.8	57.0	1 girl	60.0	57.0	1 girl
4	36.0	32.0	1.3	62.0	56.0	24.1%	59.0	56.0	12.5%
5	35.8	32.0		62.0	56.0		59.0	56.0	
6	35.5			62.0	55.0		59.0	55.0	
7	34.0		Average	61.0	54.0	Average	59.0	54.0	Average
8	32.0	No	difference	60.0	54.0	difference	58.0	54.0	difference
9	59.0	further	boys vs girls	59.0	No	boys vs girls	57.8	56.0	boys vs girls
10		Data	21.6%		Further	12.5%			6.9%
	56.0			56.0	Data		57.8	56.0	

Appendix 2 – Scholarly Publications

Refereed Publications

1. Shaw BS. Breukelman G, Millard L, Moran J, Brown G, & Shaw I. Effects of a maximal cycling all-out anaerobic test on visual performance. Clin Exp Optom. https://doi.org/10.1080/08164622.2022.2153583, 2022
2. Brown GA, Shaw BS, Shaw I. How much water is in a mouthful, and how many mouthfuls should I drink? A laboratory exercise to help students understand developing a hydration plan. Adv Physiol Educ 45: 589–593, 2021.
3. Schneider KM and Brown GA (as Faculty Mentor). What's at Stake: Is it a Vampire or a Virus? International Journal of Undergraduate Research and Creative Activities. 11, Article 4. 2019.
4. Christner C and Brown GA (as Faculty Mentor). Explaining the Vampire Legend through Disease. UNK Undergraduate Research Journal. 23(1), 2019. (*This is an on-campus publication.)
5. Schneekloth B and Brown GA. Comparison of Physical Activity during Zumba with a Human or Video Game Instructor. 11(4):1019-1030. International Journal of Exercise Science, 2018.
6. Bice MR, Hollman A, Bickford S, Bickford N, Ball JW, Wiedenman EM, Brown GA, Dinkel D, and Adkins M. Kinesiology in 360 Degrees. International Journal of Kinesiology in Higher Education, 1: 9-17, 2017
7. Shaw I, Shaw BS, Brown GA, and Shariat A. Review of the Role of Resistance Training and Musculoskeletal Injury Prevention and Rehabilitation. Gavin Journal of Orthopedic Research and Therapy. 1: 5-9, 2016
8. Kahle A, Brown GA, Shaw I, & Shaw BS. Mechanical and Physiological Analysis of Minimalist versus Traditionally Shod Running. J Sports Med Phys Fitness. 56(9):974-9, 2016
9. Bice MR, Carey J, Brown GA, Adkins M, and Ball JW. The Use of Mobile Applications to Enhance Learning of the Skeletal System in Introductory Anatomy &

Physiology Students. Int J Kines Higher Educ 27(1) 16-22, 2016

10. Shaw BS, Shaw I, & Brown GA. Resistance Exercise is Medicine. Int J Ther Rehab. 22: 233-237, 2015.
11. Brown GA, Bice MR, Shaw BS, & Shaw I. Online Quizzes Promote Inconsistent Improvements on In-Class Test Performance in Introductory Anatomy & Physiology. Adv. Physiol. Educ. 39: 63-6, 2015
12. Brown GA, Heiserman K, Shaw BS, & Shaw I. Rectus abdominis and rectus femoris muscle activity while performing conventional unweighted and weighted seated abdominal trunk curls. Medicina dello Sport. 68: 9-18. 2015
13. Botha DM, Shaw BS, Shaw I & Brown GA. Role of hyperbaric oxygen therapy in the promotion of cardiopulmonary health and rehabilitation. African Journal for Physical, Health Education, Recreation and Dance (AJPHERD). Supplement 2 (September), 20: 62-73, 2014
14. Abbey BA, Heelan KA, Brown, GA, & Bartee RT. Validity of HydraTrend™ Reagent Strips for the Assessment of Hydration Status. J Strength Cond Res. 28: 2634-9. 2014
15. Scheer KC, Siebrandt SM, Brown GA, Shaw BS, & Shaw I. Wii, Kinect, & Move. Heart Rate, Oxygen Consumption, Energy Expenditure, and Ventilation due to Different Physically Active Video Game Systems in College Students. International Journal of Exercise Science: 7: 22-32, 2014
16. Shaw BS, Shaw I, & Brown GA. Effect of concurrent aerobic and resistive breathing training on respiratory muscle length and spirometry in asthmatics. African Journal for Physical, Health Education, Recreation and Dance (AJPHERD). Supplement 1 (November), 170-183, 2013
17. Adkins M, Brown GA, Heelan K, Ansorge C, Shaw BS & Shaw I. Can dance exergaming contribute to improving physical activity levels in elementary school children? African Journal for Physical, Health Education, Recreation and Dance (AJPHERD). 19: 576-585, 2013
18. Jarvi MB, Brown GA, Shaw BS & Shaw I. Measurements of Heart Rate and

Accelerometry to Determine the Physical Activity Level in Boys Playing Paintball. International Journal of Exercise Science: 6: 199-207, 2013

19. Brown GA, Krueger RD, Cook CM, Heelan KA, Shaw BS & Shaw I. A prediction equation for the estimation of cardiorespiratory fitness using an elliptical motion trainer. West Indian Medical Journal. 61: 114-117, 2013.
20. Shaw BS, Shaw I, & Brown GA. Body composition variation following diaphragmatic breathing. African Journal for Physical, Health Education, Recreation and Dance (AJPHERD). 18: 787-794, 2012.

Refereed Presentations

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2. Steinman PC, Steinman PM, Brown GA. Female Athlete Triad Knowledge Among Sports Medicine Rehabilitation Clinicians In Nebraska. Accepted for presentation at the 70th Annual Meeting of the American College of Sports Medicine. Denver CO. May 30 – June 2, 2023.
3. Brown GA, Brown CJ, Shaw I, Shaw B. Boys And Girls Differ In Running And Jumping Track And Field Event Performance Before Puberty. Accepted for presentation at the 70th Annual Meeting of the American College of Sports Medicine. Denver CO. May 30 – June 2, 2023.
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5. Shaw BS, Lloyd R, Da Silva M, Coetzee D, Millard L, Breukelman G, Brown GA, Shaw I. Analysis Of Physiological Determinants During A Single Bout Of German Volume Training. 54(5), 886. 69th Annual Meeting of the American College of

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6. Shaw I, Turner S, Brown GA, Shaw BS. Effects Of Resistance Exercise Modalities On Chest Expansion, Spirometry And Cardiorespiratory Fitness In Untrained Smokers. Med Sci Sport Exerc. 54(5), 889. 69th Annual Meeting of the American College of Sports Medicine. San Diego, CA. May 31 - June 4, 2022.
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1. Shaw BS, Shaw I, Brown G.A. Importance of resistance training in the management of cardiovascular disease risk. In Cardiovascular Risk Factors. IntechOpen, 2021.
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1. Brown GA and Lundberg TL. Should Transwomen be allowed to Compete in Women's Sports? A view from an Exercise Physiologist Center on Sport Policy and Conduct (accepted on April 18, 2023) https://www.sportpolicycenter.com/news/2023/4/17/should-transwomen-be-allowed-to-compete-in-womens-sports
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group of the American Physiological Society. (May 16, 2022) https://blog.lifescitrc.org/pecop/2022/05/16/the-olympics-sex-and-gender-in-the-physiology-classroom-2/

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4. Brown GA. The Olympics, sex, and gender in the physiology classroom. Physiology Educators Community of Practice, managed by the Education group of the American Physiological Society (August 18, 2021) https://blog.lifescitrc.org/pecop/2021/08/18/the-olympics-sex-and-gender-in-the-physiology-classroom/

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UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF ARIZONA
TUCSON DIVISION

Jane Doe, by her next friend and parents Helen Doe and James Doe, and Megan Roe, by her next friend and parents, Kate Roe and Robert Roe,

Plaintiffs,

v.

Thomas C. Horne in his official capacity as State Superintendent of Public Instruction; Laura Toenjes, in her official capacity as Superintendent of the Kyrene School District; Kyrene School District; The Gregory School; and Arizona Interscholastic Association Inc.,

Defendants.

Case No. 4:23-cv-00185-JGZ

SECOND DECLARATION OF HELEN DOE IN SUPPORT OF JANE DOE'S MOTION FOR A PRELIMINARY INJUNCTION

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**Admitted pro hac vice.*

I, Helen Doe, declare as follows:

1. I make this declaration of my own personal knowledge, and, if called as a witness, I could and would testify competently to the matters stated here.

2. I am the mother of Jane Doe, one of the plaintiffs in this case. My husband, James Doe, is Jane's father.

3. Jane's first day of school at Kyrene Aprende Middle School is July 19, 2023.

4. As I previously stated, Jane wishes to participate and compete on the girls' cross-country, soccer, and basketball teams this year at her school. Of these sports, the cross-country team starts the earliest in the school year.

5. The dates for registering, practicing, and competing on Jane's school's cross-country team were only recently finalized on or around June 8 or 9, 2023.

6. Registration for cross-country opens online on July 1, 2023. Jane must register before she can practice and compete in cross-country. Registration is handled through an online system and involves the submission of registration forms and supporting documents, such as a physical report signed by a doctor and an initialed sportsmanship agreement. Typically, a student's registration takes at least 2-3 days to process after it is submitted.

7. The first practice for cross-country is on July 31, 2023. The first cross-country competitive meet will occur the week of August 14, 2023.

This declaration was executed this 10th day of June, 2023, in Maricopa County, Arizona.

Pursuant to 28 U.S.C. § 1746, I declare under penalty of perjury that the foregoing is true and correct.

By: _____

Helen Doe

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UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF ARIZONA
TUCSON DIVISION

Jane Doe, by her next friend and parents Helen Doe and James Doe; and Megan Roe, by her next friend and parents, Kate Roe and Robert Roe,

Plaintiffs,

v.

Thomas C. Horne in his official capacity as State Superintendent of Public Instruction; Laura Toenjes, in her official capacity as Superintendent of the Kyrene School District; Kyrene School District; The Gregory School; and Arizona Interscholastic Association Inc.,

Defendants.

Case No. 4:23-cv-00185-JGZ

REBUTTAL DECLARATION OF DANIEL SHUMER, M.D., IN FURTHER SUPPORT OF MOTION FOR PRELIMINARY INJUNCTION

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**Admitted pro hac vice.*

I, Daniel Shumer, declare as follows:

1. I submit this expert declaration based on my personal knowledge.

2. If called to testify, I would testify truthfully based on my expert opinion.

3. In preparing this declaration, I reviewed the expert declarations submitted by Dr. Gregory A. Brown, Ph.D., Dr. James M. Cantor, Ph.D., and Dr. Chad Thomas Carlson, M.D., in support of Proposed Intervenors' Opposition to Plaintiffs' Motion for Preliminary Injunction, as well as the expert declaration of Dr. Gregory A. Brown, Ph.D. in *Hecox v. Little*, 1:20-cv-00184 (D. Id. 2020), which is attached to Defendant Horne's Opposition to Plaintiffs' Motion for Preliminary Injunction. As with my prior expert declaration, I relied on my scientific education and training, my research experience, and my knowledge of the scientific literature in the pertinent fields. The materials I have relied on in preparing this declaration are the same types of materials that experts in my field of study regularly rely on when forming opinions on these subjects. I may wish to supplement these opinions or the bases for them as a result of new scientific research or publications or in response to statements and issues that may arise in my area of expertise.

Dr. Brown's Declarations

I. Testosterone levels are the biological driver of performance differences in sports between males and females.

4. Although Dr. Brown asserts that biological male physiology and anatomy is the basis for the performance advantage between males and females in athletic events (Brown Decl. at 5; Brown *Hecox* Decl. ¶ 11c),[1] the studies and findings discussed throughout Dr. Brown's declaration support the scientific consensus that the biological cause of average group differences in athletic performance between males and females is the rise in circulating levels of testosterone beginning in endogenous male puberty.

[1] The "Brown Declaration" refers to the declaration the Proposed Intervenors submitted in this case. (ECF No. 38-3.) The "Brown *Hecox* Declaration" refers to the declaration Defendant Horne submitted in this case. (ECF No. 40-1.)

5. Dr. Brown misrepresents the findings in several of the articles he cites to support his assertion that sex-based differences in sports are a result of male physiology and anatomy, without regard to the impact of the heightened level of testosterone associated with male puberty. Contrary to what Dr. Brown says, McManus and Armstrong (2011) acknowledge that differences between prepubertal boys and girls in various measurements are minimal or nonexistent. *See* Alison McManus & Neil Armstrong, *Physiology of elite young female* athletes, 56 Medicine & Science Sports & Exercise 23, 24 (2011) ("Prior to 11 years of age differences in average speed are minimal"); *id.* at 27 ("[S]mall sex difference in fat mass and percent body fat are evident from mid-childhood"); *id.* at 29 ("[B]one characteristics differ little between boys and girls prior to puberty"); *id.* at 32 ("There is little evidence that prior to puberty pulmonary structure or function limits oxygen uptake"); *id.* at 34 ("[N]o sex differences in arterial compliance have been noted in pre- and early- pubertal children").

6. Dr. Brown also misleadingly cites Staiano and Katzmarzyk (2012) for the proposition that 22 peer reviewed publications conclude that girls have more total body fat than boys throughout childhood and adolescence. (Brown Decl. ¶ 79.) Dr. Brown gives the false impression that all 22 of the peer-reviewed publications demonstrated differences on total body fat. Instead, Staiano and Katzmarzyk expressly note that "not all studies demonstrate sex differences in T[otal]B[ody]F[at] before puberty." AE Staiano & PT Katzmarzyk, *Ethnic and sex differences in body fat and visceral and subcutaneous adiposity in children and adolescents*, 36 Int. J. Obesity 1261, 1265 (2012). Nor do any of these studies connect these differences to athletic performance.

7. Dr. Brown further misrepresents Handelsman (2018)'s findings, notably omitting key portions from the study he cites. Dr. Brown writes, "[t]here is convincing evidence that the sex differences in muscle mass and strength are sufficient to account for the increased strength and aerobic performance of men compared with women and is in keeping with the differences in world records between the sexes." (Brown Decl. ¶ 59; Brown *Hecox* Decl. ¶ 88.) But Dr. Brown omits the following sentence from

Handelsman which explains that "[t]he basis for the sex difference in muscle mass and strength *is the sex difference in circulating testosterone*." David Handelsman, et al. *Circulating Testosterone as the Hormonal Basis of Sex Differences in Athletic Performance*, 39 Endocrine Revs. 803, 816 (2018) (emphasis added).

8. Handelsman (2018), which Dr. Brown cites throughout his declaration, supports the scientific consensus that the biological cause of average differences in athletic performance between men and women is the rise in circulating levels of testosterone beginning in endogenous male puberty. (*See* Brown Decl. ¶¶ 127–30; Brown *Hecox* Decl. ¶¶ 20a, 25–28, 77–85.) As Handelsman states, "evidence makes it highly likely that the sex difference in circulating testosterone of adults explains most, if not all, of the sex differences in sporting performance." *See* Handelsman (2018) at 823 (summarizing evidence rejecting the hypothesis that physiological characteristics are driven by the Y chromosome).

II. There is no evidence that prepubertal boys have a biological athletic advantage over prepubertal girls.

9. Contrary to Dr. Brown's Declarations, there is a well-established scientific consensus that, before puberty, there are no significant differences in athletic performance between boys and girls. *See, e.g.*, Marnee McKay & Joshua Burns, *When it Comes to Sport, Boys "Play Like a Girl,"* The Conversation (Aug. 3, 2017), https://theconversation.com/when-it-comes-to-sport-boys-play-like-a-girl-80328 (discussing results of research published in American Academy of Neurology Journal).

10. While some studies have found small differences between the performance of boys and girls with respect to some discrete activities, these studies did not control for other factors, particularly age, location, or socioeconomic factors. *Id.*

11. When research has controlled for those factors by using representative data, researchers have found that "[a]cross all measures of physical performance, there was one consistent finding. There was no statistical difference in the capabilities of girls and boys until high-school age (commonly age 12)." *Id.* These tests included long jump,

muscle strength, walking, jumping, and balancing. *Id*.

12. This finding has been replicated in many other studies, and there is a clear scientific consensus that athletic ability does not diverge significantly until puberty. *See, e.g.*, David Handelsman, *Sex Differences in Athletic Performance Emerge Coinciding with the Onset of Male Puberty*, 87 Clinical Endocrinology 68, 70–71 (2017) ("The gender divergence in athletic performance begins at the age of 12–13 years"); Jonathon W. Senefeld et al., *Sex Differences in Youth Elite Swimming*, 14 PLOS ONE 1, 1–2 (2019) (studying child and youth swimmers and concluding that the data suggests "girls are faster, or at least not slower, than boys prior to the performance-enhancing effects of puberty").

13. In support of his contention that boys have at least some biological advantages in athletic performance over girls before puberty, Dr. Brown relies primarily on demographic data from physical fitness tests or athletics in which there is a small difference in performance between prepubertal non-transgender boys and prepubertal non-transgender girls.[2] This data merely observes phenomena across a population sample in isolated areas and does not determine a cause for whatever is observed. There is no reliable basis for Dr. Brown to attribute those small differences to physiology or anatomy instead of other factors, such as greater societal encouragement of athleticism in boys, greater opportunities for boys to play sports, or different preferences of the boys and girls surveyed (Handelsman 2017).

III. Transgender girls who receive puberty suppressing medication at the onset of puberty have no athletic advantage over other girls.

14. Dr. Brown incorrectly asserts that the administration of puberty suppressing medication (also sometimes referred to as puberty blocking medication) and hormone

[2] Two of the studies cited by Dr. Brown are also cited in paragraph 6 of the legislative findings of Arizona's statute. *See* S.B. 1165, 55th Leg., 2d Reg. Sess. (Ariz. 2022), § 6.

replacement therapy to transgender girls does not eliminate the athletic advantage that men and adolescent boys have over women and adolescent girls.

15. Puberty suppressing medication (gonadotropin-releasing hormone agonists, or GnRHa) may be prescribed to transgender girls at the onset of puberty, well before any observable increase in testosterone or muscle mass.

16. Because such girls do not undergo male puberty, they do not gain the increased muscle mass or strength that accounts for why post-pubertal boys as a group have an advantage over post-pubertal girls as a group.

17. For that reason, studies on transgender women who have undergone testosterone suppression as adults are almost meaningless when assessing the athletic abilities of transgender girls who have received pubertal suppression beginning at the onset of puberty. The women in those studies did not transition until well after puberty and experienced exposure to testosterone over an extended time, allowing their muscles to keep developing. In sharp contrast, transgender girls who receive GnRHa do not go through male puberty and are not exposed to the heightened level of testosterone associated with male puberty.

18. Even so, those studies of adult transgender women show that testosterone suppression resulted in significant mitigation of muscle mass and development in adult transgender women.

19. For example, the only study directly examining the effects of hormone therapy on the athletic performance of transgender female athletes is a small study of eight long-distance runners. The study showed that after undergoing medical interventions, which included lowering their testosterone levels, the athletes' performance had reduced so that relative to non-transgender women their performance was now proportionally the same as it had been relative to non-transgender men prior to any medical treatment. In other words, a transgender woman who performed at about 80% as well as the best performer among men of that age before transition would also perform at about 80% as well as the best performer among women of that age after

transition. *See* Joanna Harper, *Race Times for Transgender Athletes*, 6 J. Sporting Cultures & Identities 1 (2015).[3] Given that adolescent transgender girls who receive puberty suppressing medication do not go through male puberty, there is no medical basis to expect that transgender girls receiving such medications would have an athletic advantage.

20. Dr. Brown states that although he is not aware of any research directly addressing the implications of the use of pubertal suppression on athletic capability, "[i]t seems likely that males who have undergone puberty suppression will have physiological and performance advantages over females somewhere between those possessed by pre-pubertal boys, and those who have gone through full male puberty, with the degree of advantage in individual cases depending on that individual's development and timing of the start of puberty blockade." (Brown Decl. ¶ 116.) Dr. Brown admits that his speculation about puberty blockers is outside his area of expertise. (Brown Decl. ¶ 116). In fact, Dr. Brown's mere speculation has no basis in scientific evidence and seems to rest on a misunderstanding about the use of puberty suppressing medication to treat gender dysphoria.

21. Tanner staging (also called Sexual Maturity Rating) is used to document and track the development and sequence of secondary sex characteristics of children during puberty. Under current standards of care, transgender adolescents are eligible to receive puberty blockers when they reach Tanner Stage 2, at the first onset of puberty, and long before the development of increased muscle mass and strength associated with

[3] The legislative findings of the Arizona statute incorrectly state that for transgender women who go through male puberty (unlike the plaintiffs here), the benefit conferred by testosterone "is not diminished through the use of testosterone suppression." *See* S.B. 1165, 55th Leg., 2d Reg. Sess. (Ariz. 2022), § 13. While that statement conflicts with available evidence, which shows that hormone therapy significantly reduces muscle mass and strength, it is also irrelevant to the situation of the plaintiffs in this case who have not undergone male puberty and thus are not in the position of having to mitigate the increased muscle mass and strength caused by male puberty. Notably, the legislative findings do not state that transgender girls who receive puberty suppressing medication have any conceivable athletic advantage, nor do they cite any evidence that would support that claim.

later stages of male puberty. *See* Wylie C. Hembree et al., *Endocrine Treatment of Gender-Dysphoric/Gender-Incongruent Persons: An Endocrine Society Clinical Practice Guideline*, 102 J. Clinical Endocrinology & Metabolism 3869–3903 (2017).

22. Following the administration of puberty blockers, transgender girls will also receive hormone replacement therapy to allow them to go through puberty consistent with their female gender identity. As a result, these transgender girls will develop many of the same physiological and anatomical characteristics of non-transgender girls, including bone size (Brown Decl. ¶¶ 49-51), skeletal structure (*id*. at ¶ 49), and "distinctive aspects of the female pelvis geometry [that] cut against athletic performance" (*id.* at ¶ 54). Thus, a transgender girl who received puberty suppressing medication followed by hormone replacement therapy does not have the same physiology as a prepubertal non-transgender boy.

23. None of the studies Dr. Brown cites support his hypothesis that transgender girls who receive puberty suppressing medication and hormone therapy have an athletic advantage over other girls. For example, the primary finding of the Klaver (2018) study is that receiving GnRHa and hormone therapy brings the body composition of young transgender women much closer to their non-transgender female peers than their non-transgender male peers. (Brown Decl. ¶ 118.) Those results are more pronounced the earlier a transgender girl starts GnRHa treatment.

24. Dr. Brown also cites to Tack et al. (2018) for the proposition that transgender girls who receive medical treatments around 16 years of age purportedly maintain higher muscle mass, lower percent body fat, higher body mass, higher body height, and higher grip strength than comparable girls of the same age. (Brown Decl. ¶ 117.) However, the medication administered in this study is not used in the United States and does not have nearly the same impact as puberty blockers and hormone therapy for transgender girls. The medications administered to the study participants did not fully block puberty for the participants. Yet, even with this less effective medication, the study found that transgender girls "showed a significant increase in fat mass and decrease in

lean mass, resulting in an increased body fat percentage" and did not experience any increase in grip strength. Lloyd Tack et al., *Proandrogenic and Antiandrogenic Progestins in Transgender Youth: Differential Effects on Body Composition and Bone Metabolism*, J. Clinical Endocrinology & Metabolism 2147, 2153–54 (2018). If anything, this study shows that even with a less effective medication, the physiological impact of medically treating transgender girls in adolescence, rather than when they are adults, is profound.

25. The World Rugby Transgender Women's Guidelines 2020, which Brown cites throughout his declaration, allow transgender girls and women to participate in women's rugby if they did not experience endogenous puberty, stating: "Transgender women who transitioned pre-puberty and have not experienced the biological effects of testosterone during puberty and adolescence can play women's rugby."

26. In sum, there is no evidence that transgender girls on puberty suppression medication or hormone therapy have an athletic advantage over other girls. There are no studies that have documented any such advantage, and there is no medical reason to posit that any such advantage would exist.

27. In my clinical practice, I have provided medical care to more than 300 adolescent transgender girls. None of the transgender girls I have treated with the above medical interventions appeared to have any athletic advantage over other girls.

IV. There is no evidence linking in-utero development or minipuberty to athletic performance and no credible medical reason to posit any such connection.

28. There is no scientific basis for the claim that boys gain an athletic advantage over girls based on exposure to testosterone in utero or during minipuberty.

29. In a male fetus, testosterone production peaks around 11–14 weeks of gestation (in the first trimester of pregnancy), then declines until it is completely suppressed at birth. Testosterone is necessary during this time for normal development of the genitals. *See, e.g.*, Marianne Becker & Volker Hesse, *Minipuberty: Why Does it Happen?*, 93 Hormone Research Paediatrics 76 (2020). Male babies also experience an

elevation of testosterone after birth, with levels peaking between one to two months old, and returning to prepubertal levels before six months of age. As with the in-utero elevation of testosterone, a rise in testosterone during minipuberty correlates positively with growth of the male genitals. *Id.* at 78–79.

30. Minipuberty does not result in clinically visible physical changes, other than a possible transient increase in testicular volume.

31. No research has linked this brief exposure to elevated testosterone during minipuberty to any lasting physiological impact, much less to an increase in athletic ability. Nor is there any credible medical basis even to hypothesize such an impact.

Dr. Carlson's Declaration

32. Dr. Carlson asserts that permitting transgender girls to play on girls' teams jeopardizes the safety of other girls, but none of the evidence he cites has any relevance to transgender girls—like the plaintiffs in this case—who are either prepubertal or have received puberty blocking medication at the onset of puberty and therefore have not undergone male puberty.

33. For example, Dr. Carlson states "it is [his] opinion that World Rugby's assessment of the evidence is scientifically sound." (Carlson Decl. at 2.) But as noted above, the World Rugby Transgender Women's Guidelines 2020 allow transgender girls and women to participate in women's rugby if they did not experience endogenous puberty, stating: "Transgender women who transitioned pre-puberty and have not experienced the biological effects of testosterone during puberty and adolescence can play women's rugby."

34. Dr. Carlson also cites the UK Sports Councils' Equality Group guidance for transgender inclusion in organized sports, which is not a scientific report and did not consider the situation of transgender girls who receive puberty suppression at the onset of puberty. (Carlson Decl. at 2.) Notably, however, the guidance stated that "[c]urrent scientific evidence indicates that the difference between the strength, stamina, and physique between the sexes is largely due to the higher testosterone levels of males

during their lifetime"—a consideration that has no relevance to transgender girls who do not undergo male puberty. United Kingdom Sports Councils, *Guidance for transgender inclusion in domestic sport* (2021), https://equalityinsport.org/docs/300921/Guidance for Transgender Inclusion in Domestic Sport 2021 - Summary of Background Documents.pdf (last accessed May 29, 2023).

35. Throughout his declaration, Dr. Carlson bases his opinion that transgender girls pose a safety risk to other girls on the fact that "[m]ales exhibit large average advantages in size, weight, and physical capacity over females—often falling far outside female ranges." (Carlson Decl. ¶ 11c.) But that fact has no relevance to transgender girls who receive puberty suppressing medications at the onset of puberty and thus do not develop the size, weight, and physical capacity of individuals who go through male puberty.

36. In particular, transgender girls who receive puberty suppressing medication at the onset of puberty do not differ from other girls with respect to the factors that Dr. Carlson discusses at paragraphs 42 to 56 of his declaration. They do not have greater bone density or connective tissue strength. They do not have greater speed, strength, weight, or power. And they do not have greater throwing or kicking speed.

37. Dr. Carlson notes that girls are more prone to concussions than boys (Carlson Decl. ¶¶ 58–65) and cites research indicating this may be because, on average, adolescent girls have weaker neck muscles than post-pubertal adolescent boys. (Carlson Decl. ¶ 66.) If that accounts for girls' higher rates of concussions, transgender girls on puberty suppression would be at the same or similar risk for such injury as non-transgender girls. There is no evidence, and no medical reason to believe, that their participation on girls' teams would pose any increased threat of such injuries to other girls.

38. Dr. Carlson similarly claims that permitting transgender girls to play on girls' teams increases the risk of ACL injuries because "[w]hen males are permitted to enter into the pool of female athletes based on gender identity rather than biological sex,

there is an increased possibility that a statistical outlier in terms of size, weight, speed, and strength—and potentially an extreme outlier—is now entering the female pool. Although injury is not guaranteed, risks to female participants will increase." (Carlson Decl. ¶ 78.) That rationale for exclusion has no relevance to transgender girls who receive puberty suppressing medications at the onset of puberty and who therefore do not have any advantage over other girls with respect to size, weight, speed, or strength.

39. Dr. Carlson spends a large part of his declaration disputing whether testosterone suppression and hormone therapy can mitigate athletic advantage for transgender women who transition as adults and who have therefore undergone male puberty. (Carlson Decl. ¶¶ 79–96.) I disagree with his analysis of the evidence on this issue; however, it is irrelevant to this case, which concerns transgender girls who have not yet undergone male puberty or have received puberty suppressing medication at the onset of puberty. Dr. Carlson does not cite to any evidence, nor does any exist, that such girls have an athletic advantage over other girls.

40. Dr. Carlson states in passing that there are differences in athletic ability between prepubertal boys and girls, but he does not cite any evidence to support that opinion. For the reasons stated in paragraphs 9 through 13 above, there is no evidence to support that claim.

41. In sum, transgender girls who have not yet undergone male puberty or have received puberty suppressing medication at the onset of puberty do not present any unique safety risks to other girls. Their physical characteristics in terms of height, weight, and strength overlap with those of other girls.

Dr. Cantor's Declaration

42. As discussed above, this case concerns a legal challenge to Arizona's law prohibiting girls who are transgender from participating on girls' sports teams. Dr. Cantor's expert declaration does not offer a single expert opinion that directly relates to Arizona's law or to the participation of transgender athletes in sports. Instead, Dr. Cantor launches a broadside attack against the prevailing model of medical care for transgender

youth that has been endorsed by the American Academy of Child and Adolescent Psychiatry, the American Academy of Pediatrics, the American Psychological Association, the American Psychiatric Association, and the American Medical Association, among many other mainstream medical organizations.

43. Many of Dr. Cantor's criticisms are largely irrelevant to the group targeted by Arizona's law, instead relating to children who no longer identify as transgender once they reach puberty and transgender boys. But Arizona's law affects only transgender girls.

44. Dr. Cantor appears to have no experience in child or adolescent psychology and no relevant experience with respect to gender dysphoria in childhood and adolescence. His academic career has focused on pedophilia and sexual paraphilias in adults.

45. In terms of substance, Dr. Cantor's declaration demonstrates a basic lack of understanding of the nature, evaluation, and treatment of gender dysphoria, the serious consequences of the condition if left untreated, and the strength of the evidence in support of medical management of gender dysphoria, including the efficacy and safety of these treatments. His opinions are not consistent with current evidence-based standards of care or the general medical consensus–they run counter to recommendations made by leading and well-respected medical bodies.

I. Medical care for transgender adolescents is safe and effective.

46. Dr. Cantor devotes much of his declaration to criticizing medical care for transgender adolescents. Dr. Cantor does not explain how any of his criticisms are relevant to the issue of whether transgender girls should be able to participate on female sports teams. In any event, his criticisms are not well-founded.

47. Studies have repeatedly documented that pubertal suppression and hormone therapy are safe and effective treatments for transgender adolescents with gender dysphoria.[4] These articles represent a small percentage of the full body of literature that

[4] *See, e.g.*, Diana M. Tordoff et al., *Mental Health Outcomes in Transgender and Nonbinary Youths Receiving Gender-Affirming Care*, 5 Jama Network Open at 1

was utilized to create evidence-based clinical practice guidelines for the treatment of gender dysphoria in children, adolescents, and adults. These treatments alleviate the increased distress and dysphoria caused by the physical changes accompanying puberty. Hormone therapy also brings a transgender person's body into greater alignment with their identity and reduces the number of surgeries a transgender person may need as an adult.[5]

48. The guidelines were published by long-standing and well-respected bodies, including the World Professional Association for Transgender Health (WPATH) and the

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(2022) (finding that receipt of medical care, including puberty blockers and gender-affirming hormones, was associated with 60% lower odds of moderate or severe depression and 73% lower odds of suicidality over a 12-month follow-up); Amy 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. Adolescent Health [ePublication ahead of print] at 1 (2021) (finding that access to hormone therapy during adolescence was associated with lower odds of recent depression and having attempted suicide in the past year); Jack L. Turban et al., *Pubertal Suppression for Transgender Youth and Risk of Suicidal Ideation*, 145 Pediatrics at 1 (2020) (finding that access to puberty blockers during adolescence is associated with a decreased lifetime incidence of suicidal ideation among adults); Christal Achille et al., *Longitudinal impact of gender-affirming endocrine intervention on the mental health and well-being of transgender youths: Preliminary results*, Int'l J. Pediatric Endocrinology at 1 (2020) (finding that endocrine intervention was associated with decreased depression and suicidal ideation and improved quality of life for transgender youth); Laura E. Kuper et al., *Body Dissatisfaction and Mental Health Outcomes of Youth on Gender-Affirming Hormone Therapy*, 145 Pediatrics at 1 (2020) (showing hormone therapy in youth is associated with reducing body dissatisfaction and modest improvements in mental health); Anna 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. Adolescent Health 699–704 (2020) (showing fewer emotional and behavioral problems after puberty suppression and similar or fewer problems compared to same-age non-transgender peers); Rosalia Costa et al., *Psychological Support, Puberty Suppression, and Psychosocial Functioning in Adolescents with Gender Dysphoria*, 12 J. Sexual Medicine at 2206 (2015) (finding increased psychological function after six months of puberty suppression); Annelou L.C. de Vries et al., *Young Adult Psychological Outcome After Puberty Suppression and Gender Reassignment*, 134 Pediatrics 696–704 (2014) (following a cohort of transgender young people in the Netherlands from puberty suppression through surgical treatment and finding that the cohort had global functioning equivalent to the Dutch population).

[5] *See* de Vries, *supra* n.4.

Endocrine Society (Coleman et al. 2022; Coleman et al. 2012; Hembree et al. 2017; Hembree et al. 2009). Other leading medical bodies such as the American Association of Pediatrics ("AAP"), the American Medical Association ("AMA"), the American Psychological Association, the American Psychiatric Association, and the American Academy of Family Physicians ("AAFP") all support the tenants of these guidelines due to the rigorous nature of their review of scientific evidence in the field (Rafferty et al. 2018 (AAP); AMA 2019; American Psychological Association 2015; Drescher et al. 2018 (American Psychiatric Association); Klein et al. 2018 (AAFP)).

49. Dr. Cantor's criticisms of the process used to develop the WPATH Standards of Care and the Endocrine Society Guidelines are unfounded. Both were created based on rigorous reviews of the best available science and expert professional consensus in transgender health. For WPATH, international professionals were selected to serve on the SOC 8 writing committee. Recommendation statements were developed based on data derived from independent systemic literature reviews. Grading of evidence was performed by an Evidence Review Team which determined the strength of evidence presented in each individual study relied upon in the document (Coleman et al. 2022). Similarly, the Endocrine Society Guidelines were developed through rigorous scientific processes that "followed the approach recommended by the Grading of Recommendations, Assessment, Development, and Evaluation group, an international group with expertise in the development and implementation of evidence-based guidelines." The Endocrine Society published its clinical practice guidelines in collaboration with the Pediatric Endocrine Society, the European Societies for Endocrinology and Pediatric Endocrinology, and WPATH, among others (Hembree et al. 2017).

50. Dr. Cantor also spends more than 10 pages of his declaration discussing the "Pyramid of Standards of Evidence" to support his claim that the evidence supporting puberty suppression and hormone therapy is not based on randomized controlled trials and is therefore not reliable. (Cantor Decl. ¶¶ 38–66.) While I agree with Dr. Cantor that

randomized control trials are an excellent study design in many contexts, such trials are not ethically permissible for treatments that are already known to provide a benefit to patients, which includes the use of GnRHa and hormone therapy to treat gender dysphoria in adolescents. For this reason, no such study of these treatments would be approved, no patients and families would participate, and no ethical researcher would undertake such a study. As is true for most other pediatric treatments, researchers in this field must rely on other types of study design. These types of studies can include longitudinal cohort studies, which examine any changes in symptoms over the course of treatment, or cross-sectional studies, which compare persons who are treated with those who are untreated.

51. Dr. Cantor also misstates the risks and benefits associated with GnRHa and hormone therapy. (Cantor Decl. ¶¶ 125–37.)

52. Dr. Cantor's concerns about bone density in patients prescribed GnRHa are well-known, generally short-lived (as he himself admits), and are specifically managed during patient care. In practice, risk of lower bone mineral density is mitigated by screening for, and treating, vitamin D deficiency when present, and by limiting the number of years of treatment based on a patient's clinical course (Rosenthal 2014). It is accurate to state that pubertal hormones (either testosterone or estrogen) contribute to bone density accrual. A person who was never exposed to any sex hormones for their entire life would be at high risk of osteoporosis. GnRHa, however, is administered only for a relatively short period of time. Once a decision is made to either administer gender-affirming hormones or to resume puberty consistent with a patient's birth-assigned sex, bone density accrual rises with exposure to those sex hormones.

53. Dr. Cantor also raises a hypothetical concern regarding the impact of puberty blockers on brain development. (Cantor Decl. ¶ 128.) While it is common for researchers and clinicians to consider any possible adverse impacts of medications, there is no evidence that puberty blockers have any adverse impact on brain development. For example, when considering children with naturally occurring delayed puberty, I find no

published evidence of negative consequences to brain development compared with children with normally timed puberty. Likewise, Dr. Cantor can point to no published evidence in support of this concern in transgender adolescents prescribed GnRHa, instead citing various articles that simply raise the issue. There are also studies related to children who are prescribed GnRHa for precocious puberty that found that "GnRHa treated girls do not differ in their cognitive functioning … from the same age peers." (Wojniusz et al. 2016). The authors of this article came to this conclusion because there was not a statistically significant difference in IQ, memory, mental rotation, cognitive executive function, processing speed, attention, or executive function in participants treated with GnRHa for precocious puberty.

54. Dr. Cantor asserts that I have not provided sources showing that gender identity "has a strong biological basis." (Cantor Decl. ¶ 145.) Scientific research and medical literature across disciplines demonstrates that gender identity, like other components of sex, has a strong biological foundation. For example, there are numerous studies detailing the similarities in the brain structures of transgender and non-transgender people with the same gender identity (Luders et al. 2009; Rametti et al. 2011; Berglund et al. 2008). In one such study, the volume of the bed nucleus of the *stria terminalis* (a collection of cells in the central brain) in transgender women was equivalent to the volume found in non-transgender women (Chung et al. 2002).

55. There are also studies highlighting the genetic components of gender identity. Twin studies are a helpful way to understand genetic influences on human diversity. Identical twins share the same DNA, while fraternal twins share roughly 50% of the same DNA; however, both types of twins share the same environment. Therefore, studies comparing differences between identical and fraternal twin pairs can help isolate the genetic contribution of human characteristics. Twin studies have shown that if an identical twin is transgender, the other twin is much more likely to be transgender compared to fraternal twins, a finding which points to genetic underpinnings to gender identity development (Heylens et al., 2012).

56. There is also ongoing research on how differences in fetal exposures to hormones may influence gender identity. This influence can be examined by studying a medical condition called congenital adrenal hyperplasia. Female fetuses affected by congenital adrenal hyperplasia produce much higher levels of testosterone compared to fetuses without the condition. While most females with congenital adrenal hyperplasia have a female gender identity in adulthood, the percentage of those with gender dysphoria is higher than that of the general population. This suggests that fetal hormone exposures contribute to the later development of gender identity (Dessens et al. 2005).

57. There has also been research examining specific genetic differences that appear associated with gender identity formation (Rosenthal 2014). For example, one study examining differences in the estrogen receptor gene among transgender women and non-transgender male controls found that the transgender individuals were more likely to have a genetic difference in this gene (Henningsson et al. 2005).

58. The above studies are representative examples of scientific research demonstrating biological influences on gender identity. Gender identity, like other complex human characteristics, is rooted in biology with important contributions from neuroanatomic, genetic, and hormonal variation (Roselli 2018).

59. Dr. Cantor discounts gender identity on the basis that there is "no means of either falsifying or verifying people's declarations of their gender identities." (Cantor Decl. ¶ 105.) He also claims "[i]n science, it is the objective factors—and only the objective factors—that matter to a valid definition." (Cantor Decl. ¶ 105.) But just because gender identity is a human characteristic ascertained through observation and conversations rather than a lab test makes it no less valid or "scientific." Gender identity is a real human characteristic, and it is rooted in biology.

60. Dr. Cantor also takes issue with my statement in my original declaration that a "person's gender identity is innate and cannot be changed by medical or psychological intervention." (Shumer Decl. at 7.) Dr. Cantor notes that a youth may be "mistaken about their gender identity" or may "misinterpret their experiences to indicate

they are transgender." (Cantor Decl. ¶ 146.) It is true that some youth go through a period of exploration and identity development before they understand their gender identity, while others consistently identify as a particular gender from an early age into adulthood. This is true for both transgender and non-transgender youth and does not show that therapy or any other intervention can change a young person's gender identity. To the contrary, substantial evidence shows that attempts to change a young person's gender identity or gender expression are both ineffective and extremely harmful.[6]

61. Dr. Cantor also appears to dispute that supportive treatments for gender dysphoria reduce suicidality in transgender adolescents. In fact, there are multiple studies demonstrating this positive impact, which is also consistent with my own clinical practice.[7]

62. Finally, Dr. Cantor claims, without citation, that I somehow violated "medical ethics" in my original declaration by asserting specific conclusions about the medical status of "people not under my care." Dr. Cantor is presumably referring to the plaintiffs in this case and to my statements about those plaintiffs at the end of my declaration. There is nothing unethical about those statements, all of which I stand behind.

II. Other countries provide medical care to transgender adolescents.

63. Dr. Cantor's declaration references documents from several other countries on the treatment of gender dysphoria, predominantly from Finland, Sweden, and the United Kingdom ("UK"), although they also mention documents from France and Norway.

64. Before addressing the substance of his claims related to these documents,

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[6] Douglas C. Haldeman (Ed.), *The Case Against Conversion "Therapy": Evidence, Ethics, and Alternatives* (2022).

[7] *See* Diana M. Tordoff et al., *Mental Health Outcomes in Transgender and Nonbinary Youths Receiving Gender-Affirming Care*, 5 JAMA Network Open (2022); Amy E. Green et al., *Association of Gender-Affirming Hormone Therapy With Depression, Thoughts of Suicide, and Attempted Suicide Among Transgender and Nonbinary Youth*, 7 J. Adolescent Health 643–649 (2022).

several preliminary points should be made. Dr. Cantor does not provide a comprehensive review of international practices; rather, he selectively cites documents that he believes support his position.

65. Language differences also make it difficult to fully assess some of the material that the defendants' experts cite to as support for their claims. For example, the Swedish National Board of Health and Welfare's ("NBHW"'s) guideline for the care of children and adolescents with gender dysphoria is not available as an official English translation; only a 6-page summary is available.[8]

66. With respect to the content of these documents, none is a clinical practice guideline which rates the quality of the evidence and the strength of the recommendations. Some of the documents are systematic reviews of the literature that rate the quality of the evidence but do not make recommendations.[9] Direct inferences cannot be drawn from the quality of the evidence to the strength of recommendations; low quality evidence may be a sufficient basis for strong recommendations. The French document referenced is in fact only a press release.[10]

67. Dr. Cantor mischaracterizes the conclusions of these documents, stating for example that they "range from medical advisories to outright bans on the medical transition of minors." (Cantor Decl. ¶ 16). None of the documents to which Dr. Cantor refers recommends banning medical care for treating gender dysphoria in adolescents.

68. Finland, Sweden, and the UK are all moving to providing care through

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[8] The National Board of Health and Welfare, *Care of Children and Adolescents with Gender Dysphoria: Summary* (2022), https://www.socialstyrelsen.se/globalassets/sharepoint-dokument/artikelkatalog/kunskapsstod/2022-3-7799.pdf (last accessed May 26, 2023).

[9] National Institute for Health and Care Excellence (NICE), *Evidence Review: Gonadotrophin releasing hormone analogues for children and adolescents with gender dysphoria* (2020), *available at* https://cass.independent-review.uk/nice-evidence-reviews/ (last accessed May 26, 2023).

[10] Académie Nationale de Médecine, *Medicine and gender transidentity in children and adolescents* (2022), *available at* https://www.academie-medecine.fr/la-medecine-face-a-la-transidentite-de-genre-chez-les-enfants-et-les-adolescents/?lang=en (last accessed May 26, 2023).

regional multidisciplinary clinics, the type of care commonly provided in the US.[11] In Finland, for example, medical care is provided by Helsinki University Central Hospital and Tampere University Hospital. Puberty suppression and hormone treatment are provided to minors with persistent gender dysphoria on a case-by-case basis.[12]

69. Sweden is restructuring care for gender dysphoria into three national specialized medical care units. While the Swedish recommendations state puberty suppression and gender-affirming hormone treatment "should be offered only in exceptional cases," they later state that "an early (childhood) onset of gender incongruence, persistence of gender incongruence until puberty and a marked psychological strain in response to pubertal development is among the recommended criteria."[13]

70. The UK is moving from a single specialist provider model to regional centers. The Cass Review encourages providers prescribing puberty blocker and hormone therapy to follow the Endocrine Society Guidelines and UK guidelines regarding informed consent.[14]

71. The documents all emphasize the importance of data collection. The Cass Review recommends, for example, "[e]xisting and future services should have standardised data collection in order to audit standards and inform understanding of the

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[11] Sam Hsieh & Jennifer Leininger, *Resource list: Clinical care programs for gender-nonconforming children and adolescents*, 43 Pediatric Annals 238–244 (2014).

[12] Council for Choices in Health Care in Finland, *Medical treatment methods for dysphoria associated with variations in gender identity in minors – recommendation* (2020), *available at* https://palveluvalikoima.fi/documents/1237350/22895008/Summary_minors_en+(1).pdf/fa2054c5-8c35-8492-59d6-b3de1c00de49/Summary_minors_en+(1).pdf?t=1631773838474 (last accessed May 26, 2023).

[13] The National Board of Health and Welfare, *Care of Children and Adolescents with Gender Dysphoria: Summary* (2022), *available at* https://www.socialstyrelsen.se/globalassets/sharepoint-dokument/artikelkatalog/kunskapsstod/2022-3-7799.pdf (last accessed May 26, 2023).

[14] Hilary Cass, *The Cass Review: Independent Review of Gender Identity Services for Children and Young People Interim Report*, National Health Service (NHS), UK at 71–72 (2022).

epidemiology, assessment and treatment of this group of children and young people."[15]

72. The Swedish NBHW similarly states, "[t]o ensure that new knowledge is gathered, the NBHW further deems that treatment with GnRH-analogues and sex hormones for young people should be provided within a research context, which does not necessarily imply the use of randomized controlled trials (RCTs). As in other healthcare areas where it is difficult to conduct RCTs while retaining sufficient internal validity, it is also important that other prospective study designs are considered for ethical review and that register studies are made possible."[16]

I declare under criminal penalty under the laws of Arizona that the foregoing is true and correct.

Signed on the 31st day of May, 2023, in Ann Arbor, Michigan.

Daniel Shumer, M.D.

[15] *Id.*

[16] The National Board of Health and Welfare, Care of Children and Adolescents with Gender Dysphoria: Summary (2022), *available at* https://www.socialstyrelsen.se/globalassets/sharepoint-dokument/artikelkatalog/kunskapsstod/2022-3-7799.pdf (last accessed May 26, 2023).

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UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF ARIZONA
TUCSON DIVISION

Jane Doe, by her next friend and parents Helen Doe and James Doe; and Megan Roe, by her next friend and parents, Kate Roe and Robert Roe,

Plaintiffs,

v.

Thomas C. Horne in his official capacity as State Superintendent of Public Instruction; Laura Toenjes, in her official capacity as Superintendent of the Kyrene School District; Kyrene School District; The Gregory School; and Arizona Interscholastic Association Inc.,

Defendants.

Case No. 4:23-cv-00185-JGZ

REBUTTAL DECLARATION OF DR. STEPHANIE BUDGE, PH.D., IN SUPPORT OF MOTION FOR PRELIMINARY INJUNCTION

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**Admitted pro hac vice.*

I, Stephanie Budge, declare as follows:

1. I submit this expert declaration based on my personal knowledge.

2. If called to testify in this matter, I would testify truthfully based on my expert opinion.

3. In preparing this declaration, I reviewed the expert declaration submitted by Dr. James Cantor, Ph.D. in support of the Proposed Intervenors' Opposition to Plaintiffs' Motion for Preliminary Injunction. As with my prior expert declaration in this matter, I also relied on my scientific education and training, my research experience, and my knowledge of the scientific literature in the pertinent fields.

4. The materials I have relied upon in preparing this declaration are the same types of materials that experts in my field of study regularly rely upon when forming opinions on these subjects. I may wish to supplement these opinions or the bases for them as the result of new scientific research or publications in response to statements and issues that may arise in my area of expertise.

5. My understanding is that this case is a legal challenge to Ariz. Rev. Stat. § 15-120.02, which prohibits transgender girls from participating in school sports.

6. Dr. Cantor asserts that my claims about transgender youth and their medical care are based solely on my clinical experience. (Cantor Decl. ¶ 153.) That is not true. In addition to my years of clinical experience, I rely on the APA's DSM-5-TR, the World Professional Association for Transgender Health (WPATH) Standards of Care, the Endocrine Society Clinical Practice Guidelines, and the literature cited in those sources as well as the additional research and literature cited in my declarations in this case. As mentioned in my initial declaration, WPATH is an international association of medical and mental health professionals worldwide specializing in the treatment of gender diverse people. The WPATH-promulgated Standards of Care are the internationally recognized guidelines for the treatment of persons with gender dysphoria and inform medical treatment throughout the world and have been endorsed by the American Academy of Child and Adolescent Psychiatry, the American Academy of Pediatrics, the American

Psychological Association, the American Psychiatric Association, and the American Medical Association, among many other professional medical and mental health organizations.

Dr. James Cantor does not have the level of expertise required to provide expert opinions regarding the issues raised in my initial declaration

7. There are several reasons why Dr. Cantor does not have the level of expertise to provide expert opinions regarding the issues discussed in my declaration. As part of his introduction, Dr. Cantor mentions his prior association with academic journals and as a member of the American Psychological Association ("APA"). Dr. Cantor has never been on a review board or an editor of a journal that specializes in transgender health, but instead on journals that focus on sexuality, sexual behavior, and sexual abuse; it is also notable that he is no longer in these positions.[1] As well, Dr. Cantor mentions his experience being the chair for the Committee for Science Issues for the American Psychological Association but fails to mention that this was 20 years ago (2002-2003) when the field of transgender science was barely emerging.[2] I have been a member of the LGBT Division of the APA since 2006 and I have never heard anyone in the division or in the greater APA indicating Dr. Cantor's expertise related to transgender issues. As a scholar in the field, I regularly attend transgender-focused academic conferences and larger conferences relating to mental health issues (such as the APA convention). I have never seen Dr. Cantor present at those conferences on any issues relating to transgender health nor have I seen his name listed regarding transgender health on any of the scientific programming at any conference I have attended. In fact, his conference presentations and journal publications primarily focus on pedophilia, sex offenders, and

[1] In contrast, I am an associate editor for the *Psychology of Sexual Orientation and Gender Diversity* and on the editorial board of two transgender-centered academic journals (*International Journal of Transgender Health* and *LGBTQ+ Family: An Interdisciplinary Journal*).

[2] In contrast, I was the co-chair of the same committee from 2011-2021 and am a current member of the committee.

hypersexuality, with only three presentations mentioning transgender people and four publications mentioning transgender people (three of which were not research).

8. Dr. Cantor downplays the importance of clinical expertise in his declaration, yet he opines on the role that psychotherapy can play in addressing gender dysphoria. It is notable that there is no mention in Dr. Cantor's declaration that he has ever treated a minor with gender dysphoria. In addition, when mentioning his professional expertise, he does not provide any information that he has ever diagnosed a child or adolescent with gender dysphoria, nor does it seem that he has ever monitored or supervised any minor patient receiving gender affirming treatment.

Forcing Transgender Girls to Play on Boys' Teams Is Harmful to Them

9. Dr. Cantor appears to suggest that transgender girls can play on boys' teams. (Cantor Decl. ¶ 158.) In my initial declaration, I discussed how that would be harmful to transgender girls. Moreover, laws that require transgender girls to participate on a boys' team will put a child who looks, acts, and for years may have been known only as a female student, in the spotlight by requiring them to be on a boys' team, thereby inviting unwanted visibility and attention, putting the student at risk of bullying and discrimination, and causing the student to fear harassment and to feel isolated and stigmatized due to the negation of their identity. Clark and Kosciw (2022) have found that transgender students avoid sports when they cannot play on teams consistent with their gender identity.[3]

10. Dr. Cantor further appears to suggest that excluding transgender girls from playing school sports is not psychologically damaging. (*See* Cantor Decl. ¶ 159.) This is not true. As discussed in my initial declaration, there is a broad consensus among healthcare providers working with transgender youth that laws restricting transgender students' participation in school sports will have severe negative consequences for the

[3] Caitlin M. Clark & Joseph G. Kosciw, *Engaged or excluded: LGBTQ youth's participation in school sports and their relationship to psychological well-being*, 1 Psychology in Schs. 95 (2022).

health and wellbeing of transgender youth.[4]

11. Dr. Cantor further criticizes several sources I cite in my initial declaration because they involve surveys of physicians. (Cantor Decl. ¶¶ 161–63.) However, as noted below, this is not an issue on which randomized controlled trials would be ethically permissible, and surveys of this type provide a valuable and widely accepted source of information, particularly when multiple studies arrive at similar results.

12. Dr. Cantor further criticizes my initial declaration because it did not address the biological differences between males and females and competitive fairness of transgender girls competing on girls' teams. (Cantor Decl. ¶ 163.) However, as a mental health professional, I do not have expertise in these areas and therefore will not provide an expert opinion on them.

Dr. Cantor's Criticisms of the Standards of Care Are Not Well-Founded

13. Dr. Cantor spends much of his declaration criticizing the well-established international standards of care for transgender youth. For the reasons stated below, Dr. Cantor's criticisms lack merit and represent an outlier view that is not supported by medical science or best practices in the provision of medical care.

14. Contrary to Dr. Cantor's unsupported claim that these standards lack a sufficient evidentiary basis, WPATH and the Endocrine Society developed these standards for treating gender dysphoria in minors using the same evidence-based approach used to develop standards of care and practice guidelines for the treatment of many other medical conditions. As explained in the most recent edition of WPATH's Standards of Care:

> 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

[4] Landon D. Hughes, et al., *Pediatric Provider Perspectives on Laws and Policies Impacting Sports Participation for Transgender Youth*, 9 LGBT Health 247 (2022).

committee and required that recommendation statements were approved by at least 75% of members.[5]

15. Similarly, the Endocrine Society's "evidence-based guideline was developed using the Grading of Recommendations, Assessment, Development, and Evaluation approach to describe the strength of recommendations and the quality of evidence. The task force commissioned two systematic reviews and used the best available evidence from other published systematic reviews and individual studies."[6]

16. Dr. Cantor falsely states that multiple international health care systems that had initially adopted medical transition for transgender youth have reversed that policy because of research on the safety and effectiveness of that treatment. In fact, none of the countries Dr. Cantor discusses—the United Kingdom, Sweden, Finland, Norway, and France—ban either puberty blockers or hormones for transgender adolescents. Similarly, none of the international reports that Dr. Cantor cites is a clinical practice guideline, and none recommends banning medical care for transgender youth. Rather, the primary focus of concern in these countries is improving the delivery of services and quality of care, including ensuring that providers adhere to the standards of care and provide medical treatments only after careful evaluation and assessment.

17. For example, Dr. Cantor cites a report by Dr. Hilary Cass (2022), which reviewed the delivery of care to transgender youth in England and identified problems related to the centralization of care in a single facility. Dr. Cantor fails to note that this report concludes by recommending that England create *more* centers for providing this care and that providers follow the Endocrine Society Guidelines when providing

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[5] Coleman, E., et al., *Standards of Care for the Health of Transgender and Gender Diverse People, Version 8*, International Journal of Transgender Health, 23(S1), S8 (2022).

[6] Wylie C Hembree, et al., *Endocrine Treatment of Gender-Dysphoric/Gender-Incongruent Persons: An Endocrine Society Clinical Practice Guideline*, Journal of Clinical Endocrinology & Metabolism 102(11) 3874 (2017).

hormone therapy.[7]

Dr. Cantor's View that Transgender Youth Are Mentally Ill and Should Not be Given Supportive Medical Care or Permitted to Transition Is Not Well-Founded

18. In addition to lacking a sound foundation, Dr. Cantor fails to explain how his criticisms of the standards of care for treating gender dysphoria in youth are relevant to what I understand to be the central issue in this case: whether Plaintiffs, who are transgender girls, should be able to participate and compete on girls' sports teams. Although it is not entirely clear, Dr. Cantor appears to believe that banning transgender girls from girls' teams is appropriate because, in his view, minors who are diagnosed with gender dysphoria should be required to live in accordance with their sex assigned at birth and should not be permitted to transition either socially or through medications. Instead, Dr. Cantor appears to believe these minor patients should be given counseling to prevent them from identifying as transgender, based on his view that gender dysphoria in minors is a manifestation of some other mental health condition, such as borderline personality disorder. (Cantor Decl. ¶ 122 (advancing the "hypothesis that mental health issues, such as Borderline Personality Disorder (BPD), cause both suicidality and unstable identity formation (including gender identity confusion).")

19. Dr. Cantor's views on this topic have no scientific basis and contradict the medical consensus that some youth are in fact transgender, and that gender dysphoria in minors is a real and distinct medical condition, not a manifestation of "gender identity confusion" caused by other "mental health issues." (*Id.*) There is no basis for Dr. Cantor to claim that patients who have borderline personality disorder are regularly being misdiagnosed with gender dysphoria. None of the studies he cites for this proposition involve transgender youth and there are no studies that support Dr. Cantor's claims

[7] Cass, H. *The Cass Review: Independent Review of Gender Identity Services for Children and Young People Interim Report*, National Health Service (NHS), UK (2022).

regarding this link.

20. Dr. Cantor's views also contradict the medical consensus that counseling designed to encourage or compel transgender youth to live in accordance with their sex assigned at birth is as ineffective, unethical, and harmful as other types of conversion therapy. As explained in the WPATH Standards of Care:

> Activities and approaches (sometimes referred to as "treatments") aimed at trying to change a person's gender identity and expression to become more congruent with the sex assigned at birth have been attempted, but these approaches have not resulted in changes in gender identity (Craig et al., 2017; Green et al., 2020). We recommend against such efforts because they have been found to be ineffective and are associated with increases in mental illness and poorer psychological functioning (Craig et al., 2017; Green et al., 2020; Turban, Beckwith et al., 2020).[8]

21. Dr. Cantor rejects the use of the term "conversion therapy" when applied to transgender minors, claiming that the research on conversion therapy has exclusively addressed sexual orientation and that its results cannot be extrapolated to gender identity. (Cantor Decl. ¶ 147.) Dr. Cantor's view on this issue has no scientific basis and diverges from the consensus of all major professional associations of medical and mental health providers in the United States that efforts to change a person's gender identity or gender expression are ineffective and harmful.

22. For example, the WPATH Standards of Care explain:

> Much of the research evaluating 'conversion therapy' and 'reparative therapy' has investigated the impact of efforts to change gender expression (masculinity or femininity) and has conflated sexual orientation with gender identity (APA, 2009; Burnes et al., 2016; Craig et al., 2017). Some of these efforts have targeted both gender identity and expression (AACAP, 2018). Conversion/reparative therapy has been linked to increased anxiety, depression, suicidal ideation, suicide attempts, and health care avoidance (Craig et al., 2017; Green et al., 2020; Turban, Beckwith et al., 2020).[9]

23. Similarly, the American Academy of Child and Adolescent Psychiatry has

[8] Coleman, E., et al., *Standards of Care for the Health of Transgender and Gender Diverse People, Version 8*, International Journal of Transgender Health, 23(S1), S8 (2022).

[9] *Id.* at S53.

noted:

> [B]ased on the scientific evidence, the AACAP asserts that such "conversion therapies" (or other interventions imposed with the intent of promoting a particular sexual orientation and/or gender as a preferred outcome) lack scientific credibility and clinical utility. Additionally, there is evidence that such interventions are harmful. As a result, "conversion therapies" should not be part of any behavioral health treatment of children and adolescents.[10]

24. Likewise, the American Psychological Association stated:

> [T]he incongruence between sex and gender in and of itself is not a mental disorder so, any behavioral health or [Gender Identity Change Efforts (GICE)] technique or treatment that seeks to change an individual's gender identity or expression is not indicated; thus, any behavioral health or GICE effort that attempt to change an individual's gender identity or expression is inappropriate.
>
> . . . .
>
> [T]he APA, because of evidence of harm and lack of evidence of efficacy, supports public policies and legislation that prohibit, or aim to reduce GICE.[11]

25. In 2023, the Substance Abuse and Mental Health Services Administration published a comprehensive review of existing literature on therapeutic efforts to change a child's gender identity or gender expression and found:

> No research has demonstrated that gender identity change efforts are effective in altering gender identity; there is also no evidence of any benefits of such practices to children, adolescents, or their families. Recent large, methodologically sound studies have investigated harms associated with gender identity change efforts. These studies indicate that exposure to gender identity change efforts—in childhood, adolescence, and/or adulthood—is associated with harm,

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[10] The AACAP Policy on "Conversion Therapy" (2018), *available at*, https://www.aacap.org/aacap/Policy_Statements/2018/Conversion_Therapy.aspx (last visited May 22, 2023).

[11] Am. Psychological Ass'n, APA on Gender Identity Change Efforts at 1, 3 (2021), *available at*, https://www.apa.org/about/policy/resolution-gender-identity-change-efforts.pdf (last visited May 22, 2023).

including suicidality, suicide attempt, and other negative mental health outcomes such as severe psychological distress.[12]

26. It is also my clinical experience that psychotherapy is not effective as the sole treatment for individuals who need to socially transition and who need medical changes to their bodies to reduce gender dysphoria. I have often worked with individuals diagnosed with gender dysphoria who have financial barriers that do not allow them to receive medical treatments. I have also provided psychotherapy to transgender adolescents who experienced interpersonal barriers to social and medical transition. While psychotherapy can assist these patients with coping on a day-to-day basis, many of these patients experience significant distress from delays in social and medical transition and psychotherapy alone does not alleviate their dysphoria. Clinically, I see extremely high rates of suicidal ideation and suicidal intent with patients who have barriers to social and medical transitioning. I have assisted several of these patients with obtaining inpatient care to ensure that they do not die by suicide (which is costly and usually only provides a short-term solution to their immediate distress). As noted in my previous declaration, delaying the transition process can be detrimental for transgender youth, with early recommendations noting the importance of not delaying a gender dysphoria diagnosis and treatments (including social transition) that are most appropriate for the youth[13] and more recent articles noting the immense harms from delaying treatment (de Vries et al., 2021).[14] In sum, Dr. Cantor's view that minors with gender dysphoria should not be permitted to transition and should be counseled to live in their sex assigned at birth contradicts a long-standing and well-established consensus opposing such practices as

[12] Substance Abuse and Mental Health Services Administration (SAMHSA), *Moving Beyond Change*, Pages 26-27, *available at*, https://store.samhsa.gov/sites/default/files/pep22-03-12-001.pdf (2023).

[13] Edwards-Leeper, L., & Spack, N. P., *Psychological evaluation and medical treatment of transgender youth in an interdisciplinary "Gender Management Service"(GeMS) in a major pediatric center*, *Journal of Homosexuality*, *59*(3), 321-336 (2012).

[14] de Vries, A. L. C., et al., *Weighing current knowledge and uncertainties in decisions about gender-related treatment for transgender adolescents*, International Journal of Transgender Health, 22, 217-224 (2021).

ineffective and harmful.[15]

27. Dr. Cantor similarly disputes that "gender identity is well-established in psychology and medicine"—pointing to a statement taken out of context in the DSM-5-TR. (Cantor Decl. ¶ 155.) In fact, as noted in my prior declaration, gender identity is a well-established term in psychology and medicine that has been in use for decades. It is defined in the DSM-5-TR, which explains: "Gender identity is a category of social identity and refers to an individual's identification as male, female, some category in between (i.e., gender fluid), or a category other than male or female (i.e., gender neutral)." It is a central component of gender dysphoria, which is the distress caused when a person's gender identity diverges from their assigned sex at birth.[16] Gender

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[15] *See, e.g.*, Am. Coll. of Physicians, *Lesbian, Gay, Bisexual, and Transgender Health Disparities: A Policy Position Paper from the American College of Physicians*, 163 Annals of Internal Medicine (2015); Am. Counseling Ass'n, *Resolution on Reparative Therapy/Conversion Therapy/Sexual Orientation Change Efforts (SOCE) as a Significant and Serious Violation of the ACA Code of Ethics* (2017), *available at*, https://www.counseling.org/docs/default-source/resolutions/reparative-therapy-resoltution-letter--final.pdf?sfvrsn=d7ad512c_4 (last visited May 22, 2023); Am. Medical Ass'n & GLMA, *Issue Brief: Sexual orientation and gender identity change efforts (so-called "conversion therapy")* (2022), *available at*, https://www.ama-assn.org/system/files/conversion-therapy-issue-brief.pdf (last visited May 22, 2023); Am. Psychiatric Ass'n, *Position Statement on Conversion Therapy and LGBTQ Patients* (2018), *available at*, https://www.psychiatry.org/getattachment/3d23f2f4-1497-4537-b4de-fe32fe8761bf/Position-Conversion-Therapy.pdf (last visited May 22, 2023); Nat'l Ass'n of Social Workers, Sexual Orientation Change Efforts (SOCE) and Conversion Therapy with Lesbians, Gay Men, Bisexuals, and Transgender Persons (2015), *available at*, https://www.socialworkers.org/LinkClick.aspx?fileticket=yH3UsGQQmYI%3D (last visited May 22, 2023); Jason Rafferty, *American Academy of Pediatrics Policy Statement: Ensuring Comprehensive Care and Support for Transgender and Gender-Diverse Children and Adolescents*, 142 Pediatrics (2018); Society for Adolescent Health & Medicine, Position Paper: Recommendations for Promoting the Health and Well-being of Sexual and Gender–diverse Adolescents Through Supportive Families and Affirming Support Networks, 70 J. Adolescent Health (2022).

[16] Coleman, E., et al., *Standards of Care for the Health of Transgender and Gender Diverse People, Version 8*, International Journal of Transgender Health, 23(S1), S59 (2022) ("Compared with the earlier version, the DSM-5 replaced gender identity disorder with gender dysphoria, acknowledging the distress experienced by some

identity is also discussed at length in the WPATH Standards of Care, the Endocrine Society Practice Guidelines, and a large body of medical literature.[17]

28. Dr. Cantor uses outdated, inaccurate, and narrow definitions of sex. Dr. Cantor mentions that sex can only be determined either by "visual inspection" or "chromosomes." There are several significant flaws to this outdated argument, the first being that major medical and psychological associations agree that sex is multifaceted, comprising of chromosomes, hormones, internal and external genitalia, secondary sex characteristics, and gender identity (e.g., American Academy of Pediatrics, 2018; American Psychological Association, 2014; American Psychological Association, 2021; American Psychiatric Association, 2017; American Medical Association, 2018).[18]

29. To be more specific, American Medical Association Board member Dr. William Kobler has explained: "Sex and gender are more complex than previously assumed. It is essential to acknowledge that an individual's gender identity may not align with the sex assigned to them at birth. A narrow limit on the definition of sex would have public health consequences for the transgender population and individuals born with

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people stemming from the incongruence between experienced gender identity and the sex assigned at birth.").

[17] Dr. Cantor criticizes my prior declaration for citing the DSM-5 rather than the updated DSM-5-TR for the meaning of gender dysphoria. (Cantor Decl. ¶ 154.) However, the DSM-5-TR also fully supports my statements in that paragraph.

[18] *See, e.g.*, Rafferty, J. et al., *Ensuring comprehensive care and support for transgender and gender-diverse children and adolescents*, Pediatrics, 142(4) (discussing the American Academy of Pediatrics) (2018); American Medical Association, *AMA Adopts New Policies at 2018 Meeting* (2018), *available at* https://www.ama-assn.org/press-center/press-releases/ama-adopts-new-policies-2018-interim-meeting (last accessed on May 27, 2023); American Psychiatric Association, *Definitions of Gender, Sex, Sexual Orientation, and Pronoun Usage* (2017), *available at* https://www.psychiatry.org/psychiatrists/diversity/education/transgender-and-gender-nonconforming-patients/definitions-and-pronoun-usage (last accessed on May 27, 2023); American Psychological Association, *Answers to your questions about transgender people, gender identity, and gender expression* (2014), *available at* http://www.apa.org/topics/lgbt/ transgender.aspx (last accessed on May 27, 2023); American Psychological Association, *APA Resolution on Gender Identity Change Efforts* (2021), available at https://www.apa.org/about/ policy/resolution-gender-identity-change-efforts.pdf (last accessed on May 27, 2023).

differences in sexual differentiation, also known as intersex traits" (AMA, 2018). The second is that visual inspection is inherently flawed regarding determination—for example, if a non-transgender man sustains injuries to his genitals to make them unrecognizable, that would mean that his sex is undeterminable. Similarly, in the past, babies with intersex conditions that influence their genitals typically had medical providers decide the sex of the baby, usually deciding female since those genitals were easier to reconstruct (Carpenter 2016).[19] Chromosomes are not limited to XX and XY and thus cannot also be deemed as the only major way to determine one's sex. Given that there are biological changes that occur with hormone therapy and gender affirming surgeries, relying solely on one aspect of sex determined in utero is outdated.[20]

30. In his report, Dr. Cantor contends that the terminology "sex assigned at birth" should not be used. His arguments are grounded in a false and narrow definition of what sex is. As well, "sex assigned at birth" is the terminology that is used by the major medical and psychological organizations when referring to infants being labeled as male or female at birth (see American Academy of Pediatrics, 2018; American Psychological Association, 2014; American Psychological Association, 2021; American Psychiatric Association, 2017; American Medical Association, 2018). In addition to this terminology being the primary terminology that is used in by these organizations, this is also reflected in the field in academic publications and presentations. For example, in March 2023, in the *Journal of Adolescent Health*, Tabb and colleagues published an article titled "The Role of Caregiver Acceptance and Sex Assigned at Birth on Depression Among Gender-diverse Youth."[21] A google scholar search of the terms "sex assigned at birth" and

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[19] Carpenter, M., *The human rights of intersex people: Addressing harmful practices and rhetoric of change*, Reproductive Health Matters, 24(47), 74-84 (2016).

[20] Coleman, E., et al., *Standards of Care for the Health of Transgender and Gender Diverse People, Version 8*, International Journal of Transgender Health, 23(S1) (2022).

[21] Tabb, A. et al., *The Role of Caregiver Acceptance and Sex Assigned at Birth on Depression Among Gender-diverse Youth*, Journal of Adolescent Health, 72(3), S18 (2023).

"assigned sex at birth" elicited 1,959 results for articles published in 2023 alone.

31. Dr. Cantor also incorrectly claims that gender identity is not innate and has no biological foundation. (Cantor Decl. ¶ 157.) This is false. There is consensus among professional organizations that one's gender identity cannot be changed and it is a "deeply felt, inherent sense" (e.g., American Psychological Association, 2021).[22] As the Endocrine Society Clinical Practice Guidelines for Endocrine Treatment of Gender-Dysphoric Persons explain: "although there is much that is still unknown with respect to gender identity and its expression, compelling studies support the concept that biologic factors, in addition to environmental factors, contribute to this fundamental aspect of human development."[23]

32. To support his view that minors should not be permitted to transition, Dr. Cantor claims that "among prepubescent children who feel gender dysphoric, the majority cease to want to be the other gender over the course of puberty." (Cantor Decl. ¶¶ 67-70.) The studies that are cited to promote this argument: a) are often misunderstood, and b) have significant flaws in their design. In these studies, both children who did not have gender dysphoria and children who did not identify as transgender were included in the analyses because they exhibited behaviors that did not conform to gender norms. Therefore, the concept of gender dysphoria being "outgrown" does not make sense for the vast majority of these children since they did not have gender dysphoria to begin with. All of these studies used criteria for diagnosing gender identity disorder that focused mainly on behaviors (and not identity) and had less specific criteria for distinguishing those with the disorder from other children. The current DSM-5-TR (American Psychiatric Association, 2022) gender dysphoria criteria require that

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[22] American Psychological Association, *APA Resolution on Gender Identity Change Efforts* (2021), *available at* https://www.apa.org/about/policy/resolution-gender-identity-change-efforts.pdf (last accessed May 26, 2023).

[23] Wylie C Hembree, et al., *Endocrine Treatment of Gender-Dysphoric/Gender-Incongruent Persons: An Endocrine Society Clinical Practice Guideline*, Journal of Clinical Endocrinology & Metabolism 102(11) 3874, 3875 (2017).

children/adolescents identify with a gender that is different from their assigned gender for at least six months, which was not the case for any of the studies that are cited to indicate whether or not a youth will identify experience gender dysphoria in the future (*see* Temple Newhook et al. (2018) for a comprehensive review of the data).[24]

33. Steensma & Cohen-Kettinis (2018) agree that their data have been cited incorrectly to support the purportedly low persistence rates and have stated that their "studies cannot be used to support" the persistence estimation, in that they never calculated or reported rates of persistence/desistence.[25] They also note that the negative social climate for transgender children and adolescents should be taken into account when reading the data. They further state that their data did not actually reflect gender dysphoria in children and "expect that future follow up studies using the new diagnostic criteria may find higher persistence rates."[26] Finally, they indicate that the terms "desistence" and "persistence" have been misused; they state that when they were researching youth, there were many youth who may have been "hesitating, searching, fluctuating, or exploring" and that those youth have been misclassified as desisting."[27]

34. Today, based on current scientific knowledge and clinical practice, researchers and clinicians are much better equipped to differentiate transgender from non-transgender children and adolescents. As the Endocrine Society Practice Guidelines explain: "It may be that children who only showed some gender nonconforming characteristics have been included in the follow-up studies, because the DSM-IV text revision criteria for a diagnosis were rather broad . . . With the newer, stricter criteria of

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[24] Temple Newhook, J., Pyne, J., et al., *A critical commentary on follow-up studies and "desistance" theories about transgender and gender-nonconforming children*, International Journal of Transgenderism, 19, 212-224 (2018).

[25] Steensma, T. D., & Cohen-Kettenis, P. T., *A critical commentary on follow-up studies and "desistence" theories about transgender and gender non-conforming children*, International Journal of Transgenderism, 19, 225-230 (2018).

[26] *Id.* at 226.

[27] *Id.* at 227.

the DSM-5, persistence rates may well be different in future studies."[28]

35. Dr. Cantor does not dispute that minors whose transgender identification persists into adolescence are likely to continue to identify as transgender as adults. As recent studies have shown, for "transgender adolescents who, following careful assessment, receive medical necessary gender-affirming medical treatment," "rates of reported regret…are low."[29]

The Medical Treatments for Transgender Youth are Safe and Effective

36. Dr. Cantor claims that there is insufficient evidence to support the safety or efficacy of medical treatments for gender dysphoria in minors. (Cantor Decl. ¶ 39.) In fact, as both WPATH and the Endocrine Society have concluded based on comprehensive reviews of all existing data, the safety and efficacy of medical treatments for transgender adolescents with gender dysphoria are well-supported. For example, the WPATH Standards of Care concludes that: "Taken as a whole, the data show early medical intervention—as part of broader combined assessment and treatment approaches focused on gender dysphoria and general well-being—can be effective and helpful for many transgender adolescents seeking these treatments."[30] These Standards of Care also include an extensive discussion of the potential benefits and risks of puberty blockers and hormone therapy and the need for providers to consider "the potential physical and psychological benefits and risks of starting treatment with the potential risks and benefits of delaying treatment."[31]

37. Dr. Cantor's claim rests on false or misleading assumptions. For example, he notes that randomized controlled trials provide the strongest evidence of safety and

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[28] Wylie C Hembree, et al., *Endocrine Treatment of Gender-Dysphoric/Gender-Incongruent Persons: An Endocrine Society Clinical Practice Guideline*, Journal of Clinical Endocrinology & Metabolism 102(11) 3876 (2017).

[29] Coleman, E., et al., *Standards of Care for the Health of Transgender and Gender Diverse People, Version 8*, International Journal of Transgender Health, 23, (S47) (2022).

[30] *Id.*

[31] *Id.* at S66.

efficacy and suggests that the evidence supporting transitioning medications for transgender minors is deficient because it is not based on such trials. (Cantor Decl. ¶ 44.) That criticism has no scientific merit and contradicts fundamental ethical and scientific principles that guide medical knowledge and practice. While randomized controlled trials provide the highest quality of evidence in many contexts, management of gender dysphoria in minors is not ethically amenable to randomized controlled trials. Because there is already substantial evidence that puberty blockers and hormone therapy benefit transgender minors, it would be unethical to propose a study randomly assigning some patients to these treatments and some to a placebo.[32] Deutsch et al. (2016) state that randomizing transgender people to receive or not receive hormone therapy or surgery violates the principle of equipoise (true scientific uncertainty about whether an intervention will help the individual); there are ethical ways to conduct RCTs (randomly controlled trials) with transgender youth and adults, however, these studies would be focused on schedules and delivery modes of treatment, and not on whether or not the treatment is effective. Non-transgender youth receive pubertal suppression treatments and hormone therapy treatments for a host of medical disorders and are considered safe and effective (albeit with side effects, as medical treatments typically have). Given the ethical considerations and bodies of existing evidence, researchers in this field must rely on other types of study design, such as longitudinal cohort studies, which monitor changes in symptoms over the course of treatment,[33] or cross-sectional studies comparing treated and untreated persons.[34]

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[32] Deutsch, M. B., Radix, A., & Reisner, S., *What's in a guideline? Developing collaborative and sound research designs that substantiate best practice recommendations for transgender health care*, AMA Journal of Ethics, 18(11), 1098 (2016).

[33] de Vries A.L.C., et al., *Young adult psychological outcome after puberty suppression and gender reassignment*, Pediatrics 2014 Oct;134(4):696-704.

[34] Turban J.L., et al., *Access to gender-affirming hormones during adolescence and mental health outcomes among transgender adults*, PLoS One 17(1):e0261039 (2022).

38. Studies have repeatedly documented that puberty blocking medication and hormone therapy are associated with mental health benefits for transgender people in both the short and long term, including a dramatically reduced rate of suicidality.[35]

The Medical Treatments for Transgender Youth Reduce Suicidality and Suicide

39. Dr. Cantor asserts that there is no evidence that medicalized transition significantly reduces rates of suicide or suicidality among transgender youth. (Cantor Decl. ¶ 117.) As discussed above, that is untrue.

40. Dr. Cantor cites Dhejne (2011) for the proposition that undergoing sex-

[35] *See, e.g.*, Tordoff, D.M., et al., *Mental Health Outcomes in Transgender and Nonbinary Youths Receiving Gender-Affirming Care*, Jama Network Open, 5(2):e220978 at 1 (2022) (finding that receipt of medical care, including puberty blockers and gender-affirming hormones, was associated with 60% lower odds of moderate or severe depression and 73% lower odds of suicidality over a 12-month follow-up); Green, A.E., et al., *Association of Gender-Affirming Hormone Therapy with Depression, Thoughts of Suicide, and Attempted Suicide Among Transgender and Nonbinary Youth*, J. Adolesc. Health [ePublication ahead of print] at 1 (2021) (finding that access to hormone therapy during adolescence was associated with lower odds of recent depression and having attempted suicide in the past year); Turban, J.L., et al., *Pubertal Suppression for Transgender Youth and Risk of Suicidal Ideation*, Pediatrics 145(2):e20191725 at 1 (2020) (finding that access to puberty blockers during adolescence is associated with a decreased lifetime incidence of suicidal ideation among adults); Achille, C., et al., *Longitudinal impact of gender-affirming endocrine intervention on the mental health and well-being of transgender youths: Preliminary results*, Int'l J. Pediatric Endocrinology 2020:8 at 1 (2020) (finding that endocrine intervention was associated with decreased depression and suicidal ideation and improved quality of life for transgender youth); Kuper, L.E., et al., *Body Dissatisfaction and Mental Health Outcomes of Youth on Gender-Affirming Hormone Therapy*, Pediatrics 145(4):e20193006 at 1 (2020) (showing hormone therapy in youth is associated with reducing body dissatisfaction and modest improvements in mental health); van der Miesen, A.I.R., et al., *Psychological Functioning in Transgender Adolescents Before and After Gender-Affirmative Care Compared with Cisgender General Population Peers*, J. Adolesc. Health 66(6):699-704 (2020) (showing fewer emotional and behavioral problems after puberty suppression and similar or fewer problems compared to same-age non-transgender peers); Costa, R., et al., *Psychological Support, Puberty Suppression, and Psychosocial Functioning in Adolescents with Gender Dysphoria*. J. Sexual Medicine 12(11):2206-14 at 2206 (2015) (finding increased psychological function after six months of puberty suppression).

reassignment surgery does not decrease suicidality among transgender adults. (Cantor Decl. ¶ 118.) Dr. Cantor's claim misrepresents the data from Dr. Dhejne's study, which found that suicide rates are higher among transgender people than the general population. The study did not compare treated versus untreated transgender women, as Dr. Cantor incorrectly suggests. Dr. Dhejne compared morbidity and mortality statistics from a national database of transgender people with those in the general Swedish population, and only made comparisons between these groups, not before and after surgery, or transgender women with surgery and without surgery. The study itself warns against drawing any conclusions regarding the effectiveness of surgery as a treatment for gender dysphoria: "For the purpose of evaluating whether sex reassignment is an effective treatment for gender dysphoria, it is reasonable to compare reported gender dysphoria pre and post treatment. Such studies have been conducted either prospectively or retrospectively and suggest that sex reassignment of transsexual persons improves quality of life and gender dysphoria."[36] Since the study was published, Dr. Dhejne has cautioned that interpretations like Dr. Cantor's are incorrect.[37]

41. Dr. Cantor further opines that McNeil, et al. (2017) does not show that transition reduces suicidality among transgender youth. (Cantor Decl. ¶ 120.) In fact, the study concluded that "[d]iscrimination emerged as strongly related to suicidal ideation and attempts, whereas positive social interactions and timely access to interventions appeared protective." Bauer, et al. (2015), which Dr. Cantor erroneously cites for the proposition that social support is associated with increased suicide attempts, further supports that conclusion: "Our findings support a strong effect for social exclusion, discrimination and lack of medical transition (for those needing it) on suicide ideation

[36] Dhejne, C. et al., *Long-Term Follow-Up of Transsexual Persons Undergoing Sex Reassignment Surgery: Cohort Study in Sweden*, PLOS One, 6(2):e16885, doi:10.1371/journal.pone.0016885 (2011).

[37] Dhejne, C. H, *Science AMA Series: I'm Cecilia Dhejne a fellow of the European Committee of Sexual Medicine, from the Karolinska University Hospital in Sweden. I'm here to talk about transgender health, suicide rates, and my often misinterpreted study. Ask me anything!*, Winnower 10:e150124.46274 (2017).

and attempts, and potentially on the survival of trans persons." The WPATH Standards of Care cite Bauer's study as evidence that "[a]ccess to gender-affirming medical treatment is associated with a substantial reduction in the risk of suicide attempt."[38]

42. Dr. Cantor also cites Canetto, et al. (2021) in support of his implausible claim that providing social support to transgender youth is associated with *increased* suicidal attempts. (Cantor Decl. ¶ 121.) The Canetto study did not include or address transgender youth and does not support Dr. Cantor's claim.

43. Dr. Cantor also places great weight on the fact that there is no research showing that medical treatments for transgender youth reduce suicide as opposed to reducing suicidality—apparently to support his opposition to providing transgender youth with supportive treatment and care. But that argument is faulty for at least three important reasons. First, the absence of data about how treatment impacts suicide as opposed to suicidality largely reflects the difficulty of designing or undertaking such research. Dr. Cantor misleadingly cites the Baker study as though its conclusion was that no positive impact of treatment on suicide can be shown because none exists; in fact, the study found only that it was impossible to answer the question because of "the difficulty of identifying appropriate comparison groups and uncontrolled confounding factors."[39]

44. Second, the harms caused by suicidality are themselves very serious. In a recent systematic review of the impact of suicidal ideation, the harms directly associated with suicidal thoughts are clear: a sense of loss of the self, lack of self-worth, low self-esteem, loss of meaning in life, self-hatred, feelings of worthlessness, increased guilt, and increased shame.[40] These experiences are incredibly painful. Even if suicidality and

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[38] Coleman, E., et al., *Standards of Care for the Health of Transgender and Gender Diverse People, Version 8*, International Journal of Transgender Health, 23(S1), S174 (2022).

[39] Baker, K. E., et al., *Hormone Therapy, Mental Health, and Quality of Life Among Transgender People: A Systematic Review*, Journal of the Endocrine Society, Vol. 5, Issue 4, 11-12 https://doi.org/10.1210/jendso/bvab011 (2021).

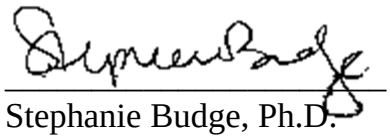
[40] Søndergaard, R., et al., *Living with Suicidal Thoughts: A Scoping Review*, Scandinavian Journal of Caring Sciences, 37(1), 60-78 (2023).

suicide were not related, which they are, preventing suicidality alone would be a compelling reason to provide medically needed care to transgender adolescents.

45. And third, because suicide attempts and suicide *are* interrelated, a treatment that reduces the former reduces the latter, even if current research designs cannot quantify that impact precisely.[41] For example, a recent study found that transgender teens were 7.6 times as likely to attempt suicide as their non-transgender peers.[42] Providing medically necessary care dramatically reduces the suicidality of transgender youth, including reductions in suicide attempts. In one recent study of transgender youth under 18, receiving hormone therapy was associated with nearly 40% lower odds of having had a suicide attempt in the past year.[43] Given the relationship between suicide attempts and suicide, there can be little doubt that receiving medically necessary care significantly reduces suicide among transgender youth.

I declare under criminal penalty under the laws of Arizona that the foregoing is true and correct.

Signed on the 31st day of May, 2023 in Madison, Wisconsin.



Stephanie Budge, Ph.D.

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[41] Jones, S.E., et al., *Mental Health, Suicidality, and Connectedness Among High School Students During the COVID-19 Pandemic—Adolescent Behaviors and Experiences Survey, United States, January-June 2021*, 71(Suppl-3):16-21 (2022), *available at*, https://www.cdc.gov/mmwr/volumes/71/su/su7103a3.htm.

[42] Pelc, Corrie, *Transgender Teens 7.6 Times More Likely to Attempt Suicide*, Medical News Today, *available at*, https://www.medicalnewstoday.com/articles/transgender-teens-7-6-times-more-likely-to-attempt-suicide (last visited May 25, 2023).

[43] Carlisle, Madeleine, *Gender-Affirming Hormone Therapy for LGBTQ Youth Can Help Save Lives, Study Finds*, Time, *available at*, https://time.com/6128131/gender-affirming-hormone-therapy-study/ (last visited May 25, 2023).

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UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF ARIZONA
TUCSON DIVISION

Jane Doe, by her next friend and parents Helen Doe and James Doe; and Megan Roe, by her next friend and parents, Kate Roe and Robert Roe,

Plaintiffs,

v.

Thomas C. Horne in his official capacity as State Superintendent of Public Instruction; Laura Toenjes, in her official capacity as Superintendent of the Kyrene School District; Kyrene School District; The Gregory School; and Arizona Interscholastic Association Inc.,

Defendants.

Case No. 4:23-cv-00185-JGZ

PLAINTIFFS' REPLY TO DEFENDANT HORNE AND THE PROPOSED INTERVENORS IN SUPPORT OF PLAINTIFFS' MOTION FOR A PRELIMINARY INJUNCTION

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INTRODUCTION

Plaintiffs Jane Doe and Megan Roe are two transgender girls who bring this as-applied challenge to Ariz. Rev. Stat. § 15-120.02 (the "Ban") so that they can have an equal opportunity to try out for and participate on girls' sports teams. The question in this case is simple: does the Ban, as applied to Plaintiffs, violate Plaintiffs' constitutional and statutory rights? The answer is yes; a preliminary injunction should therefore issue.

Plaintiffs have demonstrated a likelihood of success on their Equal Protection claims. The Ban fails to withstand heightened scrutiny, which applies here because the Ban discriminates based on Plaintiffs' transgender status and therefore based on sex. There is no "exceedingly persuasive" justification for excluding these Plaintiffs simply because they are transgender girls. *See United States v. Virginia*, 518 U.S. 515, 531 (1996). The record evidence and overwhelming scientific consensus establishes that Plaintiffs do not have athletic advantages over other girls, nor do they pose any safety risk, because neither Plaintiff has experienced male puberty. Indeed, on the facts here, the Ban cannot even survive rational basis review because there is no legitimate basis for excluding these Plaintiffs from girls' sports teams. Plaintiffs have also demonstrated a likelihood of success on their Title IX claims because the Ban singles out Plaintiffs based on their transgender status and thus impermissibly discriminates against them "on the basis of sex."

Defendant Horne and Proposed Intervenors try to reframe this case and focus most of their briefs on irrelevant topics. They repeatedly refer to Plaintiffs as "biological boys" and go to great lengths to discuss physiological differences between adult males and adult females, disregarding the undisputed evidence that Plaintiffs are transgender girls who have not undergone male puberty. They also raise whether sex-segregated sports are permissible at all, medical care for transgender youth in the United States and abroad, Dennis Rodman, Floyd Mayweather, college athletes, and Olympic-level competition. None of those topics arise here.

Enforcing the Ban against Plaintiffs will cause them irreparable harm, as courts across the country have repeatedly recognized. Defendant Horne and Proposed Intervenors

ignore these harms entirely. And the balance of the equities and the public interest weighs heavily in favor of an injunction in the face of the grave risk of harm to Plaintiffs. Speculation that participation by these Plaintiffs in girls' sports will cause harm to "women across Arizona" is unsupported in this as-applied challenge and cannot tip the scales in Proposed Intervenors' or Defendant Horne's favor.

For these reasons and those set forth below, as well as those stated in Plaintiffs' opening brief, the Court should enjoin the Ban as to Plaintiffs.

ARGUMENT

Plaintiffs have demonstrated that they have a likelihood of success on both their Equal Protection and Title IX claims, that they will be irreparably harmed if the Ban is not enjoined as to them, and that the balance of equities and public interest tips in their favor. *All. for the Wild Rockies v. Cottrell*, 632 F.3d 1127, 1131 (9th Cir. 2011). A preliminary injunction is therefore warranted.

I. THE COURT SHOULD REJECT PROPOSED INTERVENORS' AND DEFENDANT HORNE'S ATTEMPTS TO REFRAME THE CASE.

The Court should reject Proposed Intervenors' and Defendant Horne's extensive efforts to reframe the issues in this case. This case is about one thing only: the exclusion of Jane Doe and Megan Roe from girls' sports teams because they are transgender girls.

Proposed Intervenors and Defendant Horne devote the majority of their briefs to an entirely different question: whether sex-segregated sports are permissible, a proposition that Plaintiffs do not challenge. Indeed, Proposed Intervenors and Defendant Horne do not so much as use the word "transgender" in the introductions of their oppositions, instead merely referring to "biological males" or "pre-puberty boys." (Int. Br. at 1; Horne Br. at 2.) Proposed Intervenors then devote five entire pages of their brief to irrelevant propositions regarding the "performance advantages" and "physiological differences" that "biological males" have over "females" as well as the increased risk that they may pose to females in certain sports. (Int. Br. at 2–7.) For example, they point to statistics about the velocity at which *college males* can kick soccer balls, or at which *adult men* can spike

volleyballs, which have no bearing on transgender Plaintiffs' desire to play on their middle and high school girls' teams. (Int. Br. at 3.)

Proposed Intervenors devote only a small portion of their argument to their assertion that transgender girls have athletic advantages over other girls. (Int. Br. at 4–5.) Moreover, Proposed Intervenors cite exclusively from articles regarding alleged advantages that transgender females *who have undergone male puberty* retain even after undergoing testosterone suppression. (*Id.*; Brown Decl. ¶¶ 135–78.) While Plaintiffs contest those articles' findings, they need not be argued here; Plaintiffs Jane Doe and Megan Roe have not gone through male puberty. (H. Doe Decl. ¶ 11; K. Roe Decl. ¶ 6.)[1]

For his part, Defendant Horne casts his argument in terms of irrelevant and inflammatory hypotheticals such as Dennis Rodman "suddenly announc[ing] that he [is] transgender" in support of the proposition that allowing Jane Doe and Megan Roe—two young transgender girls who have not undergone male puberty—to play on girls' teams would somehow "wipe[] out" progress in women's sports. (Horne Br. at 3.) Defendant Horne devotes nearly four pages to a discussion of a handful of Olympic, college, and high school athletes from other states that are unrelated to this case and irrelevant.[2] Defendant Horne also improperly relies on an expert declaration from *another* litigation (the "prior

[1] Defendant Horne also attaches an article related to mini-puberty, two articles discussing fitness values for children, and a survey regarding individuals who received medical and surgical treatment for gender dysphoria and subsequently detransitioned. (Exs B-D, O.) Plaintiffs' expert addresses the topics discussed in the articles. (Shumer Reb. Decl. ¶¶ 11–13, 28–31, 60.) The survey (Ex. O) is plainly irrelevant to this litigation.

[2] Defendant Horne attaches a series of irrelevant exhibits (Exs. E-K; P) to his opposition. Unverified, third-party media reports purporting to attribute athletic injuries to the participation of transgender girls or women generally or discussing the alleged athletic advantage of particular transgender girls over other girls do not constitute factual or expert evidence that Plaintiffs pose a risk of injuring other girls or have an athletic advantage over other girls. Defendant Horne's two supplemental filings exhibiting media reports relating to (*i*) a letter drafted by a handful of Congressional members seeking information about the conduct of a Government-funded scientific study into psychosocial outcomes for transgender youth who received hormone replacement therapy; and (*ii*) regulations in British cycling are also far afield of the issues before the Court. (Dkt. 42; Dkt. 58.) The Court should decline to consider these exhibits as they are irrelevant and not probative of any fact in issue in this case.

Brown Declaration") in support of his argument that "pre-puberty boys" have a sports advantage over girls. The Court should not consider it. In any event, in the case in which the prior Brown Declaration was originally submitted, the court found it to be unpersuasive, noting that "the majority of the evidence Dr. Brown cites, and most of his declaration, involve the differences between male and female athletes in general, and contain no reference to, or information about, the difference between cisgender women athletes and transgender women athletes who have suppressed their testosterone." *Hecox v. Little*, 479 F. Supp. 3d 930, 980 (D. Idaho 2020).

II. PLAINTIFFS ARE LIKELY TO SUCCEED ON THEIR EQUAL PROTECTION CLAIM.

The Ban is subject to heightened scrutiny because it discriminates against transgender individuals. Neither Proposed Intervenors nor Defendant Horne have met their "demanding" burden of demonstrating an "exceedingly persuasive justification" for categorically banning all transgender girls from participating on girls' sports teams. *Virginia*, 518 U.S. at 524. Moreover, even under rational basis review, the Ban would fail. Its effect is far too removed from any ostensible government interest of remedying past discrimination or promoting fairness or safety for girls. *Romer v. Evans*, 517 U.S. 620, 635 (1996) (even under rational basis review, amendment to Colorado Constitution that prohibited antidiscrimination measures for gay and lesbian individuals violated the Equal Protection Clause).

A. The Ban Is Subject to Heightened Scrutiny.

Defendant Horne appears to accept that the Ban is subject to heightened scrutiny. (Horne Br. at 11.) For their part, Proposed Intervenors admit that laws that exclude transgender individuals are subject to heightened scrutiny in the Ninth Circuit. (Int. Br. at 9); *Karnoski v. Trump*, 926 F.3d 1180, 1200–01 (9th Cir. 2019) (examining a law that excluded transgender people from the military under a standard of review "that is more than rational basis but less than strict scrutiny"); *D.T. v. Christ*, 552 F. Supp. 3d 888, 896 (D. Ariz. 2021) ("Discrimination against transgender people is discrimination based on

sex; as such, heightened scrutiny applies."). They seek to avoid this controlling precedent, however, by arguing that the Ban does not discriminate based on transgender status because it does not expressly use the term "transgender." (Int. Br. at 8.)[3] This argument misconstrues the Ban and its facial discrimination against transgender girls and is wrong as a matter of law.

First, the Ban's disparate treatment of transgender girls because they are transgender is clear on its face. The Ban discriminates "between cisgender athletes, who may compete on athletic teams consistent with their gender identity, and transgender women athletes, who may not compete on athletic teams consistent with their gender identity." *Hecox*, 479 F. Supp. 3d at 975 (rejecting defendants' argument that similar Idaho statute "does not ban athletes on the basis of transgender status, but rather on the basis of the innate physiological advantages males generally have over females"). Courts have routinely found that laws (like the Ban) that discriminate against individuals because their gender identity does not match their sex assigned at birth discriminate based on transgender status.[4] *See, e.g.*, *A.M. v. Indianapolis Pub. Sch.*, 617 F. Supp. 3d 950, 965–66 (S.D. Ind. 2022) (holding that a virtually identical Indiana statute discriminated against transgender individuals despite not using the term "transgender"); *B.P.J. v. W. Va. State Bd. of Educ.*, 550 F. Supp. 3d 347, 353–54 (S.D. W. Va. 2021) (holding that a virtually identical West Virginia statute "discriminates on the basis of transgender status").[5]

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[3] Defendant Horne admits that the Ban was enacted because of the "risks created by transgender participation in women's sports." (Horne Br. at 6.)

[4] Proposed Intervenors incorrectly assert that *D.T. v. Christ* can be distinguished because the challenged statute "singled out" transgender individuals (Int. Br. at 9); to the contrary, the court rejected an argument much like Proposed Intervenors advance here, stating that "[w]hile the statute and regulation do not explicitly use the phrase 'transgender' or explicitly state that these laws are aimed directly at 'transgender' people, any logical reading of the statute and regulation reflects that it applies nearly exclusively to transgender people; who else is going to voluntarily seek out a 'sex change operation?'" 552 F. Supp. 3d at 895–96.

[5] While the court in *B.P.J.* later granted summary judgment to defendants and terminated the injunction, 2023 WL 111875 (S.D. W. Va. Jan. 5, 2023), the Fourth Circuit granted an injunction pending appeal, 2023 WL 2803113 (4th Cir. Feb. 22, 2023), and the

Second, there is no doubt that the purpose of SB 1165 was to exclude transgender girls from girls' sports teams. The legislative findings cite an article entitled "Transgender Women in the Female Category of Sport," and refer to "testosterone suppression." In explaining his vote for the bill, State Senator Vince Leach stated, "If we allow transgenders to take over female sports, you will not have females participating." *Consideration of Bills: Hearing on S.B. 1165 Before S. Comm. on Judiciary*, Jan. 20, 2022, 55th Leg., 2nd Reg. Sess. 1:17:32–39 (Ariz. 2022) (statement of Sen. Vince Leach, Member, S. Comm. on Judiciary). And Proposed Intervenor Peterson repeatedly asked whether those opposing the bill would "be opposed to having just a trans league, so they can all compete in their own league." *Id.* at 28:28–35 (statement of Sen. Warren Petersen, Chairman, S. Comm. on Judiciary).

Adopting Proposed Intervenors' and Defendant Horne's argument that the Ban does not discriminate against transgender individuals because it refers only to "biological sex" would all but eradicate lawsuits based on discrimination against transgender individuals. In order to survive a challenge, a legislature would merely have to avoid using the word "transgender" in the law itself, regardless of the law's purpose or impact. This cannot be the law, and indeed it is not, as is made clear by the numerous courts who have found that similar bans in other states—none of which use the word "transgender"—nevertheless discriminate against transgender individuals. *See Hecox*, 479 F. Supp. 3d at 975; *A.M.*, 617 F. Supp. 3d at 966.[6]

B. The Ban Is Not Substantially Related to Any Important Government Interest.

Supreme Court denied an application to vacate the injunction, 143 S. Ct. 889 (2023). The injunction therefore remains in effect.

[6] In any event, the Ban is subject to heightened scrutiny for an additional reason: only transgender *girls* are prohibited from playing on a team that is consistent with the gender identity. Ariz. Rev. Stat. 15-120.02(B). Transgender *boys*, in contrast, are subject to no such exclusion. This is unquestionably a sex-based classification leading to heightened scrutiny. *See, e.g.*, *A.M.*, 617 F. Supp. 3d at 966 ("The singling out of transgender females is unequivocally discrimination on the basis of sex.")

The Ban does not withstand heightened scrutiny when applied to Plaintiffs. Proposed Intervenors and Defendant Horne argue that the Ban is substantially related to "redress[ing] pas[t] discrimination against women in athletics and promot[ing] equality of athletic opportunity between the sexes" (Int. Br. at 12), and of "providing safety and fairness to girls in sports competition," (Horne Br. at 12). But they advance no "exceedingly persuasive justification" as to why a ban that categorically excludes all transgender girls—without regard for age, type of sport, whether the transgender girl has or has not undergone male puberty or has taken puberty-blocking medication and hormone replacement therapy—is substantially related to those interests. *Virginia*, 518 U.S. at 531.

Instead, their argument rests on impermissible "overbroad generalizations without factual justification." *Hecox*, 479 F. Supp. 3d at 982; *see Virginia*, 518 U.S. at 549–50, 65.[7] With regards to their assertion that "biological males will have an undue advantage competing against women" and pose a safety risk to girls (Int. Br. at 13), Proposed Intervenors cite numerous studies comparing adult males to adult females or adolescent males who have undergone male puberty to adolescent females. (Int. Br. at 2–7.) They wholly ignore that Plaintiff Jane Doe has not undergone male puberty, and Plaintiff Megan Roe took puberty-blocking medication at the onset of male puberty and later hormone replacement therapy to undergo female puberty. (H. Doe Decl. ¶ 11; K. Roe Decl. ¶ 6.) There is a well-established scientific consensus that, before puberty, there are no significant differences in athletic performance between boys and girls. (Shumer Reb. Decl. ¶¶ 9, 11–12.) While some studies have found small differences between the performance of boys and girls with respect to some discrete activities, these studies did not control for other

[7] The AIA's prior system to address transgender students' involvement in school sports illustrates that the current law is overbroad. Proposed Intervenors and Defendant Horne ignore that prior to the Ban, the AIA made case-by-case decisions regarding whether a transgender student who wished to play on the team consistent with her gender identity should be allowed to do so, and that there are no allegations that this system was infirm or unworkable. (Compl. ¶¶ 19–23.) Rather, the previous system allowed the AIA the ability to decide on a case-by-case basis, rather than categorically, whether to allow a student to play on the team consistent with her gender identity. (*Id.* ¶ 21.)

factors, particularly age, location, or socioeconomic factors. (*Id.* ¶ 10.) When research has controlled for those factors by using representative data, researchers have found that across all measures of physical performance, there was no statistical difference in the capabilities of girls and boys until high-school age. (*Id.* ¶¶ 11–12.) Moreover, there is no evidence that transgender girls who do not undergo male puberty have an athletic advantage over other girls. (*Id.* ¶¶ 14–16, 23–26.) There are no studies that have documented any such advantage, and there is no medical reason to posit that any such advantage would exist. (*Id.* ¶ 26.) Because there is no basis to conclude that Plaintiffs have a competitive advantage over other girls, there is also no basis for Proposed Intervenors and Defendant Horne's assertion that they pose a safety risk to other girls. (*Id.* ¶¶ 32–38, 41.)

Defendant Horne devotes a mere two sentences trying to refute the fact that "there is a scientific consensus that the biological driver of average group differences is their respective levels of testosterone, which begin to diverge significantly only after the onset of puberty." (Br. at 3; Shumer Decl. ¶¶ 38–39.) To the extent that Defendant Horne rests his conclusory argument that "Plaintiffs' focus on testosterone levels is misplaced" on the prior Brown Declaration filed in a *different* litigation brought by a *different* Plaintiff on a record not before this Court, it should not be credited. (Horne Br. at 14.)

In any event, nothing in the prior Brown Declaration credibly rebuts the broad scientific consensus that the surge of testosterone associated with male puberty accounts for the group-based differences in athletic ability between post-pubertal boys and girls. As the *Hecox* court noted, several studies cited by Dr. Brown supported *Plaintiffs*' position. *Hecox*, 479 F. Supp. 3d at 980 (highlighting study on which Dr. Brown relied that stated that "evidence makes it highly likely that the sex difference in circulating testosterone of adults explains most, if not all, of the sex differences in sporting performance"). Similarly, the World Rugby Transgender Women's Guidelines 2020, which Dr. Brown cites throughout his declaration, allow transgender girls and women to participate in women's rugby if they did not experience endogenous male puberty, stating: "Transgender women who transitioned pre-puberty and have not experienced the biological effects of

testosterone during puberty and adolescence can play women's rugby." Transgender Women Guidelines, *World Rugby*, https://www.world.rugby/the-game/player-welfare/guidelines/transgender/women (last visited June 1, 2023).

Proposed Intervenors and Defendant Horne also cite *Clark v. Arizona Interscholastic Association*, 695 F.2d 1126 (9th Cir. 1982), but as the district court in *Hecox* noted, that case strongly supports Plaintiffs. In *Clark*, the Ninth Circuit held that it was lawful to exclude boys from girls' volleyball teams because: (1) women had historically been deprived of athletic opportunities in favor of men; (2) as a general matter, men had equal athletic opportunities compared to women; and (3) according to the stipulated facts in the case, average physiological differences meant that males would displace females to a substantial extent if permitted to play on women's volleyball teams. *See id.* at 1131.

But as the *Hecox* court recently recognized, none of those premises holds true for girls who are transgender: (1) far from being favored in athletics, "women who are transgender have historically been discriminated against;" (2) transgender women—unlike the boys in *Clark*—would not be able to participate "in any school sports;" and (3) based on the very small numbers of transgender girls in the population, "transgender women have not and could not 'displace' cisgender women in athletics 'to a substantial extent.'" *Hecox*, 479 F. Supp. 3d at 977 (quoting *Clark*, 695 F.2d at 1131). As the *Hecox* court also noted, "it is not clear that transgender women who suppress their testosterone have significant physiological advantages over other women." *Hecox*, 479 F. Supp. 3d at 978. *Hecox*'s analysis of *Clark* is even more compelling here, where there is no question that Plaintiffs, who have not experienced male puberty, have no physiological advantage over other girls. *See Hecox*, 479 F. Supp. 3d at 981 (transgender girls who do not experience male puberty "do not have an ascertainable advantage over cisgender female athletes"). In sum, the factors in *Clark* all weigh heavily in Plaintiffs' favor, and the Ban cannot survive heightened scrutiny.

C. The Ban Fails Even Rational Basis Review.

Finally, the Ban fails rational basis review. The sweeping exclusion of all transgender girls from participating in athletics, regardless of their individual circumstances, "is so far removed from the[] particular justifications" put forward in support of it that it is "impossible to credit them." *Romer*, 517 U.S. at 635. As discussed above, the legislative findings and history of the Ban make clear that it was enacted to exclude all transgender girls from school sports in Arizona. Because a "bare . . . desire to harm a politically unpopular group cannot constitute a legitimate governmental interest," the Ban cannot survive rational basis review. *U.S. Dep't of Agric. v. Moreno*, 413 U.S. 528, 534 (1973); *see also United States v. Windsor*, 570 U.S. 744, 770 (2013) (holding the Defense of Marriage Act unconstitutional where "[t]he avowed purpose and practical effect of the law" was to "impose a disadvantage, a separate status, and so a stigma" upon same-sex married couples).

III. PLAINTIFFS ARE LIKELY TO SUCCEED ON THEIR TITLE IX CLAIM.

Plaintiffs have also demonstrated a likelihood of success on their Title IX claim because: (1) Defendant Horne admits that he is a grant recipient of federal funds (Horne. Ans. ¶ 9); (2) Plaintiffs are plainly barred from participating on sports teams that are consistent with their gender identity—unlike their similarly situated non-transgender teammates; and (3) that exclusion is "on the basis of sex" for the purposes of Title IX. *See Schwake v. Ariz. Bd. of Regents*, 967 F.3d 940, 946 (9th Cir. 2020) (enumerating elements of a Title IX claim).

A. The Ban Excludes Transgender Girls from Athletics "on the Basis of Sex."

Plaintiffs are likely to prevail on the merits of their Title IX claim because the Ban excludes them from playing sports based on their transgender status, which constitutes discrimination on the basis of sex. *See Bostock v. Clayton Cnty.*, 140 S. Ct. 1731, 1741 (2020) ("[I]t is impossible to discriminate against a person for being . . . transgender without discriminating against that individual based on sex."); *Doe v. Snyder*, 28 F.4th 103, 114 (9th Cir. 2022) (holding that discrimination based on transgender status also constitutes

impermissible discrimination under Title IX);[8] *see also B.P.J.*, 550 F. Supp. 3d at 357–58 (granting motion for preliminary injunction where transgender girl "alone cannot join the team corresponding to her gender identity"); *A.M.*, 617 F. Supp. 3d at 965–66 (same).

B. Proposed Intervenors' and Defendant Horne's Additional Arguments to the Contrary Fail.

Proposed Intervenors' and Defendant Horne's arguments to the contrary are unavailing. *First*, contrary to Proposed Intervenors' and Defendant Horne's assertions, the fact that Plaintiffs' schools offer teams for both boys and girls is of no consequence here; playing on a boys' team would be shameful and humiliating for Plaintiffs, as well as in direct conflict with their medical treatment. (J. Doe Decl. ¶ 11; H. Doe Decl. ¶ 15; M. Roe Decl. ¶ 9; K. Roe Decl. ¶ 10; Budge Decl. ¶¶ 39–40; Shumer Decl. ¶ 51; Budge Reb. Decl. ¶¶ 9–10.)

Second, the Ninth Circuit has not determined that "Title IX addresses biological sex, not gender identity." (Int. Br. at 14.) *See Snyder*, 28 F.4th at 114–15 (stating that discrimination against transgender individuals violates Title IX). Rather, the Ninth Circuit has found that discrimination based on transgender status constitutes impermissible discrimination under Title IX. *Id.*[9]

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[8] Proposed Intervenors are incorrect when they reduce Title IX to merely prohibiting discrimination based on biological sex. (Int. Br. at 14–15.) The Ninth Circuit has stated that it uses the terms "sex" and "gender" interchangeably for purposes of Title IX. *See Schwake*, 967 F.3d at 946 n.5 (citing *Emeldi v. Univ. of Oregon*, 698 F.3d 715, 723 (9th Cir. 2012) ("Title IX of the Education Amendments bars gender-based discrimination by federally funded educational institutions.").

[9] Courts of appeals across the country have found the same. *See Whitaker v. Kenosha Unified Sch. Dist. No. 1 Bd. of Educ.*, 858 F.3d 1034, 1050 (7th Cir. 2022) (finding likelihood of success that transgender student would succeed in his Title IX claims challenging a bathroom policy); *Dodds v. U.S. Dep't of Educ.*, 845 F.3d 217, 221 (6th Cir. 2016) (same); *Grimm v. Gloucester Cnty. Sch. Bd.*, 972 F.3d 586, 619 (4th Cir. 2020) (holding that restroom policy violated Title IX). Only the Eleventh Circuit, in an outlier decision, has held otherwise. *See Adams v. Sch. Bd. of St. Johns Cnty.*, 57 F.4th 791, 813 (11th Cir. 2022) (en banc) (declining to consider that sex, for the purposes of Title IX, might include gender identity). Indeed, the *Adams* court's holding to the contrary relied on a skewed reframing of the issue from "whether Adams's exclusion from the boys' bathrooms under the School District's bathroom policy violated the Equal Protection Clause or Title IX" to one of whether sex-segregated bathrooms were permissible, which was plainly not the issue. *See id.* at

Third, Plaintiffs do not "misstate" the Ninth Circuit's decision in *Doe v. Snyder*. (Int. Br. at 15.) The court there clarified the law regarding Title IX and transgender individuals precisely to "ensure appropriate proceedings" in the district court because the district court was construing *Bostock* too narrowly under established Ninth Circuit law. *Snyder*, 28 F.4th at 113–14. It is of no moment that the *Snyder* court did not resolve whether a particular statute violated Title IX.

Fourth, Plaintiffs certainly do not "seek to reverse the gains that Title IX achieved for female athletes"—they do not challenge the existence of sex-segregated sports at all. (Int. Br. at 14.) Proposed Intervenors' and Defendant Horne's arguments that Title IX allows for such separation are therefore irrelevant. (Int. Br. at 14–17; Horne Br. at 8–10.)

IV. PLAINTIFFS WILL SUFFER IRREPARABLE HARM IF THE BAN IS ENFORCED AGAINST THEM.

The Ban violates the Equal Protection Clause and Title IX. This alone is sufficient to presume that Plaintiffs will suffer irreparable harm if it is enforced as to them. *See Hernandez v. Sessions*, 872 F.3d 976, 994 (9th Cir. 2017) (a deprivation of constitutional rights "unquestionably constitutes irreparable injury"); *Anders v. Cal. State Univ., Fresno*, 2021 WL 1564448, at *18 (E.D. Cal. Apr. 21, 2021) (same for Title IX).

In addition to this "dispositive presumption," *Hecox*, 479 F. Supp. 3d at 987, the record confirms that absent a preliminary injunction, Plaintiffs will suffer significant emotional, physical, and mental harm, as well as dignitary and stigmatic injury. (Br. at 13.) Playing on boys' teams will be painful and humiliating to both Jane Doe and Megan Roe (J. Doe Decl. ¶¶ 11–12; M. Roe Decl. ¶ 9; K. Roe Decl. ¶¶ 9–11) and will directly contradict their medical treatments for gender dysphoria (Budge Decl. ¶¶ 27, 39–41; Shumer Decl. ¶¶ 51, 24; Budge Reb. Decl. ¶¶ 9–10.). In addition, if the Ban is enforced as

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843 (Jill Pryor, J., dissenting) ("[This case] is not, and ha[s] never been, (again, no matter how many times the majority opinion says it), about whether the School District can maintain separate bathrooms for boys and girls.") Regardless, as previously discussed, *Adams* cannot override Ninth Circuit precedent to the contrary.

to them, they will lose out on the various social, educational, physical, and emotional benefits that come from school sports. (Budge Decl. ¶¶ 35–38.) Defendant Horne accepts that sports provide such benefits. (Horne Ans. ¶¶ 38–43.)

Proposed Intervenors ignore these arguments altogether and avoid the considerable jurisprudence holding that "such violations are irreparable." *Hecox*, 479 F. Supp. 3d at 987 (finding irreparable injury where plaintiffs would be subjected to "embarrassment, harassment and invasion of privacy" as well as "dignitary wounds"); *see A.M.*, 617 F. Supp. 3d at 967 (finding plaintiff had shown that irreparable emotional and social harm would flow from transgender girl's exclusion from girls' softball team); *B.P.J.*, 550 F. Supp. 3d at 357 ("Forcing a girl to compete on the boys' team when there is a girls' team available would cause her unnecessary distress and stigma.").

For his part, Defendant Horne cites inapposite case law unrelated to transgender individuals. *See Gregor v. W. Va. Secondary Sch. Activities Comm'n*, 2020 WL 6292813, at *4 (S.D. W. Va. Oct. 27, 2020) (no irreparable harm where non-transgender girl who "hoped to join the boys' soccer team to compete at a different level than the girls' soccer team and because she believed it would better prepare her for college soccer" but could still play with the girls' team). In any event, *Gregor*'s holding that "courts seem to lean toward the harm being irreparable only when the *person cannot participate in the sport at all*" hurts, rather than supports, Defendant Horne's argument. *Id.* (emphasis added). As previously discussed, for Plaintiffs, losing the ability to play on girls' teams forecloses the ability to play on *any* sports teams.[10]

[10] Other case law cited by Defendant Horne is similarly inapposite. *See Dziewa v. Pa. Interscholastic Athletic Ass'n, Inc.*, 2009 WL 113419, at *7 (E.D. Pa. Jan. 16, 2009) (no irreparable harm where male student athlete could not compete on boys' wrestling team for one year due to school by-laws barring transfer students from competition); *Revesz ex rel. Revesz v. Pa. Interscholastic Athletic Ass'n, Inc.*, 798 A.2d 830, 837 (Pa. Commw. Ct. 2002) (same).

V. THE PUBLIC INTEREST AND THE BALANCE OF THE EQUITIES FAVOR PLAINTIFFS.

The balance of equities clearly favors Plaintiffs, who—as discussed above—face grave injury if the Ban is enforced against them and whose equal opportunity to participate on girls' sports teams will cause no harm to Defendants or anyone else. Proposed Intervenors' and Defendant Horne's arguments to the contrary are based in mere speculation and ignore that this is an as-applied rather than facial challenge. The alleged harm—"that biological girls will be forced to compete against transgender girls who allegedly have an athletic advantage—is unsupported; there is no evidence in the record that allowing [Plaintiffs] to play on the girls' [teams] will make this harm a reality." *A.M.*, 617 F. Supp. 3d at 968.[11] On the contrary, the record suggests the opposite. As previously discussed, Plaintiffs do not have a competitive advantage over other girls, and they do not pose a safety risk. (Shumer Reb. Decl. ¶¶ 9–27, 41.) In addition, but for the Ban, Defendants The Gregory School, Kyrene School District, Superintendent Toenjes, and the AIA would all permit Plaintiffs to play on girls' teams. (Dkt. 36 at 3; Compl. ¶ 54; Dkt. 51 at 2–3; Dkt. 59.) There is thus no harm to any Defendant in allowing Plaintiffs to continue playing with their peers as they have done until now. *Hecox*, 479 F. Supp. 3d at 988 ("[A] preliminary injunction would not harm Defendants because it would merely maintain the status quo while Plaintiffs pursue their claims."). Further, the Court should decline Proposed Intervenors' and Defendant Horne's "invitation to delve into the 'what ifs'" for women across Arizona in this as-applied challenge and instead hold that the public interest "lies in enjoining [Defendants] from applying a statute that discriminates against [Plaintiffs] based on [their] status as . . . transgender female[s]." *A.M.*, 617 F. Supp. 3d at 969 (citing *Bostock*, 140 S. Ct. at 1753).

[11] Defendant Horne baselessly asserts that "the issuance of a preliminary injunction would be an encouragement to those boys who desire to excel in sports, and may be willing to transition to girls in order to do so." (Horne Br. at 17.) There is not a shred of evidence in the record to support Defendant Horne's speculation.

CONCLUSION

For the reasons stated above, the Court should grant Plaintiffs' motion for a preliminary injunction.

Respectfully submitted this 1st day of June, 2023.

/s/ Colin M. Proksel

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UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF ARIZONA
TUCSON DIVISION

Jane Doe, by her next friend and parents Helen Doe and James Doe, and Megan Roe, by her next friend and parents, Kate Roe and Robert Roe,

Plaintiffs,

v.

Thomas C. Horne in his official capacity as State Superintendent of Public Instruction; Laura Toenjes, in her official capacity as Superintendent of the Kyrene School District; Kyrene School District; The Gregory School; and Arizona Interscholastic Association Inc.,

Defendants.

Case No. _____

DECLARATION OF KATE ROE IN SUPPORT OF MEGAN ROE'S MOTION FOR A PRELIMINARY INJUNCTION AND HER AND MEGAN AND ROBERT ROE'S MOTION TO PROCEED UNDER A PSEUDONYM

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**Pro hac vice application forthcoming*

I, Kate Roe, declare as follows:

1. I make this declaration of my own personal knowledge, and, if called as witness, could and would testify competently to the matters stated here.

2. I am the mother of Megan Roe, one of the plaintiffs in this case. My husband, Robert Roe, is Megan's father.

3. Megan has always known she was a girl. She was always uncomfortable with the gender she was told she had, and told us she was a girl by the time she was three. She was quite consistent and persistent on this fact.

4. Megan has always been friends primarily with other girls. She transitioned between first and second grade, and it was a fairly seamless transition. We love our child and will support her in every way that we can.

5. Megan has been living as a girl since she was very young. Her school, coaches, and friends have been very supportive of her.

6. Megan was formally diagnosed with gender dysphoria at the age of 10. As part of her medical treatment, she has been taking puberty blockers since she was 11, which prevented her from undergoing male puberty. She also began hormone therapy when she was 12 years old.

7. Megan began playing sports right after she socially transitioned, when she was about seven years old. She joined a swim team, and the coach was supportive of Megan and her gender identity.

8. Megan is excited to play on the girls' volleyball team at The Gregory School. Volleyball is a very social and competitive sport at Megan's school. A lot of students show up for the games and there is a big community surrounding the sport. Megan hopes to try out and play on the team with her friends.

9. The Arizona law barring transgender girls from playing on girls' teams is the first time Megan has faced a significant obstacle because she is transgender. It

saddens me that Megan must face this. No parent ever wants their kid to lose out on opportunities and experiences that can help them grow as people. Sports provide all kinds of benefits to kids, and it is very upsetting that they may be completely cut off for my child.

10. Playing and/or competing with boys would be harmful and painful for Megan and it is not something she would do. It would also directly conflict with her medical treatment for gender dysphoria because Megan's well-being depends on her ability to live and interact with others as a girl. Megan has lived as a girl for as long as she can remember. Playing and competing with boys is simply not an option for her.

11. Megan will be distraught if she cannot play on the girls' volleyball team this year.

12. We want Megan to proceed under a pseudonym so that she can maintain her privacy during this lawsuit. She is just a child and it scares me that there has been so much attention placed on transgender kids in recent years, and especially in Arizona because of this law. Megan also wants agency over who knows personal information about her, especially when it comes to members of the public. While many of her friends and teachers are supportive of Megan, we do not know how other people will treat her if they know her identity and that she is a part of the lawsuit.

13. I also ask to proceed under a pseudonym, along with my husband Robert Roe, because using our full names would identify Megan as well. Our identities could quite easily be linked to Megan, especially given that Megan and Robert share a last name. Further, using our real names could expose our family to harassment from being part of this lawsuit. For those reasons, we request that the Court allow us to use pseudonyms in this case.

This declaration was executed this 12th day of April, 2023, in Pima County, Arizona.

Pursuant to 28 U.S.C. § 1746, I declare under penalty of perjury that the foregoing is true and correct.

By: Kate Roe

Kate Roe

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FOR THE DISTRICT OF ARIZONA
TUCSON DIVISION

Jane Doe, by her next friend and parents Helen Doe and James Doe, and Megan Roe, by her next friend and parents, Kate Roe and Robert Roe,

Plaintiffs,

v.

Thomas C. Horne in his official capacity as State Superintendent of Public Instruction; Laura Toenjes, in her official capacity as Superintendent of the Kyrene School District; Kyrene School District; The Gregory School; and Arizona Interscholastic Association Inc.,

Defendants.

Case No. _____

DECLARATION OF MEGAN ROE IN SUPPORT OF HER MOTION FOR A PRELIMINARY INJUNCTION AND HER AND KATE AND ROBERT ROE'S MOTION TO PROCEED UNDER A PSEUDONYM

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**Pro hac vice application forthcoming*

I, Megan Roe, declare as follows:

1. I make this declaration of my own personal knowledge, and, if called as witness, could and would testify competently to the matters stated here.

2. I am 15 years old and I am a transgender girl.

3. Ever since I was really young, I knew I was a girl. I transitioned when I was seven years old with the support of my parents. My friends have always mostly been girls.

4. Sports has always been a part of my life. When I was in elementary school, I swam on the JCC swim team, and I used to also like to dance.

5. Before I started at The Gregory School, my parents shared with the school that I am a transgender girl, and everyone there has been very supportive.

6. When I was 11 years old, my doctor gave me medicine that stops me from going through puberty. I have taken that medicine ever since. When I was 12 years old, my doctor gave me hormone medication, which I continue to take.

7. I would really like to try out for the girls' volleyball team at my school this year. A lot of my friends are on the team, and I am excited to play on the volleyball team with them.

8. One of the reasons I want to join the team is because it's a really important part of our community. A lot of kids show up for the school volleyball games, and I want to be a part of that. I'm also excited to make new friends.

9. Because of the Arizona law banning transgender girls from playing on girls' sports teams, I am afraid I will not be able to play on the girls' team. I cannot play for the boys' team because I am a girl. I would feel embarrassed and humiliated if I had to play on a team where I know I do not belong. I know that some kids do not get to play on teams because there may not be enough spots. But that is very different from telling

me and all other transgender girls that we are never welcome and can never play on teams with our friends.

10. I am also afraid that because of the law, other people at school and in Arizona will think it is okay to target transgender people.

11. I do not want to use my real name or initials as part of this lawsuit. Even though my parents and school have been supportive, I still want to control private information about my life. I am also worried about facing harassment and ridicule for being a part of this case.

12. I would also like my parents to be able to use pseudonyms. I believe that if my parents' identities are public, the public could determine my identity as well. I also do not want my family to face any harassment.

This declaration was executed this 12th day of April, 2023, in Pima County, Arizona.

Pursuant to 28 U.S.C. § 1746, I declare under penalty of perjury that the foregoing is true and correct.

By: Megan Roe

Megan Roe

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Defendants.

Case No. _____

DECLARATION OF HELEN DOE IN SUPPORT OF JANE DOE'S MOTION FOR A PRELIMINARY INJUNCTION AND HER AND JANE AND JAMES DOE'S MOTION TO PROCEED UNDER A PSEUDONYM

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**Pro hac vice application forthcoming*

I, Helen Doe, declare as follows:

1. I make this declaration of my own personal knowledge, and, if called as witness, could and would testify competently to the matters stated here.

2. I am the mother of Jane Doe, one of the plaintiffs in this case. My husband, James Doe, is Jane's father.

3. Jane has always known she is a girl. Ever since she could talk, Jane would say "I'm a girl, I'm a girl." When she was about two years old, she told us she was a girl. At five years old, she told her doctor she was a girl at the pediatrician's office, completely spontaneously.

4. James and I let Jane wear dresses at home and express herself how she wanted.

5. As parents, we were nervous and scared for Jane as she started school. Jane came out as transgender in kindergarten, wearing a dress to school one day. When she came home, she told us people made fun of her for wearing the dress and decided she would not wear it anymore. I was disheartened to hear that people teased my daughter. But, a week later, she decided to wear the dress again and told us "this is who I am." She has attended school as a girl since that time.

6. In second grade, Jane began using the girls' bathroom. At first, a teacher did not let her use the girls' bathroom and even sent Jane to the principal's office. I spoke to the principal about the issue and Jane has been using the girls' bathroom ever since.

7. Jane was diagnosed with gender dysphoria when she was seven years old.

8. In third grade, Jane went to a new public school district. We informed the principal at the new school that Jane is transgender and is attending school as a girl, but the principal did not accept that about Jane. We tried to educate the principal throughout the year, as Jane wanted to share her gender identity with her class. Jane's teacher, however, was supportive and wanted to help Jane explain her identity to her school

mates. The principal got nervous and threatened to send a letter to the class saying that the school did not condone it, but thankfully, did not end up sending the letter. Jane was able to explain to her class that she is transgender.

9. Despite the above incident, Jane's teachers, coaches, and friends have been really supportive of Jane. There is some curiosity, but people in her close circle have been very respectful and loving. Jane has shared she is transgender with her soccer team, and they have been very supportive.

10. Jane lives as a girl in all aspects of her life.

11. As part of her medical treatment, Jane sees her doctor in Phoenix every year. Jane is 11 years old and has not yet undergone puberty. These annual check-ins are in part to monitor whether Jane is entering puberty, at which point Jane and our family will decide whether Jane will start taking puberty blockers. Jane currently plans to take puberty blockers when her doctor says it is the right time.

12. Sports are a vitally important part of Jane's life and our family. We love sharing sports with Jane. Jane has a passion for soccer and has played on the girls' club and recreational sports team for nearly five years. It has been wonderful watching her find a passion for soccer and we are so excited to see her participate on her school teams, for soccer and other sports.

13. As athletes ourselves, James and I understand the benefits of playing sports from a young age. Aside from the physical and emotional benefits, soccer has also helped Jane make new friends and connect with other girls. Jane wants to be able to compete with her friends on the soccer team when she enters middle school. Jane also would like to participate on the cross-country and basketball teams.

14. The Arizona law prohibiting transgender girls from playing sports will bar Jane from playing on the girls' soccer and basketball teams and competing against other girls on the cross-country team. The cross-country team starts in mid-July of this year.

15. Playing and/or competing on a boys' team is not an option for Jane. It would be harmful to Jane and directly conflict with her medical treatment for gender dysphoria. The last thing she wants to do is to stand out and playing on a boys' team would send the message to other people that she's not really a girl.

16. Jane will be very upset if she is not allowed to play sports on a girls' team. Jane knows this would be because she is transgender, and I worry about how that will affect her self-esteem and her confidence. She also will not receive all the positive benefits that school sports provide. This includes the obvious physical benefits, but also social and emotional benefits of playing with other kids, learning how to win and lose, and having coaches and other adults who support the team.

17. Jane wants to proceed under a pseudonym so that she can maintain her privacy during this lawsuit. Jane wants agency over who knows personal information about her life, especially when it comes to members of the public. While many of her friends and teachers are supportive of Jane, she does not know how other people will treat her if they know she is involved in the lawsuit.

18. I also ask to proceed under a pseudonym, along with my husband James Doe, because using our full names would identify Jane as well. We share an uncommon last name that could easily be linked to Jane. Further, using our real names could expose Jane and our family to harassment from being a part of this case. For those reasons, we request that the Court allow us to use pseudonyms in this case.

This declaration was executed this 12th day of April, 2023, in Maricopa County, Arizona.

Pursuant to 28 U.S.C. § 1746, I declare under penalty of perjury that the foregoing is true and correct.

By: Helen Doe

Helen Doe

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Defendants.

Case No. _____

DECLARATION OF JANE DOE IN SUPPORT OF HER MOTION FOR A PRELIMINARY INJUNCTION AND HER AND HELEN AND JAMES DOE'S MOTION TO PROCEED UNDER A PSEUDONYM

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**Pro hac vice application forthcoming*

I, Jane Doe, declare as follows:

1. I am 11 years old and will be starting middle school in the Kyrene School District in July. I am a transgender girl.

2. I have always known I am a girl. My parents have told me that I would tell them I was a girl when I was only a few years old. My parents have always supported me.

3. When I was in Kindergarten, I wore a dress to school for the first time. The first time, people made fun of me, but I decided to wear one again anyway, and I have dressed in a way that reflects who I am (a girl) since then..

4. I live as who I am (a girl) in all parts of my life, including at school.

5. Sports are really important to me and my parents.

6. I especially love soccer and have been playing soccer as long as I can remember. I hope I can play soccer for the rest of my life.

7. Playing soccer has helped me make friends and being part of a team makes me feel like I belong.

8. I have played club soccer on a girls' team with some of my friends for almost five years, and I am hoping that I can play with some of them on the school team. We are all excited about it.

9. When I start middle school in July, I am excited to try out for the girls' soccer team, the cross-country team, and the girls' basketball team. Both the soccer and basketball teams have separate teams for boys and girls. The cross-country team trains together, but boys and girls compete separately. The cross-country team starts in mid-July of this year.

10. Because of the Arizona law that passed about transgender girls playing sports, I am really afraid I will not be able to play on the girls' team for soccer or basketball or get to compete with other girls as part of the cross-country team.

11. I cannot play on boys' teams or compete with the boys because I am a girl. I would feel embarrassed if I had to play on a boys' team. Everyone at school knows I'm a girl, including my teachers, my friends, and all the other students. The last thing I want is to draw attention to myself. I just want to go to school like other kids.

12. I am afraid the law will encourage people in Arizona to treat transgender people differently and harass them. I want to be able to play with my friends and to hopefully make new friends too. It hurts to know that some people want to keep me away from sports and from my friends.

13. I also do not want to use my real name or initials as part of this lawsuit. People might find out who I am and harass me. I also do not want more people who I do not even know to find out private things about me or my family.

14. I don't want my parents to use their real names either, because then people could find out my name. I don't want people to harass my parents.

15. The lawyers representing me explained to me that it is important that I tell the truth. Everything I said in this paper is true.

This declaration was executed this 12th day of April, 2023, in Maricopa County, Arizona.

Pursuant to 28 U.S.C. § 1746, I declare under penalty of perjury that the foregoing is true and correct.

By: Jane Doe

Jane Doe

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UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF ARIZONA
TUCSON DIVISION

Jane Doe, by her next friend and parents Helen Doe and James Doe; and Megan Roe, by her next friend and parents, Kate Roe and Robert Roe,

Plaintiffs,

v.

Thomas C. Horne in his official capacity as State Superintendent of Public Instruction; Laura Toenjes, in her official capacity as Superintendent of the Kyrene School District; Kyrene School District; The Gregory School; and Arizona Interscholastic Association Inc.,

Defendants.

Case No. _____

DECLARATION OF DR. DANIEL SHUMER, M.D., MPH, IN SUPPORT OF PLAINTIFFS' MOTION FOR A PRELIMINARY INJUNCTION AND PLAINTIFFS' MOTION TO PROCEED UNDER A PSEUDONYM

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Pro hac vice application forthcoming

I, Daniel Evan Shumer, M.D., declare as follows:

1. I submit this expert declaration based upon my personal knowledge.

2. If called to testify in this matter, I would testify truthfully based on my expert opinion.

Qualifications and Experience

3. I am a Pediatric Endocrinologist and Medical Director of the Comprehensive Gender Services Program at Michigan Medicine, University of Michigan. I also serve as the Clinical Director of Child and Adolescent Gender Services at C.S. Mott Children's Hospital, and as an Assistant Professor of Medicine at the University of Michigan, where the major focus of my clinical and research work pertains to transgender adolescents. A true and correct copy of my curriculum vitae is attached hereto as **Exhibit A**.

4. I received my medical degree from Northwestern University in 2008. After completing a residency in pediatrics at Vermont Children's Hospital, Fletcher Allen Health Care, University of Vermont, I began a clinical fellowship in pediatric endocrinology at Harvard University's Boston Children's Hospital. During that clinical fellowship, I completed a Master of Public Health from Harvard University's T.H. Chan School of Public Health. I finished both the fellowship and my MPH degree in 2015.

5. As a fellow at Harvard, I was mentored by Dr. Norman Spack, a pioneer in transgender medicine who established the Gender Management Services Clinic (GeMS), the first major program in the U.S. to focus on gender-diverse and transgender adolescents. GeMS is located at Boston Children's Hospital. Working at GeMS, I became a clinical expert in the field of transgender medicine within pediatric endocrinology and began conducting research on gender identity and the evaluation and management of transgender children and adolescents.

6. Based on my work at GeMS, I was recruited to establish a similar program focusing on gender-diverse and transgender children and adolescents at the C.S. Mott

Children's Hospital. In October 2015, I founded the hospital's Child and Adolescent Gender Services Clinic.

7. The Child and Adolescent Gender Services Clinic has treated over 600 patients since its founding. I have personally evaluated and treated over 400 patients for gender dysphoria. As the Clinical Director, I oversee the clinical practice, which includes four other physicians, two clinical social workers, and nursing and administrative staff. I also actively conduct research related to transgender medicine and mental health concerns specific to transgender youth.

8. In addition to my work with transgender children and adolescents, I also treat children and adolescents with differences of sex development ("DSD"), commonly referred to as intersex conditions. I participate in the DSD Clinic's monthly meetings and approximately 5% of my patients are children and adolescents with DSDs.

9. My academic duties as an assistant professor include teaching lectures entitled "Puberty," "Transgender Medicine," and "Pediatric Growth and Development." I am also the Director of the Transgender Medicine elective for the University of Michigan Medical School.

10. My recent publications include *Health Disparities Facing Transgender and Gender Nonconforming Youth Are Not Inevitable*, Pediatrics, 141(3), 1–2 (2018); *Psychological Profile of the First Sample of Transgender Youth Presenting for Medical Intervention in a U.S. Pediatric Gender Center*, Psych. Sexual Orientation & Gender Diversity, 4(3), 374–82 (2017); *The Effect of Lesbian, Gay, Bisexual, and Transgender-Related Legislation on Children*, J. Pediatrics, 178(5-6.e1), 5–7 (2016); *Advances in the Care of Transgender Children and Adolescents*, Advances Pediatrics, 63(1), 79-102 (2016); *The Role of Assent in the Treatment of Transgender Adolescents*, Int'l J. Transgenderism, 16(2), 97-102 (2015); and *Serving Transgender Youth: Challenges, Dilemmas, and Clinical Examples*, Professional Psychology: Research and Practice, 46(1), 37–45 (2015). I have also co-authored chapters of textbooks, including "Medical

Treatment of the Adolescent Transgender Patient" in *Gender Affirmation: Medical and Surgical Perspectives* (Christopher J. Salgado et al. eds., 2016). A listing of my publications is included in my curriculum vitae in **Exhibit A**.

11. I have been invited to speak at numerous hospitals, clinics, and conferences on topics related to clinical care and standards for treating transgender children and youth. For example, in December 2017 I spoke at the Nursing Unit (12-West) Annual Educational Retreat in Michigan on the topic of "Gender Identity at the Children's Hospital," and in October 2017, I planned, hosted, and spoke at a conference in Michigan entitled "Transgender and Gender Non-Conforming Youth: Best Practices for Mental Health Clinicians, Educators, & School Staff."

12. In October 2019, I was invited by the Michigan Organization on Adolescent Sexual Health to speak to community groups across Southeast Michigan on the topic of "Gender Identity in Adolescents—Supporting Transgender Youth." A listing of my lectures is included in my curriculum vitae in **Exhibit A**.

13. I belong to a number of professional organizations and associations relating to (i) the health and well-being of children and adolescents, including those who are transgender; and (ii) appropriate medical treatments for transgender individuals. For example, I am currently a member of the Pediatric Endocrine Society where I serve on the Gender Identity Special Interest Group's Education Committee, and the World Professional Association for Transgender Health ("WPATH"), an international multidisciplinary professional association to promote evidence-based care, education, research, advocacy, public policy, and respect in transgender health. Both organizations are central in the development of the standards of care for the treatment of gender dysphoria. A complete list of my involvement in various professional associations is located in my curriculum vitae in **Exhibit A**.

14. In preparing this declaration, I reviewed the text of Senate Bill 1165 ("SB 1165") at issue in this matter. I also relied on my scientific education and training, my

research experience, and my knowledge of the scientific literature in the pertinent fields. The materials I have relied upon in preparing this declaration are the same types of materials that experts in my field of study regularly rely upon when forming opinions on these subjects. I may wish to supplement these opinions or the bases for them as a result of new scientific research or publications or in response to statements and issues that may arise in my area of expertise.

15. I have not met or spoken with the Plaintiffs or their parents for purposes of this declaration. My opinions are based solely on the information that I have been provided by Plaintiffs' attorneys as well as my extensive background and experience treating transgender patients.

16. In the past four years, I have been retained as an expert and provided testimony on behalf of transgender plaintiffs in the following cases: *Dekker v. Weida*, No. 4:22-cv-00325-RH-MAF (N.D. Fla.); *Boe v. Marshall*, No. 2:22-cv-00184-LCB-CWB (M.D. Ala.); *Roe v. Utah High Sch. Activities Ass'n*, No. 220903262 (3d Jud. Dist. in and for Salt Lake County, Utah); *Menefee v. City of Huntsville Bd. of Educ.*, No. 5:18-cv-01481-LCB (N.D. Ala.); *Flack v. Wis. Dep't of Health Servs.*, No. 3:18-cv-00309-wmc (W.D. Wis.); *Whitaker v. Kenosha Unified Sch. Dist. No. 1 Bd. of Educ.*, No. 2:16-cv-00943-PP (E.D. Wis.). I also provided expert witness testimony on behalf of a parent in a custody dispute involving a transgender child in the following case: *In the Interest of Younger*, No. DF-15-09887 (Dallas County, Tex.) and have been retained on a case in Arizona related to gender identity and legal documentation of sex.

17. I am being compensated at an hourly rate for the actual time that I devote to this case, at the rate of $300 per hour for any review of records, preparation of reports, or declarations. I will be compensated with a day rate of $1920 for deposition and trial testimony. My compensation does not depend on the outcome of this litigation, the opinions that I express, or the testimony that I provide.

Medical and Scientific Background on Gender Identity and Gender Dysphoria

18. "Gender identity" is the medical term for a person's internal, innate sense of belonging to a particular sex. Everyone has a gender identity.

19. A person's gender identity has a strong biological basis, although the precise causal mechanism is not yet known. Research suggests that differences in prenatal hormonal exposures, genetic factors, and brain structural differences may all contribute.

20. The terms "gender role" and "gender identity" refer to different things.

21. Gender roles are behaviors, attitudes, and personality traits that a particular society considers masculine or feminine, or associates with male or female social roles. For example, the convention that girls wear pink and have longer hair, or that boys wear blue and have shorter hair, are socially constructed gender roles from a particular culture and historical period.

22. By contrast, gender identity does not refer to socially contingent behaviors, attitudes, or personality traits. It is an internal and largely biological phenomenon.

23. A person's gender identity is innate and cannot be changed by medical or psychological intervention.

24. Living consistently with one's gender identity is critical to the health and well-being of any person, including transgender people.

25. Attempts to "cure" transgender individuals by forcing their gender identity into alignment with their birth sex are harmful and ineffective. Those practices have been denounced as unethical by all major professional associations of medical and mental health professionals, such as the American Medical Association, the American Academy of Pediatrics, the American Psychiatric Association, and the American Psychological Association, among others.

26. From a medical perspective, a person's sex is comprised of several components, including, among others, internal reproductive organs, external genitalia,

chromosomes, hormones, gender identity, and secondary-sex characteristics. Diversity and incongruence in these components of sex are a naturally occurring source of human biological diversity.

27. When a child is born, a healthcare provider designates the child's sex as male or female based on the child's observable anatomy. For most people, that initial designation (often referred to as "assigned sex") turns out to be consistent with the person's gender identity. For a transgender person, however, that initial designation turns out to be inaccurate because it does not reflect the person's gender identity.

28. Due to the incongruence between their assigned sex and gender identity, transgender people experience varying degrees of gender dysphoria, a serious medical condition recognized in the American Psychiatric Association's *Diagnostic and Statistical Manual of Mental Disorders* ("DSM-5") and the World Health Organization's *International Classification of Diseases* ("ICD-10"), where it is referred to as "gender incongruence." Gender dysphoria is highly treatable and can be effectively managed. If left untreated, however, it can result in severe anxiety and depression, eating disorders, substance abuse, self-harm, and suicidality.

29. When transgender adolescents are provided with appropriate medical treatment and have parental and social support, they can thrive and grow into healthy adults.

The Medical Treatment of Gender Dysphoria in Adolescents

30. The goal of medical treatment for transgender patients is to alleviate their distress by allowing them to live consistently with their gender identity. Research and clinical experience have consistently shown the medical treatments for gender dysphoria to be safe and effective.

31. The prevailing standards of care for the treatment of gender dysphoria are developed by WPATH. The WPATH Standards of Care represent expert consensus for clinicians related to medical care for transgender people, based on the best science and

clinical experience. The WPATH Standards of Care were first published in 1979, more than four decades ago, and have been continually updated to reflect new knowledge and research. These standards have been endorsed by the major professional associations of medical and mental health providers in the United States, including the American Medical Association, the American Academy of Pediatrics, the American Psychiatric Association, the American Psychological Association, and the Pediatric Endocrine Society.

32. The Endocrine Society is a 100-year-old global membership organization representing professionals in the field of adult and pediatric endocrinology. In 2017, the Endocrine Society published clinical practice guidelines on treatment recommendations for the medical management of gender dysphoria, in collaboration with the Pediatric Endocrine Society, the European Societies for Endocrinology and Pediatric Endocrinology, and WPATH, among others.

33. Together, the WPATH Standards of Care and the Endocrine Society's clinical practice guidelines establish the prevailing standards governing the healthcare and treatment of gender dysphoria in both youth and adults.

34. Undergoing treatment to alleviate gender dysphoria is commonly referred to as transition. The transition process typically includes one or more of the following three components: (i) social transition, including adopting a new name, pronouns, appearance, and clothing, and correcting identity documents; (ii) medical transition, including puberty-delaying medication and hormone-replacement therapy; and (iii) for adults, surgeries to alter the appearance and functioning primary- and secondary-sex characteristics. Surgery is rarely indicated for transgender minors.

35. At the onset of puberty, adolescents diagnosed with gender dysphoria may be prescribed puberty-delaying medications to prevent the distress of developing physical characteristics that conflict with the adolescent's gender identity. For example, a transgender girl will experience no progression of physical changes caused by

testosterone, including male muscular development, facial and body hair, an Adam's apple, or masculinized facial structures. And in a transgender boy, puberty-blocking medication will prevent breast development, menstruation, and widening of the hips.

36. Thereafter, the treating provider may prescribe cross-sex hormones to induce the puberty associated with the adolescent's gender identity. This treatment is referred to as hormone therapy. The result of this treatment is that a transgender boy typically has the same levels of circulating testosterone as other boys. Similarly, a transgender girl who receives hormone therapy will typically have the same levels of circulating estrogen and testosterone levels as other girls and significantly lower than boys who have begun pubertal development.

Sports and Gender

37. Being transgender is not an accurate proxy for athletic performance or ability. Sex chromosomes and genitals alone do not meaningfully affect athletic performance.

38. Before puberty, there are no significant differences in athletic performance between boys and girls. After puberty, boys perform better on average than girls in most athletic competitions.

39. The biological driver of these average group differences is testosterone, not anatomy or genetics. Both boys and girls produce testosterone. After puberty, however, boys produce much higher levels of testosterone than girls, which results in increased muscle mass and muscle strength. As a result, post-pubertal boys and men have an athletic advantage over girls and women in many sports. *See*, *e.g.*, David J. Handelsman, et al., *Circulating Testosterone as the Hormonal Basis of Sex Differences in Athletic Performance*, 39 Endocrine Revs. 803–29 (2018).

40. Setting aside the narrow category of individuals with DSDs,[1] the ranges of

[1] DSD includes a group of congenital conditions associated with atypical development of internal and external genital structures. These conditions are caused by variations in genes,

testosterone in males and females do not overlap with each other.

41. There are transgender girls and women who have testosterone in the female range because they are receiving hormone therapy or because, as a result of receiving puberty-blocking medication, they never have gone through male puberty.

42. The fact that a girl is transgender, in itself, does not indicate that she has any athletic advantage over other girls.

Plaintiffs and Arizona's Ban on Transgender Girls in Sports

43. There is no medical justification for Arizona to exclude Plaintiffs from girls' interscholastic athletics because they are transgender.

44. Plaintiffs' attorneys have explained to me that Plaintiff Jane Doe is an 11-year-old transgender girl who was diagnosed with gender dysphoria when she was about seven years old and has lived her life as a girl since that time.

45. As part of her medical treatment for gender dysphoria, Jane's doctors have determined that she has not yet started puberty. As a result, Jane has not experienced any of the physiological changes that increased testosterone levels would cause in a pubescent boy.

46. Plaintiffs' attorneys have explained to me that Plaintiff Megan Roe is a 15-year-old transgender girl who was diagnosed with gender dysphoria when she was about 10 years old and has lived as a girl since that time.

47. As part of her medical treatment for gender dysphoria, Megan started to receive puberty-blocking medication when she was 11 years old after clinical documentation of the initial signs of puberty. This medication prevented her from undergoing male puberty. Megan then started to receive hormone therapy when she was 12 years old. As a result, she has not experienced any of the physiological changes, including muscle development, that increased testosterone levels would cause in a

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development in utero, or hormones. Some women who have certain disorders of sexual development may produce levels of testosterone that are typically seen only in men.

pubescent boy. Instead, the hormone therapy she has received has caused her to develop many of the physiological changes associated with puberty in females.

48. SB 1165 suggests that biological "sex is determined at [fertilization] and revealed at birth or . . . *in utero*." S.B. 1165, 55th Leg., 2d Reg. Sess. (Ariz. 2022), § 2.

49. By suggesting sex to mean only biological sex determined at fertilization and revealed in utero or at birth, Arizona prevents Plaintiffs from participating on girls' teams because they are transgender girls. But the biological driver of average differences in athletic performance between men and women is circulating testosterone—not a person's transgender status or their biological sex determined at fertilization and revealed in utero or at birth. A person's genetic makeup and anatomy at birth alone are not reliable indicators of athletic performance.

50. Because both Jane and Megan have not experienced increased testosterone levels that accompany male puberty, they do not have the biological characteristics that would cause them to have an athletic advantage over other girls in some sports.

51. In addition, requiring Plaintiffs to participate on a boys' team would conflict with the standards of care for treating gender dysphoria in adolescents. Such a requirement would be harmful to Plaintiffs' mental, emotional, and physical health.

52. I declare under criminal penalty under the laws of Arizona that the foregoing is true and correct.

Signed on the 4th day of April, 2023, in Ann Arbor, Michigan.

Daniel Shumer, M.D.

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UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF ARIZONA
TUCSON DIVISION

Jane Doe, by her next friend and parents Helen Doe and James Doe; and Megan Roe, by her next friend and parents, Kate Roe and Robert Roe,

Plaintiffs,

v.

Thomas C. Horne in his official capacity as State Superintendent of Public Instruction; Laura Toenjes, in her official capacity as Superintendent of the Kyrene School District; Kyrene School District; The Gregory School; and Arizona Interscholastic Association Inc.,

Defendants.

Case No. _____

DECLARATION OF DR. STEPHANIE BUDGE, PH.D., IN SUPPORT OF PLAINTIFFS' MOTION FOR A PRELIMINARY INJUNCTION AND PLAINTIFFS' MOTION TO PROCEED UNDER A PSEUDONYM

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**Pro hac vice application forthcoming*

I, Stephanie Budge, declare as follows:

1. I submit this expert declaration based upon my personal knowledge.

2. If called to testify in this matter, I would testify truthfully based on my expert opinion.

Qualifications and Experience

3. I am a licensed psychologist who has been specializing in issues of gender identity and gender transition processes for over 15 years. I received a master's degree in educational psychology from the University of Texas at Austin in 2006 and a PhD in counseling psychology in 2011 from the University of Wisconsin-Madison (UW-Madison). My PhD concentration focused on transgender individuals' mental health. As part of my PhD program, I also specialized in psychological assessment. A true and correct copy of my curriculum vitae is attached hereto as **Exhibit A**.

4. I have been a mental health professional since 2006, and I am currently licensed to practice psychology in the state of Wisconsin (license # 3244-57). I have been a faculty member in the UW-Madison Department of Counseling Psychology since 2014.

5. I have expertise working with transgender individuals. Since 2007, I have been a mental health provider to transgender individuals. Since 2011, transgender individuals have comprised the majority of my clinical caseload, and I have worked clinically with over 200 transgender clients through the provision of individual therapy, group therapy, psychological evaluations, and supervision of others' clinical work.

6. As a faculty member at UW-Madison, I teach courses that focus on training master's and doctoral students skills to become mental health professionals and psychological researchers. I provide *pro bono* therapy and train student therapists in best practices in clinical work with transgender clients at the Counseling Psychology Training Clinic (CPTC), the community clinic affiliated with my academic department at UW-Madison.

7. As part of my faculty appointment, I am the Director of the Trans CARE Collaborative. In this role, I design research projects that focus on transgender individuals' mental health.

8. I am also the Director of the Advancing Health Equity and Diversity (AHEAD) program in the School of Medicine and Public Health at UW-Madison. In this role, I mentor postdoctoral scholars and junior faculty in the School of Medicine and Public Health who focus their clinical and research efforts on health equity issues.

9. I have published 99 invited and peer-reviewed journal articles and book chapters, with the majority of these focusing on transgender individuals. Several of these publications are focused on the impact of discrimination on transgender people's mental health and effective interventions to improve transgender people's mental health. I have been involved in more than 180 academic presentations (internationally, nationally, and regionally), the majority of which have focused on transgender individuals. I am an associate editor for the journal *Psychology of Sexual Orientation and Gender Diversity*. I am on the editorial board for the *International Journal of Transgender Health* and *LGBTQ+ Family: An Interdisciplinary Journal*. Researchers in the United States and internationally have sought my assistance as an expert reviewer for research focused on transgender individuals. A listing of my publications and lectures is included in my curriculum vitae in **Exhibit A**.

10. I have received several awards for my work with transgender individuals. Most recently, I received the 2021 American Psychological Association (APA) Distinguished Contribution to Counseling Psychology Award for my clinical work and research with transgender people. I also received the 2021 APA Social Justice Award for my contributions to psychotherapeutic practice with transgender people. I was the first recipient of the APA Transgender Research Award in 2010. Locally, I am also a member of the Wisconsin Trans Health Coalition (WTHC), which is an organization focused on

improving health care for transgender individuals throughout Wisconsin. My primary role in the coalition is to consult on research projects and collect data about transgender individuals in the upper Midwest to tailor health care interventions for local community members. For my community-focused research with the WTHC, I received the 2018 UW-Madison School of Education Community Engaged Scholar Award, the 2021 UW-Madison Exceptional Service Award, and the 2022 UW-Madison School of Education Excellence in Diversity Award.

11. I am also a member of the Society for the Psychology of Sexual Orientation and Gender Diversity within the APA (of which I am also a member). In August 2021, I completed a 10-year term as co-chair of the Science Committee for the Society and now continue as a member of the committee. We provide programming at the annual APA convention to disseminate cutting-edge research on the best psychological practices and evidence-based treatments with lesbian, gay, bisexual, transgender, and queer (LGBTQ) individuals. At the 2022 APA annual convention, I chaired or participated in six presentations/panels that focused on (a) best practices in psychological science focused on transgender populations; and (b) interventions to reduce psychological distress for transgender individuals. In 2021, I became a Fellow of the APA.

12. I am also a member of the World Professional Association of Transgender Health (WPATH). WPATH is an interdisciplinary professional and educational organization of individuals worldwide specializing in research and practice in transgender health. A complete list of my involvement in various professional associations is included in my curriculum vitae in **Exhibit A**.

13. In preparing this declaration, I reviewed the text of Senate Bill 1165 ("SB 1165") at issue in this matter. I also relied on my scientific education and training, my research experience, and my knowledge of the scientific literature in the pertinent fields. The materials I have relied upon in preparing this declaration are the same types of materials that experts in my field of study regularly rely upon when forming opinions on

these subjects. I may wish to supplement these opinions or the bases for them because of new scientific research or publications or in response to statements and issues that may arise in my area of expertise.

14. I have not met or spoken with the Plaintiffs or their parents for purposes of this declaration. My opinions are based solely on the information that Plaintiffs' attorneys have provided me as well as my extensive background and experience with transgender clients.

15. In the past six years, I have been retained as an expert witness in the following cases: *Whitaker v. Kenosha Unified Sch. Dist. No. 1 Bd. Of Educ.*, No. 16-3522 (7th Cir.), *Flack v. Wis. Dep't of Health Servs.*, No. 3:18-cv-00309 (W.D. Wis.), *Boyden v. State of Wis. Emp. Trust Funds*, No. 17-cv-00264-wmc (W.D. Wis.), *Cooper v. USA Powerlifting & USA Powerlifting Minn.*, No. 62-CV-21-211 (Minn.), *Bridge v. Okla. State Dep't of Educ.*, No. CIV-22-787-JD (W.D. Okla.), and *Lusk v. Minn. Dep't of Corr.*, No. 62-CV-22-3284 (Minn.). Of these cases, I provided testimony by deposition and at trial in *Boyden* and testimony by deposition in *Cooper*.

16. I am being compensated at an hourly rate of $250/hour for actual time devoted for research, preparation, reports, and/or consulting related to my expert opinion in this case. If deposed or providing testimony in the state of Wisconsin, I will be compensated at a rate of $400/hour. I also receive $3,000 a day for compensation when travel is required for my services. My compensation does not depend on the outcome of this litigation, the opinions I express, or the testimony I provide.

<u>Transgender Youth</u>

17. The term "gender identity" is well-established in psychology and medicine and refers to a person's internal or psychological sense of having a particular gender. All human beings have a gender identity. Human beings usually begin to explore and understand their gender identity around the age of three (with some variation).

18. At birth, the sex of infants is generally identified as male or female based on external genitalia. Typically, individuals born with the external physical characteristics commonly associated with males grow up to identify as men and experience themselves as male, and individuals born with the external physical characteristics commonly associated with females grow up to identify as women and experience themselves as female. However, for transgender individuals, their gender identity differs from the sex they were identified as at birth.

19. Every individual's sex is comprised of many distinct biologically influenced characteristics, including but not limited to chromosomal makeup, hormones, internal and external reproductive organs, secondary sex characteristics, and gender identity.

20. Transgender children and adolescents experience a pervasive, consistent, persistent, and insistent sense of being a gender different from the sex assigned to them.

21. Gender identity is innate and cannot be changed through psychological or medical treatments. A girl who is transgender cannot simply turn off her gender identity like a switch, any more than a non-transgender girl or anyone else could. It is not a personal decision, preference, or belief. It is a core sense of oneself.

22. Like all children, transgender youth can thrive and grow into healthy adults when they are supported by their parents and caretakers and their social environment.

Medical Care for Transgender Youth

23. The incongruence between a person's gender identity and sex assigned at birth can manifest in clinically significant and disabling distress, which the APA calls gender dysphoria.[1] Gender dysphoria is codified in the APA's Diagnostic and Statistical Manual of Mental Disorders (DSM-5) and is the medical and psychiatric diagnosis for distress associated with gender incongruence.

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1 American Psychiatric Association, *Diagnostic and Statistical Manual of Mental Disorders* (5th ed. 2013).

24. Two current diagnostic categories are used by mental health and medical providers when children and youth are transgender: Gender Dysphoria in Childhood (DSM Diagnostic Code F64.2) and Gender Dysphoria in Adolescents and Adults (DSM Diagnostic Code F64.9). Although individuals who are diagnosed with gender dysphoria can experience a diversity of symptoms, the shared diagnostic criteria that is required for both includes clear, distinct, and significant distress from the incongruence between the sex the individual was assigned at birth and their gender identity.

25. Gender dysphoria is highly treatable, and the medical community has known for decades how to treat this serious medical condition. Every major medical association in the United States agrees that medical treatment for gender dysphoria is safe, necessary, and effective.

26. The precise treatment for gender dysphoria depends on the individual. For most transgender individuals, a gender transition is considered psychologically and medically necessary. Transition can take either or both of two forms: (a) social transition, and (b) medical treatments that change a person's body to align with their gender.

27. For transgender individuals, social transition can be an important aspect of treatment to reduce the symptoms of gender dysphoria. As part of a social transition, an individual will typically, among other things, use a name and pronouns congruent with their gender identity and use sex-designated facilities such as restrooms that align with their gender identity. To be clinically effective at alleviating the distress associated with gender dysphoria, a social transition must be respected consistently across all aspects of a transgender individual's life—for example, at home, in school, and at work. It is the aim of treatment to assist the individual in successfully integrating their internal identity into a life that allows them to function consistently in accordance with that identity and not feel shame for who they are. For those transgender adolescents for whom social transition is part of treatment of gender dysphoria, it is likely that serious distress will result if clinically indicated aspects of transition are impeded.

28. Many transgender patients also undergo medical procedures to assist them with achieving primary or secondary sex characteristics that are closely aligned with their gender identity. Hormone therapy may be prescribed—either puberty-blocking hormones designed to delay the onset of physical changes associated with puberty and/or hormones designed to masculinize or feminize the individual's appearance. Chest reconstruction may be advised for some older adolescents, depending on several factors. Genital surgery is generally not advised until after the adolescent has reached the age of majority. Whether any of these medical interventions are indicated for a patient depends on the needs of the individual patient.

29. Transgender girls treated with hormone therapy may appear indistinguishable from non-transgender girls. Transgender girls who are prescribed puberty blockers will not develop the deepened voice, facial hair, and muscle development experienced by boys during puberty, and if that is followed by estrogen and anti-androgen medication, they will have breast development, redistribution of fat (specific to abdomen, buttocks, hips, thighs, and arms), musculature, and hair and skin texture typical of other girls.

30. Psychotherapy to reduce the harmful effects of stigma and improve resiliency can also be an important form of support for individuals of any age with gender dysphoria. While psychotherapy can be useful as a support tool, it is not a substitute for social transition and medical treatments needed to reduce/eliminate gender dysphoria.

31. There is no "one size fits all" treatment regimen. In addition, individuals may be constrained by practical limitations—such as medical contraindications or cost—on the ability to obtain particular treatments.

32. Attempts to "cure" transgender individuals by seeking to change their gender identity to match their assigned sex are ineffective and cause extreme psychological damage. All major associations of medical and mental health providers, including the American Medical Association, the American Psychiatric Association, the

American Psychological Association, and the American Academy of Pediatrics, consider such efforts unethical.

33. When individuals with gender dysphoria do not obtain competent and necessary treatment, serious and debilitating psychological distress (for example, suicidal ideation, substance use, depression, anxiety, and self-harm) often occurs.

34. Failing to support a transgender minor's gender identity can cause serious harm to their long-term health and wellbeing because transgender youth experience that mistreatment as a profound rejection of their core self. This harm often includes significant psychological distress and difficulty maintaining healthy interpersonal relationships and developing emotional resilience, among others.

Participating in Sports Provides Significant Long-Term Benefits to a Child's Mental and Physical Health and Wellbeing

35. For children and young adults, school-sponsored athletics offer lifelong benefits and have a positive developmental impact that is second only to family support. These benefits can be seen in a variety of realms in students' lives, including social and emotional development as well as physical and mental health. With regards to social benefits, students who participate in sports are given the opportunity to make friends and become part of a supportive community of teammates and peers.[2] Athletes spend considerable time with their teammates, often experiencing high-pressure situations together that lead to deeper friendships. Students who participate in sports also can build teamwork, discipline, and leadership skills. They learn the importance of working as part of a team to achieve a common goal and the importance of each teammate's role in bringing about that goal. Moreover, coaches and other staff members provide students

[2] *See* Erin M. Boone & Bonnie J. Leadbeater, *Game On: Diminishing Risks for Depressive Symptoms in Early Adolescence Through Positive Involvement in Team Sports*, 16 J. Rsch. Adolescence 79 (2006).

who participate in sports access to meaningful mentorship and guidance. This mentorship can extend beyond school athletics, guiding students through other areas of their lives.

36. With regards to emotional benefits, school sports provide an opportunity for youth to gain confidence. They also reduce the effects of risk factors, such as stressful life events, that lead to increases in depression.[3] Furthermore, learning how to manage stressful events at a young age provides benefits to student athletes throughout their lives, such as learning how to regulate their emotions.[4] Students who participate in sports experience significantly lower levels of externalizing issues (for example, aggression and delinquency) and anxiety/depression.[5] Students also experience the success and personal fulfillment achieved from discipline, hard work, and perseverance through many hours of practice and competition, all of which helps students develop positive habits that can benefit them in many other areas of life.[6]

37. With regards to physical and mental health benefits, students who play school sports have fewer physical and mental health concerns when compared to those who do not.[7] Participation in sports at a young age also encourages continued participation as an adult, in turn reducing the morbidity and mortality of many diseases that can arise later in life.[8]

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[3] *See id.* at 79, 88.

[4] *See, e.g.*, Stewart A. Vella et al., *Sports Participation and Parent-Reported Health-Related Quality of Life in Children: Longitudinal Associations*, 164(6) J. Pediatrics 1469 (2014).

[5] *See* Sarah J. Donaldson & Kevin R. Ronan, *The Effects of Sports Participation on Young Adolescents' Emotional Well-Being*, 41 Adolescence 369 (2006).

[6] *See*, *e.g.*, Jennifer Y. Mak & Chong Kim, *Relationship Among Gender, Athletic Involvement, Student Organization Involvement and Leadership*, 25:2 Hum. Kinetics J. 89 (2016); Robert P. Dobosz & Lee A. Beaty, *The Relationship Between Athletic Participation and High School Students' Leadership Ability*, 34 Adolescence 215 (1999).

[7] Hans Steiner et al., *Adolescents and Sports: Risk or Benefit?*, 39 Clinical Pediatrics 161, 164 (2000).

[8] Christer Malm et al., *Physical Activity and Sports—Real Health Benefits: A Review with Insight into the Public Health of Sweden*, 7 Sports 1, 13–14 (2019).

38. Moreover, students who participate in high school sports are more likely to finish college and to be actively engaged in planning for their future. Participation in sports also has a positive impact on academic achievement.[9]

The Negative Impact of Banning Transgender Girls from School Sports

39. Based on my experience working with transgender youth, it would be psychologically damaging for a transgender girl to be banned from playing sports on equal terms with their non-transgender peers. This specific type of discrimination causes irreversible and severe damage to their development. Specifically, discriminating against transgender youth athletes leads to an increase in youth anxiety, depression, trauma, and suicidal ideation/attempts as well as an increase in physical health concerns for transgender youth.[10] Barrera et al. (2022) report that the physical consequences for transgender youth of not being able to participate in sports include worse cardiovascular outcomes, poor bone mineral density, and poor neurocognitive development when compared to non-transgender youth.[11] In addition, physicians report that participation in sports is often one primary method through which transgender youth gain access to regular medical care, and if they do not participate in sports, it increases the disparity between non-transgender youth and transgender youth.[12] In addition to the physical and mental health consequences of not being able to participate in sports, transgender people

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[9] *See, e.g.*, Angela Lumpkin & Judy Favor, *Comparing the Academic Performance of High School Athletes and Non-Athletes in Kansas in 2008-2009*, 4 J. Sport Admin. & Supervision 41 (2012).

[10] Landon D. Hughes et al., *Pediatric Provider Perspectives on Laws and Policies Impacting Sports Participation for Transgender Youth*, 9(4) LGBT Health 247–53 (2022).

[11] Ellis Barrera et al., *The Medical Implications of Banning Transgender Youth from Sport Participation*, 176(3) JAMA Pediatrics 223–24 (2022).

[12] *See* Hughes et al., *supra* note 10.

report greater experiences of harassment, prejudice, rejection, and bullying as a result of legislation focused on restricting transgender people's rights.[13]

40. Transgender girls will also internalize the shame and stigma of being excluded for a personal characteristic (being transgender) over which they have no control and that already subjects them to prejudice and social stigma. Fear of additional discrimination and violence are two primary outcomes that stem from transgender girls being excluded from sports. Not only are there the actual consequences outlined above that occur from direct discrimination, but fear of additional sports-related discrimination leads transgender youth to avoid gym/physical education class, locker rooms, and athletic fields and facilities.[14] Also, being misgendered (i.e., requiring transgender girls to participate in boys' sports) is associated with the internalization of stigma and the subsequent mental health consequences that arise from internalized stigma.[15]

41. For transgender girls who are already playing on girls' teams, a law that requires them to be excluded from continued participation on girls' teams would have a further negative impact on their health and well-being, causing them to feel isolated, rejected, and stigmatized, and thereby putting them at high risk for severe depression and/or anxiety.

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[13] Elliot A. Tebbe et al., *A Dangerous Visibility: Moderating Effects of Anti-Trans Legislative Efforts on Trans and Gender-Diverse Mental Health*, 9(3) Psych. Sexual Orientation Gender Diversity 259–71 (2021).

[14] Joseph G. Kosciw, et al., GLSEN, *The 2021 National School Climate Survey: The Experiences of LGBTQ+ Youth in Our Nation's Schools* 10–11 (2022).

[15] Kevin A. McLemore, *Experiences with Misgendering: Identity Misclassification of Transgender Spectrum Individuals*, 3(1) Stigma & Health 53–64 (2015).

I declare under criminal penalty under the laws of Arizona that the foregoing is true and correct.

Signed on the 7th day of April, 2023 in Madison, Wisconsin.

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IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF ARIZONA
TUCSON DIVISION

Jane Doe, by her next friends and parents Helen Doe and James Doe; and Megan Roe, by her next friends and parents, Kate Roe and Robert Roe,

Plaintiffs,

v.

Thomas C. Horne, in his official capacity as State Superintendent of Public Instruction; Laura Toenjes, in her official capacity as Superintendent of the Kyrene School District; Kyrene School District; The Gregory School; and Arizona Interscholastic Association, Inc.,

Defendants.

Case No.:_____

PLAINTIFFS' MOTION FOR A PRELIMINARY INJUNCTION AND MEMORANDUM OF LAW IN SUPPORT THEREOF

ORAL ARGUMENT REQUESTED

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INTRODUCTION

Plaintiffs Jane Doe and Megan Roe are transgender girls who want an equal opportunity to try out for and participate on the girls' volleyball, soccer, basketball, and cross-country teams at their schools. They are prohibited from doing so by Ariz. Rev. Stat. § 15-120.02 (the "Ban"), which categorically bars transgender girls from playing on girls' interscholastic or intramural sports teams, regardless of their individual circumstances or qualifications for doing so. The Ban bars Plaintiffs from playing on girls' teams because they are transgender even though Plaintiffs have not undergone male puberty and do not have a competitive or physiological advantage over their non-transgender peers.

Plaintiffs have filed suit in this Court alleging that, as applied to them, the Ban violates their rights to equal treatment under the Equal Protection Clause of the Fourteenth Amendment, Title IX, the ADA, and the Rehabilitation Act. Plaintiffs now move for a preliminary injunction on their Title IX and Equal Protection claims so they can have an equal opportunity to play school sports on girls' teams during the upcoming school year while this case proceeds. Tryouts for the earliest sport start in mid-July of this year.

The Ban singles out transgender girls and therefore impermissibly discriminates "on the basis of sex" under Title IX. The Ban also violates the Equal Protection Clause because it discriminates against Plaintiffs based on their transgender status and cannot survive rational basis review, much less the heightened scrutiny required here. If enforced against Plaintiffs, the Ban will cause Plaintiffs irreparable mental, physical, and emotional harm, in addition to the violation of their constitutional rights. The public interest and balance of equities favor a preliminary injunction. For these reasons and those set forth below, the Court should preliminarily enjoin the Ban as to Plaintiffs.

STATEMENT OF FACTS

I. PLAINTIFFS ARE TRANSGENDER GIRLS AND STUDENT ATHLETES

A. Medical Background on Transgender Youth and Treatment for Gender Dysphoria

A transgender person is one whose gender identity differs from the person's assigned sex at birth. (Budge Decl. ¶ 18.) "Gender identity" is the medical term for a person's internal, innate, deeply-held sense of their own gender. (Shumer Decl. ¶ 18.) Everyone has a gender identity. (*Id.*) There is a medical consensus that a person's gender identity is not subject to voluntary change and has a significant biological foundation. (*Id.* ¶ 23.)

When a child is born, a health care provider identifies the child's sex based on the child's observable anatomy. (*Id.* ¶ 27.) In medical terminology, this is often referred to as the person's "assigned sex." (*Id.*) In most cases, that initial designation turns out to be accurate. (*Id.*) Most children who are identified as female at birth grow up to be female, and most children who are identified as male at birth grow up to be male. (*Id.*) For a transgender person, however, that initial designation does not match the person's gender identity. (*Id.*)

Gender dysphoria is a serious medical condition characterized by intense and, in some cases, disabling distress due to the incongruence between a person's gender identity and assigned sex. (Budge Decl. ¶ 23.) The treatment for gender dysphoria is well-established and highly effective. (*Id.* ¶ 25; Shumer Decl. ¶ 28.) When individuals with gender dysphoria are diagnosed and receive appropriate medical care, they can thrive. (Shumer Decl. ¶ 29.) If untreated, however, gender dysphoria causes serious harms, including anxiety, depression, eating disorders, substance abuse, self-harm, and suicide. (Budge Decl. ¶ 33; Shumer Decl. ¶ 28.)

The major associations of medical and mental health providers in the United States, including the American Medical Association, the American Academy of Pediatrics, the American Psychiatric Association, the American Psychological Association, and the Pediatric Endocrine Society, have adopted medical standards of care for treating gender dysphoria in adolescents, which were developed by the World Professional Association for Transgender Health and the Endocrine Society. (Shumer Decl. ¶ 31.) The goal of treatment is to permit transgender adolescents to live consistent with their gender identity in all aspects of their lives. (*Id.* ¶ 30.) In addition, when a child begins puberty, doctors may prescribe puberty-blocking medication and, for older adolescents, hormone therapy. (*Id.* ¶¶ 35–36.)

Before puberty, boys and girls do not differ significantly in athletic performance. (*Id.* ¶ 38.) After puberty, adolescent boys begin to produce higher levels of testosterone, which over time causes them to become, on average, stronger and faster than adolescent girls. (*Id.* ¶¶ 38–39.) There is a scientific consensus that the biological driver of average group differences in athletic performance between adolescent girls and boys is differences in their respective levels of testosterone, which begin to diverge significantly only after the onset of puberty. (*Id.* ¶ 39.)

Transgender girls who receive puberty-blocking medication do not have an athletic advantage over other girls because they do not go through male puberty. (*Id.* ¶¶ 40–42.) As a result, they do not experience the physiological changes caused by the increased production of testosterone associated with male puberty. (*Id.* ¶ 35.) When those girls subsequently receive hormone therapy, their bodies develop the skeletal structure, fat distribution, and muscle and breast development typical of other girls. (Budge Decl. ¶ 29; Shumer Decl. ¶¶ 35–36.) Transgender girls who receive these medical treatments typically have testosterone levels in the same range as other girls. (Shumer Decl. ¶ 36.)

For transgender youth, research has shown that being accepted and supported is enormously beneficial to their health and well-being. (*Id.* ¶ 29; Budge Decl. ¶ 22.) Conversely, being denied recognition and support can cause significant harm, exacerbate gender dysphoria, and expose them to the risk of discrimination and harassment. (Shumer Decl. ¶ 28.)

B. Jane Doe

Plaintiff Jane Doe is an 11-year-old transgender girl who will begin middle school in the Kyrene School District in July. (J. Doe Decl. ¶ 1.) Jane was diagnosed with gender dysphoria when she was seven years old and lives as a girl in all aspects of her life. Jane has not yet started puberty. (H. Doe Decl. ¶¶ 7, 11.) Jane's doctors are currently monitoring her for signs for the onset of puberty as part of her medical treatment for gender dysphoria. (*Id.* ¶ 11.) As a result, Jane has not experienced any of the physiological changes that increased testosterone levels would cause in a pubescent boy. (Shumer Decl. ¶ 45; Budge Decl. ¶ 28.)

Sports are a vital part of Jane's life. (J. Doe Decl. ¶¶ 5–8.) Her family places a high value on sports' benefits. (H. Doe Decl. ¶¶ 12–13.) Jane particularly loves playing soccer and has played soccer on girls' club and recreational sports teams for nearly five years. (J. Doe Decl. ¶¶ 6–8.) In addition to her passion for the sport, soccer has allowed Jane to make new friends and establish a sense of community. (*Id.* ¶ 7.) The friendships she has made through soccer are enriching and meaningful. (H. Doe Decl. ¶ 13.) Jane has shared that she is a transgender girl with her coaches and soccer teammates, who are highly supportive of her identity. (*Id.* ¶ 9.)

The Ban will apply to Jane when she enters Kyrene Aprende Middle School this July. Jane intends to try out for the girls' soccer team in the winter 2023-2024 athletic season, the cross-country team in the 2023 summer season (which starts in mid-July), and the girls' basketball team in the spring 2024 season. (J. Doe Decl. ¶ 9.) Both soccer and

basketball at Kyrene Aprende Middle School have separate teams for boys and girls. (*Id.*) While the cross-country team practices co-educationally, the sexes compete separately. (*Id.*) Jane is excited to play on the girls' teams with her friends and peers. (*Id.* ¶¶ 8–9.) However, if the Ban applies to her, Jane will be banned from trying out for and playing and competing on the girls' soccer, cross-country, and basketball teams.

Jane will not participate in sports at all if she is forced to be on a boys' team. (*Id.* ¶¶ 10–11.) Her health depends on her ability to live her life fully as a girl, and playing sports on a boys' team and competing with boys would contradict her medical care and jeopardize her health. (H. Doe Decl. ¶¶ 15–16.) It would also be painful and humiliating to Jane—who is accepted as a girl—to be forced to play on the boys' teams. (J. Doe Decl. ¶¶ 11–12.)

C. Megan Roe

Megan Roe is a 15-year-old transgender girl who resides in Pima County, Arizona and attends The Gregory School. (M. Roe Decl. ¶¶ 2, 5.) Megan was diagnosed with gender dysphoria when she was 10 years old. (K. Roe Decl. ¶ 6.) Before starting at The Gregory School, Megan's parents shared with administrators and teachers at the school that Megan is a transgender girl, and The Gregory School is highly supportive of Megan and her identity. (M. Roe Decl. ¶ 5.) As part of her medically-prescribed treatment for gender dysphoria, Megan has been receiving puberty-blocking medication since she was 11 years old, after clinical documentation of the initial signs of puberty. (K. Roe Decl. ¶ 6.) This medication has prevented her from undergoing male puberty. (*Id.*) Megan also started to receive hormone therapy when she was 12 years old. (*Id.*) As a result of these medical treatments, she has not experienced the physiological changes that increased testosterone levels would cause in a pubescent boy. (*Id.*) Instead, the hormone treatment she has received has caused her to develop physiological changes associated with puberty in females. (Shumer Decl. ¶ 47; Budge Decl. ¶ 29.)

Megan enjoys playing volleyball and intends to try out for the girls' volleyball team at The Gregory School for this year's fall season. (M. Roe Decl. ¶ 7.) Volleyball is one of the most important sports in the school's social fabric—the matches are an important social occasion, which are well-attended by the school community. (*Id.* ¶ 8; K. Roe Decl. ¶ 8.) Her school friends are also on the girls' volleyball team. (M. Roe Decl. ¶ 7.) Megan's teammates, coaches, and school are highly supportive of her and would welcome her participation in the girls' volleyball team. (*Id.* ¶ 5; K. Roe Decl. ¶¶ 5, 12.) However, if the Ban applies to Megan, she will not be able to play on the girls' volleyball team and will be deprived of the opportunity to play school sports.

Megan will not compete on the boys' volleyball team, as her health and well-being depend on her ability to live her life as a girl in all aspects. (M. Roe Decl. ¶ 9; K. Roe Decl. ¶ 10.) Playing on the boys' team contradicts her medical care, and it would also be painful and humiliating. (M. Roe Decl. ¶ 9; K. Roe Decl. ¶¶ 9–11.) The Ban will deny Megan the opportunity to participate in school sports and enjoy the physical, emotional, and social benefits of playing on a school sports team. She will lose her chance to be on the volleyball team, maintain her friendships, and foster a sense of community at her school.

II. THE ARIZONA INTERSCHOLASTIC ASSOCIATION'S PRIOR POLICY ON TRANSGENDER STUDENT PARTICIPATION

Prior to the enactment of the Ban, transgender girls were permitted to play on girls' sports teams. Each school or school district set its own rules on transgender students' participation in intramural sports, and the Arizona Interscholastic Association, Inc. (the "AIA") set rules for transgender students' participation in interscholastic sports. (Compl. ¶ 19.) In October 2014, the AIA Executive Board for the first time approved a transgender student athlete's request to participate on a team consistent with that student's gender identity. (*Id.* ¶ 20.) By December 2018, the AIA formalized its policy to

permit transgender students to play on teams consistent with their gender identity so long as they had a letter of support from their parent or guardian explaining when their child realized they were transgender. (*Id.* ¶ 21.) At that time, the AIA received only two or three requests from transgender students. (*Id.* ¶ 22.)

III. THE ARIZONA SPORTS BAN IS ENACTED

Despite the AIA's successful policies, Arizona enacted the "Save Women's Sports Act" (S.B. 1165) on March 30, 2022. *See* Ariz. Rev. Stat. § 15-120.02. The Ban requires each public school team and private school team that competes against a public school team to be designated as male, female, or co-ed based on "the biological sex of the students who participate." *Id.* § 15-120.02(A). The Ban's Legislative Findings provide that for purposes of school sports a student's sex is determined at "fertilization and revealed at birth or, increasingly, *in utero*." S.B. 1165, 55th Leg., 2d Reg. Sess. (Ariz. 2022), § 2 (internal citation and brackets omitted). The Ban, therefore, defines Plaintiffs, who are transgender girls, as male. The Ban requires that "athletic teams or sports designated for 'females,' 'women,' or 'girls,' may not be open to students of the male sex." Ariz. Rev. Stat. § 15-120.02(B).

IV. DIFFERENCES IN ATHLETIC ABILITY BETWEEN BOYS AND GIRLS STEM FROM POST-PUBERTAL TESTOSTERONE LEVELS, NOT A PERSON'S SEX AT BIRTH

An individual's genetic makeup and anatomy at birth are not reliable indicators of athletic performance because sex chromosomes and genitals alone do not meaningfully affect athletic performance. (Shumer Decl. ¶ 37.) Rather, the performance differences between adolescent girls and boys in sports are due to differences in their levels of testosterone, which do not diverge significantly until puberty. (*Id.* ¶¶ 38–39.)

Transgender girls who receive medical treatment, such as puberty-blocking medication, do not undergo male puberty or experience physiological changes caused by

increased testosterone production. (*Id.* ¶¶ 35, 41.) There is no physiological reason that transgender girls who have not undergone male puberty would have any athletic advantage over other girls. (*Id.* ¶¶ 37, 42.) Simply knowing that a girl is transgender reveals nothing about her athletic ability. (*Id.* ¶ 42.)

ARGUMENT

A preliminary injunction is warranted here because Plaintiffs can establish: (1) they are likely to succeed on the merits of their claims; (2) they are likely to suffer irreparable harm in the absence of preliminary relief; (3) the balance of equities tips in their favor; and (4) an injunction is in the public interest. *See All. for the Wild Rockies v. Cottrell*, 632 F.3d 1127, 1131 (9th Cir. 2011). When the government is a party, the third and fourth factors merge. *Nken v. Holder*, 556 U.S. 418, 435 (2009); *Porretti v. Dzurenda*, 11 F.4th 1037, 1050 (9th Cir. 2021). Where, as here, the burden to justify the Ban under the Equal Protection Clause "rests entirely on the State," *United States v. Virginia*, 518 U.S. 515, 533 (1996), the burden to show a likelihood of success shifts to Defendants at the preliminary injunction stage for the Equal Protection claim. *See Gonzales v. O Centro Espirita Beneficente Uniao de Vegetal*, 546 U.S. 418, 429–30 (2006).

I. PLAINTIFFS ARE LIKELY TO SUCCEED ON THE MERITS

Courts across the country, including within this Circuit, have held that excluding transgender girls from girls' sports teams violates the Equal Protection Clause and Title IX. *See, e.g.*, *A.M. v. Indianapolis Pub. Sch.*, --- F. Supp. 3d ---, 2022 WL 2951430, at *11 (S.D. Ind. July 26, 2022) (granting preliminary injunction to stop enforcement of a similar law because it violates Title IX); *Hecox v. Little*, 479 F. Supp. 3d 930, 988 (D. Idaho 2020) (same under Equal Protection Clause); *see also Roe v. Utah High Sch. Activities Ass'n*, 2022 WL 3907182, at *4 (Utah Dist. Ct. Aug. 19, 2022) (holding that

transgender sports ban violated Utah's "state-law counterpart to the federal Equal Protection Clause"). The Court should find the same here.

A. Applying the Ban to Plaintiffs Violates Title IX

Title IX provides that no person "shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any educational program or activity receiving Federal financial assistance[.]" 20 U.S.C. § 1681(a).[1] Because Defendants Kyrene School District (administered and overseen by Defendant Toenjes), The Gregory School, and the AIA receive federal financial assistance, and because Defendants Horne is a grant recipient of federal funds, they must comply with Title IX's requirements. *See* Compl. ¶¶ 9–13.[2]

Plaintiffs are likely to prevail on the merits of their Title IX claim because the Ban discriminates against them based on their transgender status. As the Supreme Court held in *Bostock v. Clayton County*, "it is impossible to discriminate against a person for being . . . transgender without discriminating against that individual based on sex." 140 S. Ct. 1731, 1741 (2020). Applying that analysis, the Ninth Circuit has held that discrimination based on transgender status also constitutes impermissible discrimination under Title IX. *Doe v. Snyder*, 28 F.4th 103, 114 (9th Cir. 2022).

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[1] Among other things, an institution covered by Title IX may not: (1) treat one person differently from another in determining whether such person satisfies any requirement or condition for the provision of such aid, benefit, or service; (2) provide different aid, benefits, or services or provide aid, benefits, or services in a different manner; (3) deny any person any such aid, benefit, or service; (4) subject any person to separate or different rules of behavior, sanctions, or other treatment. 34 C.F.R. § 106.31(b).

[2] Defendant AIA is bound by Title IX because it receives federal financial assistance indirectly from its member schools. *See* 34 C.F.R. § 106.2(i).

That precedent is controlling here. The Ban discriminates against Plaintiffs based on their status as transgender girls by providing that for purposes of school sports a student's sex is fixed "at birth." S.B. 1165, 55th Leg., 2d Reg. Sess. (Ariz. 2002), § 2. By design, the Ban classifies all transgender girls as male. Because the Ban prohibits students who are "male" under this definition from playing on girls' teams, Ariz. Stat. § 15-120.02(B), it intentionally excludes all transgender girls, including Plaintiffs, from participating on girls' teams and deprives them of the benefits of sports programs and activities that their non-transgender classmates enjoy. Under *Snyder*, this discrimination violates Title IX. 28 F.4th at 114; *see also A.M.*, 2022 WL 2951430, at *11 (granting a preliminary injunction of a similar Indiana law that banned transgender girls from playing on girls' sports teams based on Title IX).

B. The Ban Also Violates Plaintiffs' Rights Under the Equal Protection Clause

1. The Ban Is Subject to Heightened Scrutiny

The Ban also violates the Equal Protection Clause because it fails the applicable heightened scrutiny review. The Ninth Circuit has held that laws that discriminate against transgender people are sex-based classifications and, as such, warrant heightened scrutiny. *See Karnoski v. Trump*, 926 F.3d 1180, 1200–01 (9th Cir. 2019) (analyzing a policy barring transgender people from military service as sex-based discrimination and applying heightened scrutiny); *see also D.T. v. Christ*, 552 F. Supp. 3d 888, 896 (D. Ariz. 2021) ("Discrimination against transgender people is discrimination based on sex; as such, heightened scrutiny applies.").

Under heightened scrutiny, the burden is on the government to show "an exceedingly persuasive justification" for the discrimination, *Virginia*, 518 U.S. at 531, which must not be based on "generalizations" or "stereotypes." *Id.* at 549–50, 565. Rather, "[t]he justification 'must be genuine, not hypothesized or invented *post hoc* in

response to litigation[.]'" *Karnoski*, 926 F.3d at 1200 (quoting *Virginia*, 518 U.S. at 533). The government cannot meet that burden here.

2. The Ban Cannot Survive Heightened Scrutiny

Categorically banning all transgender girls from all girls' sports is not substantially related to any important governmental interest. Proponents of the Ban claim it is necessary to protect girls' sports by barring girls who have a purportedly unfair athletic advantage over other girls.[3] But this is based on overbroad generalizations and stereotypes that erroneously equate transgender status with athletic ability. *See Hecox*, 479 F. Supp. 3d at 982 (holding the asserted advantage between transgender and non-transgender female athletes "is based on overbroad generalizations without factual justification"). There is no rational basis, much less one that meets heightened scrutiny, for treating a girls' transgender status as an accurate proxy for athletic ability.

From a medical perspective, boys may have an athletic advantage over girls because of the increased testosterone associated with male puberty, which results in increased muscle mass and muscle strength. (Shumer Decl. ¶¶ 38–39.) Before male puberty, boys have no significant athletic advantage over girls. (*Id.*) Here, Plaintiffs live as girls in all aspects of their lives and are similarly situated to other girls their age. Jane has not started male puberty and therefore has no competitive or physiological advantages over her teammates or opponents. (*Id.* ¶ 45.) Megan has received hormone blockers and hormone replacement therapy and therefore has never experienced male

[3] *See* Letter from Governor Douglas A. Ducey, State of Arizona, to J. Katie Hobbs, Arizona Sec'y of State (Mar. 30, 2022), https://azgovernor.gov/sites/default/files/sb1138_sb1165_signing_letter.pdf ("S.B. 1165 creates a statewide policy to ensure that biologically female athletes at Arizona public schools, colleges, and universities have a level playing field to compete . . . This legislation simply ensures that the girls and young women who have dedicated themselves to their sport do not miss out on hard-earned opportunities . . . due to unfair competition.").

puberty. (*Id.* ¶ 47.) Accordingly, she has no competitive or physiological advantages over her teammates or opponents. (*Id.*) Yet, purely because they are transgender, Plaintiffs are treated differently than other girls; unlike all other girls, they are barred from playing on girls' teams.

Rather than advancing an "exceedingly persuasive justification" for discrimination, *Virginia*, 518 U.S. at 524, the Ban's "avowed purpose and practical effect are to impose a disadvantage, a separate status, and so a stigma" upon transgender athletes. *United States v. Windsor*, 570 U.S. 744, 770 (2013) (explaining that "[t]he Constitution's guarantee of equality must at the very least mean that a bare [legislative] desire to harm a politically unpopular group cannot justify disparate treatment of that group") (internal quotation marks and citation omitted). Accordingly, the Ban cannot survive rational basis review, much less heightened scrutiny.

II. THE BAN IRREPARABLY HARMS PLAINTIFFS

Plaintiffs face irreparable harm if this Court does not enjoin the Ban as to them. First, enforcement of the Ban in violation of the Equal Protection Clause—in and of itself—is sufficient to presume irreparable harm to justify a preliminary injunction. *Hernandez v. Sessions*, 872 F.3d 976, 994–95 (9th Cir. 2017) ("It is well established that the deprivation of constitutional rights unquestionably constitutes irreparable injury.") (internal quotation marks and citation omitted); *Hecox*, 479 F. Supp. 3d at 987 (noting this "dispositive presumption"). A violation of Title IX also causes irreparable harm. *See Anders v. Cal. State Univ., Fresno*, 2021 WL 1564448, at *18 (E.D. Cal. Apr. 21, 2021) (finding irreparable harm under Title IX given the "presumption of irreparable injury where plaintiff shows violation of a civil rights statute" and in light of "the insult that comes from unequal treatment"); *Portz v. St. Cloud State Univ.*, 196 F. Supp. 3d 963, 973 (D. Minn. 2016) ("Plaintiffs have a fair chance of succeeding on their Title IX claim, and Congress passed the Title IX pursuant to its power to enforce the Fourteenth Amendment.

Plaintiffs' expectation that they may be treated unequally in violation of Title IX's terms is an irreparable harm.") (footnote omitted).

Moreover, Plaintiffs will suffer severe and irreparable mental, physical, and emotional harm if the Ban applies to them. Plaintiffs' mental health is dependent on living as girls in all aspects of their lives. (Budge Decl. ¶ 27; Shumer Decl. ¶ 24.) Playing on a boys' team would directly contradict Plaintiffs' medical treatment for gender dysphoria and would be painful and humiliating. (Budge Decl. ¶¶ 27, 39–41; Shumer Decl. ¶ 51.) If Defendants are permitted to enforce the Ban against them, Plaintiffs will be excluded from school sports and deprived of the social, educational, and physical and emotional health benefits that come from school sports. (Budge Decl. ¶¶ 35–38.) They will also suffer the shame and humiliation of being unable to participate in a school activity simply because they are transgender—a personal characteristic over which they have no control. (*Id.* ¶ 40.)

Plaintiffs will further suffer the stigmatic injury of exclusion. (*Id.*); *See Grimm v. Gloucester Cnty. Sch. Bd.*, 972 F.3d 586, 625 (4th Cir. 2020) (explaining that the stigma of exclusion "publicly brand[s] all transgender students with a scarlet 'T'") (internal quotation marks and citation omitted). They will also suffer the cognizable and irreparable "dignitary wounds" associated with the passage of a law expressly designed to communicate the state's moral disapproval of their identity, wounds that "cannot always be healed with the stroke of a pen." *Obergefell v. Hodges*, 576 U.S. 644, 678 (2015); *Hecox*, 479 F. Supp. 3d at 987 (finding such wounds to constitute irreparable harm).

III. THE PUBLIC INTEREST AND BALANCE OF EQUITIES FAVOR INJUNCTIVE RELIEF

When an injunction is sought against a governmental entity, the public interest and balance-of-the-hardships factors merge. *Nken*, 556 U.S. at 435–36. As an initial matter, "it is always in the public interest to prevent the violation of a party's constitutional

rights." *Melendres v. Arpaio*, 695 F.3d 990, 1002 (9th Cir. 2012) (internal citation and quotation marks omitted). Moreover, the balance of equities tips heavily in Plaintiffs' favor. Defendants "cannot suffer harm from an injunction that merely ends an unlawful practice." *Rodriguez v. Robbins*, 715 F.3d 1127, 1145 (9th Cir. 2013). Plaintiffs, however, are continuing to face serious and current ongoing harm, as detailed above and in the accompanying declarations. Accordingly, the public interest and balance of equities favor a preliminary injunction.

IV. PLAINTIFFS SHOULD NOT BE REQUIRED TO POST A BOND

The District Court has discretion not to require the moving party to post a bond before granting a preliminary injunction. *Diaz v. Brewer*, 656 F.3d 1008, 1015 (9th Cir. 2011) (citing *Johnson v. Couturier*, 572 F.3d 1067, 1086 (9th Cir. 2009)). The Court should exercise that discretion here. Waiving this requirement is particularly appropriate where "there is no realistic likelihood of harm to the defendant from enjoining his or her conduct." *Jorgensen v. Cassiday*, 320 F.3d 906, 919 (9th Cir. 2003). As discussed above, the requested injunction will not harm Defendants. Further, imposing a bond would improperly burden Plaintiffs' efforts to vindicate their constitutional rights.

CONCLUSION

For the foregoing reasons, Plaintiffs respectfully request the Court grant their motion for a preliminary injunction.

Respectfully submitted this 17th day of April, 2023.

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UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF ARIZONA
TUCSON DIVISION

Jane Doe, by her next friends and parents Helen Doe and James Doe; and Megan Roe, by her next friends and parents, Kate Roe and Robert Roe,

Plaintiffs,

v.

Thomas C. Horne, in his official capacity as State Superintendent of Public Instruction; Laura Toenjes, in her official capacity as Superintendent of the Kyrene School District Kyrene School District; The Gregory School; and Arizona Interscholastic Association, Inc.,

Defendants.

Case No. _____

COMPLAINT

INTRODUCTION

1. Generations of children across America have enjoyed playing sports with their friends and classmates. They have benefited physically, mentally, socially, and developmentally from doing so. For many children, playing sports is an important part of their school experience.

2. Plaintiffs want nothing more than an equal opportunity to enjoy that same experience: to try out for and participate on the girls' volleyball, soccer, basketball, and cross-country teams at their schools. Arizona law, however, denies Plaintiffs that opportunity because Plaintiffs are transgender girls. Ariz. Rev. Stat. § 15-120.02 (the "Ban"). Plaintiffs bring this suit to challenge the application of the Ban to them because it violates the U.S. Constitution and federal law.

3. The Ban's exclusion of Plaintiffs from participating in school sports because they are transgender denies them equal treatment under the law, excludes them from a critical school activity, causes them to experience shame and stigma, denies them well-known physical and mental health benefits that arise from playing school sports, and directly contributes to negative physical and emotional health consequences.

4. The Ban, as applied to Plaintiffs, violates the Equal Protection Clause because it impermissibly discriminates based on Plaintiffs' transgender status and on account of their sex because being transgender is a sex-based trait. Accordingly, Arizona may apply the Ban to Plaintiffs only if it has an "exceedingly persuasive justification" for doing so, *U.S. v. Virginia*, 518 U.S. 515, 533 (1996), which here is absent. In fact, the Ban's impermissible discrimination cannot survive any level of scrutiny.

5. The application of the Ban to Plaintiffs also violates Title IX of the Education Amendments of 1972, 20 U.S.C. § 1681, *et seq*. ("Title IX"), the Americans with Disabilities Act, 42 U.S.C. § 12101, *et seq.* ("ADA"), and Section 504 of the Rehabilitation Act, 29 U.S.C. § 794 ("Rehabilitation Act").

6. Plaintiffs seek declaratory and injunctive relief to enjoin the Ban's enforcement as applied to them. Without the injunctive relief sought, Plaintiffs will suffer immediate irreparable injury.

PARTIES

I. Plaintiffs

7. Plaintiff Jane Doe[1] is an 11-year-old transgender girl who resides in Maricopa County, Arizona. She proceeds in this case by her next friends and parents Helen Doe and James Doe.

8. Plaintiff Megan Roe is a 15-year-old transgender girl who resides in Pima County, Arizona. She proceeds in this case by her next friends and parents Kate Roe and Robert Roe.

II. Defendants

9. Defendant Thomas C. Horne is the State Superintendent of Public Instruction. Defendant Horne is the chief executive officer of the Arizona Department of Education. Ariz. Rev. Stat. § 15-231(B)(2). He is charged with superintending the schools of Arizona and executing all education laws. Ariz. Rev. Stat. § 15-251. Upon

[1] Plaintiffs are filing herewith a motion to proceed via pseudonym.

information and belief, Defendant Horne is a grant recipient of federal funds because he has administrative control over the Arizona Department of Education. He is sued in his official capacity only.

10. Defendant Laura Toenjes is the Superintendent of Kyrene School District. Defendant Toenjes executes her official duties in Maricopa County and is responsible for the administration and oversight of the Kyrene School District. She is sued in her official capacity only.

11. Defendant Kyrene School District is a public school district serving parts of Maricopa County. Kyrene School District oversees the Kyrene Aprende Middle School. Upon information and belief, it receives federal financial assistance.

12. Defendant The Gregory School is a private middle and high school located in Tucson. Upon information and belief, it receives federal financial assistance.

13. Defendant Arizona Interscholastic Association, Inc. ("AIA") is a membership organization of public and private high schools that regulates and oversees interscholastic athletic competition in the State of Arizona. The Kyrene School District and The Gregory School's athletic teams participate in competitions regulated by the AIA and comply with the AIA's guidelines and policies. The AIA is subject to Title IX because it indirectly receives federal funding from its member schools. *See* 34 C.F.R. § 106.2(i). It is also a government actor subject to the Fourteenth Amendment. *Clark v. Arizona Interscholastic Ass'n*, 695 F.2d 1126, 1128 (9th Cir. 1982).

JURISDICTION AND VENUE

14. This action arises under 42 U.S.C. § 1983 to redress the deprivation under color of state law of rights secured by the Fourteenth Amendment to the United States Constitution and under Title IX, the ADA, and the Rehabilitation Act.

15. This Court has original jurisdiction over the subject matter of this action pursuant to 28 U.S.C. §§ 1331 and 1343 because the controversy arises under the laws of the United States, including laws providing for the protection of civil rights, and because this suit seeks redress for the deprivation, under color of state law, of rights secured by the United States Constitution.

16. Venue is proper in the District of Arizona under 28 U.S.C. § 1391(b)(1) and (2) because Defendants reside in the District and because a substantial part of the events or omissions giving rise to the claims occurred in the District.

17. This Court has the authority to enter a declaratory judgment and to provide preliminary and permanent injunctive relief pursuant to Rules 57 and 65 of the Federal Rules of Civil Procedure and 28 U.S.C. §§ 2201 and 2202.

18. This Court has personal jurisdiction over Defendants because they are domiciled in Arizona and because their denial of Plaintiffs' rights under the United States Constitution and the laws of the United States occurred within Arizona.

FACTUAL ALLEGATIONS

I. Arizona's Ban

19. Prior to the enactment of the Ban, transgender girls were permitted to play on girls' sports teams. Each school or school district set its own rules governing the

participation of transgender students in intramural sports, and the AIA set rules for transgender students' participation in interscholastic sports.

20. In October 2014, the AIA Executive Board approved for the first time a transgender student's request to compete on a sports team consistent with that student's gender identity.[2] Subsequently, the AIA considered requests for transgender students to play on the teams consistent with their gender identity on a case-by-case basis.[3]

21. By December 2018, the AIA in conjunction with its Sports Medicine Advisory Committee formalized and revised its policy to permit transgender students to play on teams consistent with their gender identity so long as the student's parent or guardian made the request to the school administrator or athletic director and explained when their child realized they were transgender.[4]

22. This policy's goal was to ensure that transgender students felt supported and did not need to provide intrusive medical documentation.[5] At that time, the AIA had

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[2] Robert Obert, *AIA Approves First Transgender Athlete to Play a Sport*, AZ Central Sports (Oct. 22, 2014), https://www.azcentral.com/story/sports/high-school/2014/10/22/aia-approves-first-transgender-athlete-play-sport/17718485/.

[3] Erin Buzuvis, *"As Who They Really Are": Expanding Opportunities for Transgender Athletes to Participate in Youth and Scholastic Sports*, 34 L. & Ineq. 341, 346–47 (2016).

[4] *Minutes: Executive Board Meeting*, Arizona Interscholastic Association (Dec. 10, 2018), https://aiaonline.org/files/16539/executive-board-meeting-minutes-december-10-2018.pdf; Arizona Interscholastic Association, *AIA Policies and Procedures*, Art. 41 (2022-2023), https://aiaonline.org/files/16362/article-41-sports-medicine.pdf.

[5] *AIA alters language of transgender policy for Arizona student-athletes*, ABC 15 (Dec. 17, 2018), https://www.abc15.com/sports/aia-alters-language-of-transgender-policy-for-arizona-student-athletes.

received only two or three requests by transgender students to play on teams consistent with their gender identity and had approved all of them.

23. Arizona's schools and teams were thus including the small number of transgender students who sought to be treated in accordance with their gender identity, and no problems or complaints regarding their participation in school sports arose.

24. Despite the AIA's successful policies, the Arizona Legislature passed the Ban at issue in this case on March 24, 2022.

25. The Ban requires each interscholastic or intramural athletic team or sport that is sponsored by a public school or a private school whose students or teams compete against a public school to be designated as a boys', a girls', or coed team based on the students' "biological sex." Ariz. Rev. Stat. § 15-120.02(A). The Ban prohibits athletic teams or sports designated for females, women, or girls to be open to members of the "male sex." *Id.* § 15-120.02(B).

26. The Ban does not define the terms "biological sex," "male sex," or "sex" generally. The Legislative findings, however, suggest "sex" as being determined at "[fertilization] and revealed at birth or, increasingly, *in utero*." S.B. 1165, 55th Leg., 2d Reg. Sess. (Ariz. 2022), § 2.

27. The law also forbids an interscholastic association—such as the AIA—from permitting transgender girls to play on girls' teams in interscholastic competitions. Ariz. Rev. Stat. § 15-120.02(A), (D).

28. In addition to regulating schools and interscholastic associations directly, the law creates a private cause of action for any student to sue a school or athletic

association that permits transgender girls to play on girls' teams if that student believes that they have "suffer[ed] any direct or indirect harm" from a violation of the law. *Id.* § 15-120.02(E), (G).

II. Transgender People and Sports

29. "Gender identity" is the medical term for a person's internal, innate, deeply held sense of their own gender. Everyone has a gender identity. There is a medical consensus that a person's gender identity is not subject to voluntary change and has a significant biological foundation.

30. From a medical perspective, a person's sex encompasses several different biological attributes, including sex chromosomes, certain genes, gonads, the body's production of and response to sex hormones, internal and external genitalia, secondary sex characteristics, and gender identity. Those attributes are not always aligned in typical ways.

31. When a child is born, a health care provider designates the child's sex to be marked on the child's birth certificate based on the child's observable anatomy. In the vast majority of cases, that initial designation turns out to be consistent with the individual's gender identity. For a transgender person, however, that initial designation turns out to be inaccurate because it does not reflect the person's gender identity.

32. Gender dysphoria, which results from physical impairments, is the distress caused by incongruence between a person's gender identity and their designated sex at birth. If untreated, gender dysphoria may cause anxiety, depression, eating disorders, substance abuse, self-harm, and suicide. Gender dysphoria is a diagnosable and treatable

condition recognized by the American Psychiatric Association[6] and is articulated in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition ("DSM-V").[7]

33. Under the medical standards of care for the treatment of gender dysphoria in adolescents, the only safe and effective treatment for gender dysphoria is to permit transgender adolescents to live consistent with their gender identity in all aspects of their lives. In addition, when a child begins puberty, doctors may prescribe puberty blocking medication and, for older adolescents, hormone therapy. Forcing a transgender girl to be treated as male contradicts the medical standards of care and can result in serious negative health consequences, including, for example, severe anxiety, depression, substance abuse, self-harm, and suicidality.

34. There is a scientific consensus that the biological driver of average group differences between girls and boys with respect to athletic performance is differences in their respective levels of testosterone, which begin to diverge significantly only after the onset of puberty.

35. Transgender girls who receive puberty-blocking medication do not go through male puberty. As a result, they do not experience the physiological changes caused by the increased production of testosterone associated with male puberty. If those

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[6] *What is Gender Dysphoria?*, American Psychiatric Association, https://www.psychiatry.org/patients-families/gender-dysphoria/what-is-gender-dysphoria (last visited Apr. 12, 2023).

[7] American Psychiatric Association, *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, Text Revision (DSM-5-TR)* (2022).

girls subsequently receive hormone therapy, their bodies develop the skeletal structure, fat distribution, and muscle and breast development typical of other girls.

36. Transgender girls who receive puberty-blocking medication and those who receive hormone therapy typically have testosterone levels in the same range as other girls and significantly lower than boys who have begun pubertal development.

37. For transgender youth, research has shown that being accepted and supported as who they are is enormously beneficial to their health and well-being. Conversely, being denied recognition and support can cause significant harm, exacerbate gender dysphoria, and expose them to the risk of discrimination and harassment.

III. The Benefits of School Sports

38. For children and young adults, school-sponsored sports offer benefits they will experience throughout life and often have a positive developmental impact that is second only to family support. For example, students who participate in high school sports are more likely to finish college and more likely to be actively engaged in planning for their future. Participation in sports has a documented positive effect on academic achievement, with student athletes generally experiencing better academic achievement than students who are not athletes.

39. Sports provide an opportunity to gain confidence, to build social connections, and to develop important social, emotional, and coping skills. Participation in sports provides students the opportunity to make friends and become part of a supportive community of teammates and peers. It also reduces the effects of factors, such as stressful life events, that lead to an increased likelihood of experiencing anxiety,

depression, poor academic performance, dropping out of school, and engaging in risky behaviors. Learning how to manage stressful events at a young age provides benefits to student athletes throughout their lives, even after the competitions have ended. In contrast, when young people are excluded from participating in youth sports, or do not feel accepted or respected, they do not have the opportunity to experience these benefits. In addition, when youth are excluded from an equal opportunity to participate because they are transgender, the negative impact on their emotional and social development is severe; in addition to losing the benefits that participation in sports provides, they internalize the shame and stigma of being officially excluded for a personal characteristic (being transgender) over which they have no control and that already subjects them to prejudice and social stigma.

40. Participation in sports also allows students to build teamwork and discipline skills. Students learn the importance of working as part of a group to achieve a common goal and the necessity of each individual member's role in bringing about success. Students also experience the success and personal fulfillment achieved from discipline, hard work, and perseverance through countless hours of practice and competition.

41. Through sports, students develop social skills and emotional maturity that allow them to create and sustain lifelong friendships. Sportspersons spend considerable time with their teammates, often experiencing high-pressure situations together that lead to deeper and more meaningful social bonds and friendships. These sports experiences in turn result in reduced anxiety and higher self-esteem. These benefits positively affect students throughout their entire lives.

42. Coaches and other staff members provide students who participate in sports access to meaningful mentorship and guidance. This mentorship extends beyond school sports, guiding students through academics and life.

43. Students who participate in sports also derive physical and mental health benefits. In general, students who play sports in school have fewer physical and mental health problems than those who do not. Students who participate in sports further learn how to regulate their emotions, and they experience significantly lower levels of emotional problems and distress as a result. Participation in sports at a young age also encourages continued participation as an adult, in turn reducing the morbidity and mortality of many diseases that arise later in life.

IV. Plaintiffs' Medical Treatment and Participation in Sports

A. Jane Doe

44. Plaintiff Jane Doe is an 11-year-old girl who attends a public elementary school in the Kyrene School District. She will attend Kyrene Aprende Middle School starting in July 2023. Jane is transgender. This will be the first school year the Ban will apply to Jane.

45. Jane was diagnosed with gender dysphoria when she was seven years old and has lived her life as a girl since she was five years old. She is accepted by her family, soccer teammates, classmates, coaches, and teachers.

46. As part of her medical treatment for gender dysphoria, Jane's doctors are monitoring her for signs of the onset of puberty. Because she has not yet started puberty,

Jane has not experienced any of the physiological changes, including muscle development, that increased testosterone levels would cause in a pubescent boy.

47. Jane has played soccer on girls' club and recreational sports teams for nearly five years. She enjoys playing soccer and making new friends through it. The friendships she has made through soccer are real and meaningful, and Jane has shared with her soccer teammates that she is a transgender girl. Jane's teammates and coaches have been highly supportive of her identity.

48. For Jane's family, playing sports is also an important value.

49. Jane intends to try out for the girls' soccer team at Kyrene Aprende Middle School—which has separate teams for boys and girls—in the winter 2023-2024 athletic season.

50. Jane also intends to try out for the girls' cross-country team in the summer 2023 season, which starts in mid-July 2023, and the girls' basketball team in the spring 2024 season at Kyrene Aprende Middle School. Like soccer, basketball has separate teams for boys and girls. While cross-country practices co-educationally, boys and girls compete separately.

51. Jane's health and well-being depend on being able to follow her medically-prescribed treatment, including living as a girl in all aspects of her life.

52. Playing on boys' teams or not being able to compete with other girls is not an option for Jane. It would be painful and humiliating for Jane to be forced to play on boys' teams. It would also contradict her medical treatment for her gender dysphoria.

53. The Ban thus denies Jane the opportunity to participate in school sports at all and the numerous social, educational, and physical and emotional health benefits that school sports provide.

54. But for the Ban, the Kyrene School District would permit Jane to play on girls' sports teams. In fact, the members of the Kyrene School District's Governing Board have denounced the Ban.[8]

55. If the Ban is not enjoined as to Jane, it will cause Jane to suffer irreparable emotional, psychological, and developmental harm that will irreparably and negatively affect her educational and social experience.

B. Megan Roe

56. Plaintiff Megan Roe is a 15-year-old transgender girl who attends The Gregory School.

57. Megan has identified as a girl since she was very young. She was diagnosed with gender dysphoria when she was 10 years old.

58. Before starting at The Gregory School, Megan's parents informed administrators and teachers at the school that Megan is a transgender girl.

59. As part of her medically-prescribed treatment for gender dysphoria, Megan has been receiving puberty-blocking medication since she was 11 years old, after clinical documentation of the initial signs of puberty. This medication has prevented her from

[8] Paul Maryniak, *Kyrene Board Rips Transgender, Other State Laws*, Ahwatukee Foothills News (Sept. 21, 2022, last updated Oct. 25, 2022), https://www.ahwatukee.com/news/article_50d6aaa4-3907-11ed-baa2-5b5183664658.html.

undergoing male puberty. Megan then started to receive hormone therapy when she was 12 years old. As a result, she has not experienced the physiological changes, including muscle development, that increased testosterone levels would cause in a pubescent boy. Instead, the hormones she has received have caused her to develop many of the physiological changes associated with puberty in females.

60. Megan's health and well-being depend on being able to follow her medically-prescribed treatment, including living as a girl in all aspects of her life.

61. Megan started to play volleyball a couple of years ago and has found it fun and enjoyable. Before volleyball, Megan enjoyed other sports, including swimming and dance. Megan's schoolfriends are on the girls' volleyball team. Megan's teammates, coaches, and The Gregory School have been highly supportive of her transgender identity and would welcome her participation on the girls' volleyball team.

62. At The Gregory School, volleyball is one of the most important sports in the school's social fabric. The matches are an important social occasion, which are well-attended by the school community.

63. The Gregory School has separate volleyball teams for boys and girls. Megan intends to try out for the girls' volleyball team at The Gregory School this fall.

64. The Gregory School participates in the AIA and complies with its rules so that students can play in interscholastic competitions.[9] But for the Ban, The Gregory School would permit Megan to play on the girls' volleyball team.

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[9] *The Gregory School Athletics Program*, The Gregory School, https://www.gregoryschool.org/athletics (last visited Apr. 13, 2023).

65. Competing on a boys' volleyball team is not an option for Megan. It would be painful and humiliating for Megan to be forced to be on a boys' team and would also contradict her medical care.

66. The Ban thus denies Megan the opportunity to participate in school sports at all. She will be prohibited from participating in school sports and therefore will be denied the numerous social, educational, and physical and emotional health benefits that school sports provide.

67. If the Ban continues to apply to Megan, she will suffer irreparable emotional, psychological, and developmental harm that will irreparably and negatively affect her educational and social experience.

CLAIMS FOR RELIEF

COUNT I
Deprivation of Equal Protection
U.S. Const. Amend. XIV
(Against Defendants Horne, Toenjes, Kyrene School District, and the Arizona Interscholastic Association)

68. Plaintiffs incorporate all preceding paragraphs of the Complaint as though fully set forth herein.

69. Plaintiffs bring this Count against Defendants Thomas C. Horne and Laura Toenjes in their official capacities, as well as against Defendants Kyrene School District and the Arizona Interscholastic Association.

70. The Equal Protection Clause of the Fourteenth Amendment, enforceable pursuant to 42 U.S.C. § 1983, provides that no state shall "deny to any person within its jurisdiction the equal protection of the laws." U.S. Const. amend. XIV, § 1.

71. The Ban singles out and categorically bars Plaintiffs from competing on girls' teams because they are transgender girls. In so doing, the Ban impermissibly discriminates based on Plaintiffs' transgender status and, because being transgender is a sex-based trait, it also discriminates against Plaintiffs based on sex.

72. Under the Equal Protection Clause, classifications based on sex are subject to heightened scrutiny and are therefore presumptively unconstitutional absent a showing by the government that the discrimination has an "exceedingly persuasive" rationale and is substantially related to an important state interest.

73. The Ban fails heightened scrutiny as to Plaintiffs because it is not substantially related to any important state interest. Plaintiffs, who identify and live as girls and who have not and will not undergo male puberty, are similarly situated to other girls with respect to their participation on girls' sports teams at school. The Ban, therefore, undermines the health and well-being of Plaintiffs by denying their access to school sports without any exceedingly persuasive rationale to support it. The Ban cannot survive even rational basis review because it lacks any rational basis, rests on stereotypes and misconceptions, and undermines rather than advances any alleged purpose.

COUNT II
Violation of Title IX
20 U.S.C. § 1681 *et seq*.
(Against All Defendants)

74. Plaintiffs incorporate all preceding paragraphs of the Complaint as though fully set forth herein.

75. Title IX provides that "[n]o person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity receiving Federal financial assistance." 20 U.S.C. § 1681(a).

76. Plaintiffs bring this Count against all Defendants.

77. Under Title IX, discrimination "on the basis of sex" encompasses discrimination against individuals because they are transgender. *See Doe v. Snyder*, 28 F.4th 103, 114 (9th Cir. 2022) (holding that discrimination against transgender individuals violates Title IX).

78. Title IX forbids sex discrimination in athletic programs. The implementing regulations for Title IX permit sports teams to be separated by sex but do not mandate such separation.

79. Neither Title IX, its regulations, nor its guidance purport to define "sex" as something that is determined at fertilization and revealed at birth or in utero.

80. By barring Plaintiffs from playing on girls' sports teams because they are transgender, Defendants exclude them from, deny them the benefits of, and subject them to discrimination in educational programs and activities "on the basis of sex," in violation of their rights under Title IX of the Education Amendments of 1972, 20 U.S.C. § 1681 *et seq.*

COUNT III
Discrimination On Basis of Disability
Americans with Disabilities Act, 42 U.S.C. § 12101 *et seq*.
Section 504 of the Rehabilitation Act, 29 U.S.C. § 794
(Against All Defendants)

81. Plaintiffs incorporate all preceding paragraphs of the Complaint as though fully set forth herein.

82. The ADA provides that "no qualified individual with a disability shall, by reason of such disability, be excluded from participation in or be denied the benefits of the services, programs, or activities of a public entity, or be subjected to discrimination by any such entity." 42 U.S.C. § 12132. Section 504 of the Rehabilitation Act extends that protection to "any program or activity receiving Federal financial assistance." 29 U.S.C. § 794(a).

83. Plaintiffs bring this Count against all Defendants.

84. Plaintiffs have a disability within the meaning and scope of 42 U.S.C. § 12102 based on their gender dysphoria, which results from physical impairments. 42 U.S.C. § 12102(1); 29 U.S.C. § 705(9). Defendants are therefore required to afford Plaintiffs the protections of the ADA and Section 504 of the Rehabilitation Act.

85. By depriving Plaintiffs of the opportunity to try out for and compete on girls' sports teams, denying Plaintiffs meaningful access to sports programs and activities, and subjecting Plaintiffs to discrimination, all because of Plaintiffs' gender dysphoria, Defendants violate Plaintiffs' rights under the ADA and Section 504 of the Rehabilitation Act. Playing on boys' sports teams is not an available option for Plaintiffs

because it would exacerbate Plaintiffs' disabilities, be detrimental to their health, and contradict their prescribed medical treatment.

PRAYER FOR RELIEF

WHEREFORE, Plaintiffs respectfully request that this Court enter orders and judgment:

A. Declaring that the enforcement by Defendants of Ariz. Rev. Stat. § 15-120.02 violates Plaintiffs' rights under the Equal Protection Clause of the Fourteenth Amendment to the United States Constitution, Title IX, 20 U.S.C. § 1681 *et seq*., the Americans with Disabilities Act, 42 U.S.C. § 12101, *et seq.*, and Section 504 of the Rehabilitation Act, 29 U.S.C. § 794, *et seq.*

B. Preliminarily and permanently enjoining enforcement or any threat of enforcement of Ariz. Rev. Stat. § 15-120.02 by Defendants and their employees, agents, appointees, or successors as to Plaintiffs, and requiring Defendants and their employees, agents, appointees, or successors to permit Plaintiffs to try out for and play on the school sports' teams consistent with their gender identity;

C. Waiving the requirement for the posting of a bond as security for entry of preliminary injunctive relief;

D. Awarding Plaintiffs their costs, expenses, and reasonable attorneys' fees pursuant to 42 U.S.C. § 1988 and other applicable laws; and

E. Granting such other and further relief as the Court deems just and proper.

Respectfully submitted this 17th day of April, 2023.

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**Pro hac vice application forthcoming*