Attached please find written comments of the Women's Sports Policy Working Group regarding the inclusion of transgender girls and women in girls' and women's interscholastic and intercollegiate competitive sports. Thank you for your attention to these positions.

Regards,
Donna A. Lopiano
Proposal to include all transgender women and girls under the girls’ and women’s sports umbrella in ways that are not category defeating. It is our evidence-based, considered judgment, shared by almost all sports governing bodies, that the category can continue to be protected and its goals mostly still met by narrowly tailoring inclusion standards according to evidence of group-based sex-linked differences and athletic results data. We note that this was also apparently the view of the Obama Departments of Justice and Education, which did not reject the competitive sports exception to Title IX’s general nondiscrimination rule. This same language could be adopted by your OCR should it decide to issue a Dear Colleague Letter in the interim period in which it was developing new regulations.

PROPOSED CONTENT FOR INTERIM DEAR COLLEAGUE LETTER
(unaltered from Obama Administration DOJ/DOE May 2016 Dear Colleague Letter)

Athletics. Title IX regulations permit a school to operate or sponsor sex-segregated athletics teams when selection for such teams is based upon competitive skill or when the activity involved is a contact sport. A school may not, however, adopt or adhere to requirements that rely on overly broad generalizations or stereotypes about the differences between transgender students and other students of the same sex (i.e., the same gender identity) or others’ discomfort with transgender students. 17 Title IX does not prohibit age-appropriate, tailored requirements based on sound, current, and research-based medical knowledge about the impact of the students’ participation on the competitive fairness or physical safety of the sport. 2

Our particular proposal for regulatory reform, developed in conjunction with world-leading scientific experts and data scientists, meets these same evidentiary standards. Proposed revisions are in bold/underline:

1 Correspondence to WSPWG may be addressed to: Donna.Lopiano@gmail.com. See Exhibit A for composition of the WSPWG.
2 Departments of Justice and Education, Dear Colleague Letter on Transgender Students, May 13, 2016, at 3.
WSPWG PROPOSED AMENDMENT TO THE TITLE IX REGULATIONS
(34 C.F.R. § 106.41)

(a) General. No person shall, on the basis of sex, be excluded from participation in, be denied the benefits of, be treated differently from another person or otherwise be discriminated against in any interscholastic, intercollegiate, club or intramural athletics offered by a recipient, and no recipient shall provide any such athletics separately on such basis.

(b) Separate teams. Notwithstanding the requirements of paragraph (a) of this section, a recipient may operate or sponsor separate teams based on biological sex where selection for such teams is based upon competitive skill or the activity involved is a contact sport. However, where a recipient operates or sponsors separate-sex teams and offers a team in a particular sport for members of one sex but operates or sponsors no such team for members of the other sex, and athletic opportunities for members of that sex have previously been limited, members of the excluded sex must be allowed to try-out for the team offered, except if the sport involved is a contact sport and the position at issue implicates physical playing-safety because of sex-linked differences in size, weight, strength, and explosive force. A recipient may, but is not required to, prohibit members of the excluded sex from trying out for such positions. For the purposes of this part, contact sports include but are not limited to boxing, wrestling, rugby, ice hockey, football, basketball and other sports the purpose or major activity of which involves bodily contact.

(c) Treatment of Transgender Athletes.

(1) Because trans girls/women who have not begun male puberty do not have significant male sex-linked advantages, they shall be included in girls’ and women’s sport without conditions or limitations.

(2) Trans boys/men who have not taken gender-affirming hormones may be included in girls’ and women’s sport without conditions or limitations.

(3) Trans girls/women who have experienced all or part of male puberty and who have sufficiently mitigated their male sex-linked advantages — through surgery and/or gender affirming hormones consistent with the rules of their international sports federations — may participate in girls’/women’s sport without additional conditions or limitations.

(4) Trans girls/women who have experienced all or part of male puberty and who

3 Because the contact sport exception is permissive not mandatory, schools may allow girls/women to try out for positions on boys’/men’s contact sports teams. This is least controversial when the position at issue — as opposed to the sport in general — does not involve a high risk of significant physical impact. See, e.g., Vanderbilt kicker Sarah Fuller first woman to score in Power 5 football game, ESPN News Service, December 12, 2020.
have not, or only insufficiently, mitigated their male sex-linked advantages according to the international sports federation standards in their sport may be accommodated within girls'/women's sports but not in head-to-head competition with female athletes.

(5) The private medical information (PMI) necessary to determine an athlete’s eligibility must be available to the relevant sports authorities. The information, which shall be kept confidential, is strictly limited to confirmation of the athlete’s biological sex and of their hormone status over the relevant period of time. All challenges to an athlete’s eligibility shall be resolved by the relevant sports authorities based on this confirmation.

(6) Policy and training should encourage a safe, respectful, and affirming environment for all women and girls.

RATIONALE

1. Like many Americans and most all female athletes, we are deeply committed to sex equality in education-based sport. This includes a commitment to equal competitive opportunities for females and males in both high school and college. Since the inception of Title IX, this has meant, among other things, matching opportunities for sports teams, coaching and training resources, travel for competitions, and the competition opportunities themselves: rounds, semi-finals, finals, and championships. We hope that we can count on DOE also to remain committed to this proposition as it has and continues to do really valuable work for individual women and girls, for their communities, and for society as a whole. Indeed, we need DOE’s support today as much as we have needed it in the past. While we’ve come a long way since Title IX was enacted in 1972, as we approach its 50th anniversary we are still not at parity on any number of measures in either high school or college sport.

2. We all rely on the continued lawfulness of evidence-based exceptions to general nondiscrimination rules to achieve these equality goals. In the education-based sports space specifically, we rely on the continued lawfulness of the original 1975 Title IX regulations. Those regulations include an exception to the statute's general nondiscrimination rule allowing for separate sports teams for males and females. The sex-linked performance gap between males

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4 This information should be included on the standard pre-season physical eligibility form that is completed and signed by the athlete's physician. The form should include the following questions for the physician: whether the athlete is or is not transgender; if they are, whether they are or are not on puberty blockers and/or gender affirming hormones; and if they are, the dates of treatment and testosterone levels they have maintained during the relevant period.

5 Assuming the relevant sports authority has confirmed the athlete’s eligibility according to the relevant rule, no challenge to their inclusion should be entertained in the absence of admissible evidence of fraud.

6 It was possible for the regulations to do this work because they were specifically requested and formally approved by Congress as part of the development of the integrated Title IX scheme in the 1972-78 period. Because of this, the
and females that emerges from the onset of male puberty, together with the high school and college results data, make clear that the only way to achieve sex equality in school-based competitive sports is by segregating competition on the basis of sex.7

3. We also rely on the continued treatment of girls' and women's sports as a legally protected category or class, i.e., protected from male entrants. The original 1975 Title IX Regulations, including as interpreted by the federal courts, provide for this treatment without regard to the (small) number of males at any given time who might want to be included for any reason, e.g., traditionally because there is only a girls' and not also a boys' swimming or wrestling team, and today because of this and moves to make spaces gender-affirming for transgender students regardless of their developmental stage and hormone status.8 Both the performance gap between male and female athletes and the results data make clear that if eligibility standards for the category cannot restrict males, regardless of their reason for wanting to compete on girls' and women's teams, competitive opportunities for females will be further diminished. See Exhibit B that contains research-supported charts demonstrating male-sex linked performance advantages and their relationship to the onset of puberty.

4. Transgender women and girls who are not on hormone suppression are physically the same as those the protected category was designed to exclude.9 Neither the performance gap nor the results data are affected by the competitors' gender identity. As a high school senior before she transitioned physically, our advisor and supporter Juniper Eastwood was ranked 112th in the country among high school boys running the 800 meters in 1:53.17. Had her high school athletic association's policy been gender-affirming and she had been included in girls' events without hormone suppression, running from a high school track in Montana, she would have become the women's world record holder in the event. There aren't a lot of Junipers today, of course, but statistically there very well could be in the near future, and their unconditional inclusion into girls' and women's sport would have dramatic effects.

original regulations have been afforded heightened deference by the courts. For the legal history of the Title IX Regulations, see Coleman, Joyner, Lopiano, Re-Affirming the Value of the Sports Exception to Title IX's General Non-Discrimination Rule, 70 Duke J. Gender L & Pol'y 69, 76-87 (2020). This paper is co-authored by two of the members of the WSPWG and a leading expert from the Mayo Clinic. It collects all of the significant legal history, scientific evidence and results data, and policy arguments on the subject.

7 The sex-linked performance gap emerges at the onset of male puberty and from then forward ranges from 10-50% depending on the sport and event. It is attributed to the particular set of sex traits that include the Y chromosome, testes, and bioavailable testosterone in the male range. The results data make clear that even the very best females in high school, college, and beyond are routinely surpassed not only by the best but also by many second- and even third-tier males. Were sport not sex segregated, we would rarely if ever see females on the podium, and competitive opportunities across all levels of sport would also be reduced. See id. at 87-99.

8 For the legal history of the protected girls' and women's classification see id. at 82-87.

9 That is, they have a Y chromosome, testes, and bioavailable testosterone in the male range and they go through the same pubertal development as their cis-male counterparts. Some advocates for transgender athletes have suggested that data on males should not be used to support restrictions on transgender girls because they are "girls, period." Anecdote aside, this claim has no evidentiary basis.
5. Whether and how to include transgender women and girls in girls' and women's competitive sport has become a big issue for sports in the last five years because the ask from transgender advocates has shifted in this period from (a) inclusion after surgery or hormone suppression to (b) inclusion based only on self-declaration and gender identity. In prior periods, sports policymakers were working with advocates who accepted the premise that competitive sport is properly sex-segregated so that sex-linked conditions on eligibility for the protected class are necessary. Most recently, however, they are confronted by advocates who are increasingly clear that their project is to redesign girls' and women's spaces according to a particular social construction of sex. For example, the National Women's Soccer League – the players association – recently issued a statement describing their vision for a woman's team which would include females however they identify—including trans men, males who identify as women or as nonbinary—trans women, and both males and females who choose testosterone suppression or testosterone supplementation for gender affirming reasons, even though the latter is undoubtedly a doping violation. Only cis-males are left out of their redesign of the category.\footnote{NWSL Policy on Transgender Athletes, last accessed on April 30, 2021.} Regardless of the numbers of individuals involved, this redesign would be legally significant as it would deprive the category of its only raison d'être, i.e., the sex-linked differences that account for the performance gap between male athletes as a group and female athletes as a group. For sports administrators who care about sex equality in sport, including in the education-space, being able lawfully to separate males from females and to showcase females separately – e.g., during the NCAA's March Madness basketball tournament – is critical.

6. The numbers of transgender-identifying students are expected by everyone to grow in this next period; regulatory reform should take the growing numbers into account. In competitive sport where there is only one state or national champion, only three spots on a podium, and restricted access to post-season competitive opportunities, very small numbers of males can disrupt significant opportunities set aside for females. While today, we know that there are currently low numbers of trans-identifying students, we also know that the numbers are growing. Partly, this is because what it means to be transgender has recently changed from someone who transitions physically to someone whose announces that their gender identity is different from their natal sex; as we speak, even this last definition is expanding to include those who identify as nonbinary and fluid. The numbers are also increasing because it is easier and more acceptable in many locales and families for kids to come out as transgender, and for their supporting adults to affirm their gender identity. It is not a coincidence that in the last five years we've seen our first transgender state high school and national collegiate champions. Regulatory reform that assumes the numbers of transgender women and girls who are not on hormone suppression are so low as to be inconsequential would be outdated almost immediately.
EXHIBIT A

WOMEN'S SPORTS POLICY WORKING GROUP

Donna de Varona, OLY. Two-time Olympian and double gold medalist in swimming. In 1965, UPI and AP voted her outstanding woman athlete in the world after she set 18 world records and world bests. She was a sports broadcasting pioneer, the youngest and one of the first women to work in the industry. An Emmy recipient, she used her visibility to advise and advocate for the protection and promotion of Title IX and the Ted Stevens Olympic and Amateur Sports Act. As the first President and Chair of the Board of the Women’s Sports Foundation, she helped build the organization into a sustainable, influential entity. She has served on five presidential commissions and is a member of the U.S. Olympic, International Swimming, and Women’s Halls of Fame among others. Currently, she is a member of the International Olympic Committee Communications Commission, and was recently voted onto the U.S. Olympic and Paralympic Committee Board of Directors.

Martina Navratilova, OLY. Former professional tennis player and coach. In 2005, Tennis magazine selected Navratilova the greatest female tennis player for the years 1975 - 2005. She is considered one of the best female tennis players of all time. Over her career, she won 18 Grand Slam singles titles, 31 Grand Slam women's doubles titles (an all-time record), and 10 Grand Slam mixed doubles titles, for a combined total of 59 major titles, marking the Open Era record for the most Grand Slam titles won by one player, male or female. Coached later in her career by the first trans-woman tennis player, Renée Richards, and long active in LGBTQ rights work and with the women's tennis tour, Navratilova is particularly well-positioned to contribute to thoughtful policy on the inclusion of trans women/girls in women's sport.

Donna A. Lopiano, Ph.D. President and founder of Sports Management Resources, LLC, Adjunct Professor of Sports Management, Southern Connecticut State University, former Chief Executive Officer of the Women’s Sports Foundation (1992-2007), Director of Women’s Athletics, University of Texas at Austin (1975-1992). President of The Drake Group—an organization focused on academic integrity in college sport. A Title IX sports pioneer, Lopiano specializes in gender equity in the educational and Olympic and elite sports spaces. As an athlete, she participated in 26 national championships in four sports and was a nine-time All-American at four different positions in softball, a sport in which she played on six national championship teams.

Nancy Hogshhead-Makar, J.D., OLY, CEO Champion Women, civil rights lawyer, two-time Olympian, three-time Olympic gold medalist and one silver in swimming, U.S. National Team for eight years, 12 Halls of Fame, including the International Women’s Sports Hall of Fame and the International Swimming Hall, 20 years of teaching Sports Law and Administration, current Professor at Rutgers University’s Global Sports Business MS Program. Women’s Sports Foundation - President 1991-1993, Legal Advisor, 2003-2010, Senior Director of Advocacy, 2010-2014, and recently named to the U.S. Congressional Commission on the State of U.S. Olympics and Paralympics.

Tracy Sundlun, CEO, Everything Running, Inc., Founding Board Member, National Scholastic Athletics Foundation. Co-Founder and original Director of the National Scholastic (High School) Indoor & Outdoor Track & Field Championships (1984 – Present). Co-Founder, Rock ‘n’ Roll Marathon Series, at the time the largest running series in the world with over 500,000 participants annually in 29 events in 7 countries (1998 – 2016). Former club and collegiate track coach (including Georgetown, Colorado, and USC), guiding over 100 men and women in every event from 15 countries who competed in the Olympic Games and international competitions. Six-time Olympic Coach and Manager (1972 – 2016). Inducted into Running USA Hall of Champions.
Doriana Coleman, J.D. Professor of Law and Co-Director of the Center for Sports Law & Policy at Duke Law School; Senior Fellow at the Kenan Institute for Ethics and Associate of the Trent Center for Bioethics, Humanities & History of Medicine at Duke University & School Medicine; former collegiate and Swiss national champion in the 800 meters on the track. She has worked for years in domestic and international arenas on anti-doping policy and rules defining eligibility for the women's category. Her writing on sex in sport is widely referenced by policymakers considering the hard questions posed by trans and intersex inclusion in girls' and women's sport.

SUPPORTERS

Willie Banks, OLY, three-time Olympian and former world record holder in the triple jump

Juniper Eastwood, trail runner, former D1 Track and Cross-Country runner. First D1 athlete to compete on a women's team while openly identifying as transgender

Chris Evert, OLY, seven-time year-ending world No. 1 singles player, eighteen-time Grand Slam singles champion, past President of the Women's Tennis Association (WTA), Tennis Hall of Fame

Joanna Harper, former elite marathoner, transgender athlete and researcher

Wendy Hilliard, first Black athlete on US National Rhythmic Gymnastics Team, National & International Gold Medalist, four-time US National Team Coach, USA Gymnastics Hall of Fame

Micki King, OLY, Olympic gold medalist, ten-time national champion in springboard & platform diving

Edwin Moses, OLY, two-time Olympic gold medalist, two-time World Champion, former world record holder, undefeated in the 400 meters hurdles for 10 years and 107 consecutive races

Benita Fitzgerald Mosley, OLY, Olympic gold medalist, two-time Olympian, and eight-time national champion in the 100 meters hurdles

Diana Nyad, one of the greatest ever long-distance swimmers credited with a record setting swim around Manhattan island and being first person to swim from Cuba to Florida without a shark cage

Renee Richards, tennis player, one of the first professional athletes to identify as transgender

Sanya Richards-Ross, OLY, four-time Olympic gold medalist, six-time World Champion, ranked #1 in the world in the 400 meters from 2005 to 2009 and in 2012

Sally Roberts, three-time national wrestling champion, 2003 World Cup Champion, 2003 & 2005 World bronze medalist and a 2008 Olympic alternate

Lyn St. James, former IndyCar and LeMans racecar driver, first woman to win Indianapolis 500 Rookie of the Year award, and one of Sports Illustrated’s “Top 100 Women Athletes of the Century”

Pam Shriver, OLY, Olympic gold medalist, winner of over 100 professional singles and doubles championships over 19 years, International Tennis Hall of Fame

Inge Thompson, OLY, ten-time national champion cyclist, three-time Olympian and two-time podium finisher at the Women’s Tour de France

Champion Women, non-profit legal advocacy organization for girls and women in sports; harnessing the power of sport for social justice

The Drake Group, non-profit advocacy organization committed to defending academic integrity and protecting the health and well-being of athletes participating in collegiate sport
**National Scholastic Athletics Foundation**, non-profit organization created to fund competitive opportunities for high school track and field athletes and host the indoor and outdoor high school nationals

**Wrestle Like A Girl**, non-profit organization empowering girls and women using the sport of wrestling to become leaders in life

### Petition Supporters

**Olympians and Paralympians**
- Tela Bacher, Olympian and Sport Leader
- Don Barcome, Olympian
- Greg Barton, Olympian
- Molly Botkin-Rossiter, Olympian
- Jay Bowerman, Olympian
- Carol Brown, Olympian
- Michael Burley, Olympian
- Stephen Clarke, Olympian
- Steve Cohen, Olympian
- Cathy Connor, Olympian
- Tara Cunningham, Olympian
- Dale Dedrick, Paralympian
- Christa Dietzen, Olympian
- Loren Drum, Olympian
- Ted Fay, Paralympian
- Lee Ford-Faherty, Paralympian
- Keith Frostad, Olympian
- Amy Gamble, Olympian
- 7 Anonymous
- Joan Hansen-Lester, Olympian
- LaVonne Idlette, OLY, MBA, JD, Olympian
- Victoria King, Olympian
- Stacey Liapis-Fuchsgruber, Olympian
- Arlene Limas, Olympian
- Lorraine Moller, Olympian
- Nancy Olson, Paralympian
- Rick Paine, Olympian
- Caroline Pingatore-Holmes, Olympian
- Paul Reynolds, Olympian
- Monica Rowland, Olympian
- Leslee Schenck Trzcinski, Olympian
- Deena Schmidt, Olympian
- Ashley Tappin-Doussan, Olympian
- Cathy Turner, Olympian
- Wendy Weil, Olympian
- Leslie Wright, Olympian

**Elite Athletes**
- Richard Ader, Elite Athlete and Sport Leader
- Suzanne Anderson, Elite Athlete
- Heather Andrews, Elite Athlete
- Charlotte Bailey, Elite Athlete and Sport Leader
- Brian Baker, Elite Athlete
- Robert Ball, Elite Athlete
- Robin Barton, Elite Athlete
- Marian Benjamin, Elite Athlete
- Steven Breiter, Elite Athlete
- Bebe Bryan, Elite Athlete and Coach
- Robert Bunner, Elite Athlete
- Shelley Carlisle, Elite Athlete
- Lara Carlson, Elite Athlete and Sport Leader
- April Carmanah, Elite Athlete
- Charmaine Carnes, Elite Athlete
- Marie Christopherson, Elite Athlete
- Catherine Clarke, Elite Athlete
- Meredith Conroy, Elite Athlete and Sport Leader
- Anthony Corbisiero, Elite Athlete and Sport Leader
- Andrew Cressman, Elite Athlete
- Ruth Crowe, Elite Athlete
- Monica Dalton, Elite Athlete
- Nicole DeBoom, Professional Athlete
- Nancy Diamond, Elite Athlete
- Natalie Donnelley, Elite Athlete
- Kristen Eleehko, Elite Athlete
- Richard Englehart, Elite Athlete
- Thomas Fritz, Elite Athlete
- Christine Furbee, Elite Athlete
- Dodi Gaba, Elite Athlete
- James Garrett, Elite Athlete
- Troy Greder, Elite Athlete
- Cathy Griffin, Elite Athlete and Sport Leader
- Beth Harrell, Elite Athlete and Coach
- Dave Hartsfield, Elite Athlete
- Kristen Hughes, Elite Athlete and Sport Leader
- Gregory Jacobsmeyer, Elite Athlete
- Jessica Johnson, Elite Athlete
Jeri Jump, Elite Athlete
John Katz, Elite Athlete and Coach
Sonja Keating, J.D., Elite Athlete and Sport Leader
Creigh Kelley, Elite Athlete and Sport Leader
Kathy Kinane, Elite Athlete
Susie Kincade, Elite Athlete
Jim Kizer, Elite Athlete
Dr. Darlene Kluka, Elite Athlete and Sport Leader
Dawn Koontz, Elite Athlete
Amanda Kovattana, Elite Athlete
Caitlyn Kuenzi, Elite Athlete
Janine Kuestner, Elite Athlete and Sport Leader
Sharon Lane, Elite Athlete
Laura Lasko, Elite Athlete
Cynthia Laughlin, Elite Athlete
Martha Le, Elite Athlete
Nate Leech, Elite Athlete
Julie Lindsey, Elite Athlete
Bob Link, Elite Athlete
Dr. Phyllis A. Love, Elite Athlete
Alan MacBean, Elite Athlete
Alison Mahedy, Elite Athlete
Nancy Major, Elite Athlete
Lou Manganello, Elite Athlete and Coach
Melissa Marsh, Elite Athlete
Dana May, Elite Athlete
Thomas McNamara, Elite Athlete
Kirsti Miller, Elite Athlete
Robert Miller, Elite Athlete
Dianne Morse, Elite Athlete
Margaret Murphy, Professional Athlete and Coach
Erin Nagel, Elite Athlete
Catherine Nelson, Professional Athlete
Donna Orender, Professional Athlete and Sport Leader
Tracy Palmero, Elite Athlete
Jennifer Parks, Elite Athlete and Sport Leader
David Pastoriza, Elite Athlete, Coach, and Sport Leader
Katherine Pekler, Elite Athlete
Christi Perry, Elite Athlete
Nathalie Pettus, Elite Athlete
William Phelps, Elite Athlete
Victoria Piccioni, Elite Athlete
Allen Poucher, Jr., Elite Athlete
Lauren Primerano, Elite Athlete
Robert Pughe, Elite Athlete
Katherine Redmond, Elite Athlete and Sport Leader
Randy Reese, Elite Athlete and Coach
B. David Ridpath, Elite Athlete and Sport Leader
Eva Rodansky, Elite Athlete
Michael Roth, Elite Athlete
Melissa Rubiola, Elite Athlete
Patricia Rudy, Elite Athlete and Coach
Denise Schreiner, Professional Athlete
Donna Senkbeil, Elite Athlete
Liz Shaw, Elite Athlete
Todd Shuman, Elite Athlete
Kelley Smith, Elite Athlete
Michele Sommer, Elite Athlete
Julie Sommer, Elite Athlete and Sport Leader
Glenn Steinling, Elite Athlete and Sport Leader
Elysse Stolpe, Elite Athlete
Gregory Tarone, Elite Athlete
Laurel Treon Morrow, Elite Athlete
Carolyn Voorhees, Elite Athlete
Sharon Weiss, Elite Athlete
Denise Welling, Elite Athlete
Steve Wheelbee, Elite Athlete
Harrison Wilder, Elite Athlete
Susan Williams, Elite Athlete
Stephen Wilson, Elite Athlete
Dana Wilson, Elite Athlete
Kimberly Wood, Elite Athlete
43 Anonymous

Recreational Athletes
Alex Barnes
Melissa Bondy
Abigail Buckley
Julie Delisle
Stacey Guillory
Carolyn Herman
Eugene Hung
Aiyona Hunt
Michelle Jordan

Susan Kenworthy
Linda Leavitt
William Lewis
Catherine Matthews
Rupert Oldham
Todd Selle
Cairns Tishman
Coralie Wilcher
10 Anonymous
Sport Leaders
Richard Lapchick
Patricia Rodowsky

Supporters
The Honorable Judge Rosemarie Aquilina
David Beazley
Eric Biber
Sharon Cahoon
Diana Cavallaro
Vicki Costello
George DeMonbreun
Amari Dryden
Erica Fritsche
Keri Garcia
Edward Hall
John Hopper
Laurie Jackson
Trey Jackson
Jerri Jones
Derrick Kardos
Caitlin McFall

Stephanie Schleuder
Kenneth Wong
Victor Meleski
Marc Murphy
Cathy O'Neil
Steven Pedersen
Mary Podbielski
Mike Rianda
Terry Sanders
Tricia Savitt
Catherine Seybold
Kent Stevens
Cathy Treible
Emily Trott
Deb Vemm
Nancy Walker
Gretchen West
Evin Willman
19 Anonymous
Testosterone (T) is the primary driver of the performance gap between males as a group and females as a group, Levine et al., 2019. The differentials in T levels and performance emerge at the onset of male puberty, Figures 1 and 2.

Figure 1 is derived from NHANES data. It shows that after birth, males and females produce about the same low, stable levels of testosterone up to age 11—about 0.25 milligrams per day. Beginning at about age 11, while female continue to produce about 0.25 milligrams per day, male levels continue to increase so that by age 13 there is a gap, no overlap, in male and female levels. From that point forward, testosterone distributes bimodally. Figure 2 represents the same data in two additional ways.

Figures 1 and 2 in J. Senefeld et al., JAMA Research Letter (2020)
Testosterone distributes bimodally beginning at about age 13, Figure 1 and 2. The normal testosterone range for post-pubertal males is from 7.7 to 29.4 nmol/l. The normal female range is from 0.06 to 1.68 nmol/l. Males produce four to fifteen times more testosterone than females, Handelsman, 2018.

Figure 3 represents this bimodal distribution including the two female and two male differences of sex development (DSDs or intersex conditions) that are most relevant for sport. Figure 4 represents the same distribution without DSDs/intersex conditions.
As testosterone levels rise in males from the onset of male puberty, beginning at about age 11, performance levels begin to increase correspondingly. The reason we begin to separate males from females in competitions from the onset of male puberty forward is because this is when having a male (androgenic) endocrine system versus a female (estrogenic) endocrine system begins to matter.

Figure 5 tracks both the increase in male T levels starting from age 9 through age 19, and the increasing performance gap. It shows that the performance gap coincides with or “fits” the T level increase, using running, jumping, and swimming events as illustrations. In jumping events or in events where jumping is an asset, by age 11 males have about a 3% advantage over females. By age 13, the male advantage is about 10%. By age 14, it’s about 15%.

Figure 5 - Sex Differences in Athletic Performance Coinciding with The Onset of Male Puberty: Running, Jumping, and Swimming (Handelsman, 2018)¹

¹ This figure is part of a series that was published in David J. Handelsman, et al., Circulating Testosterone as the Hormonal Basis of Sex Differences in Athletic Performance, 39 Endocrine Reviews 803-829 (2018), available at https://academic.oup.com/edrv/article/39/5/803/5052770/.
Figure 6 uses comprehensive national age-group swimming data to demonstrate the emergence of the performance gap coinciding with the onset of male puberty in that sport. It is particularly helpful because, together with Handelsman’s fitted curves (Figure 5) – it details the percentage performance gap by age and event in a sport where male and female athletes are typically well-resourced and train and compete together from a young age.

Figure 6 – Sex Differences in Youth Elite Swimming (Joyner and Senefeld, 2019)

The data in the figure are from the top 5 swimming performances of all-time by US swimmers for each 1-year age group from age 5 to 18 years, a database maintained and verified by USA Swimming. These data are using long course, freestyle swimming performances. Panel A demonstrates the sex difference in swimming performance across age (5 - 18 years). The sex difference in negative (indicating faster performances by girls) until age 10 (no sex differences) and then the sex difference markedly increases (faster boys) with a plateau at age 17. This plateau at ~8.5% maintains steady until ~age 50. The black line is the mean sex difference, and the grey area is the 95% confidence interval. Panel B demonstrates that similar trends were observed for each major freestyle swimming distance. Notably, the sex difference is largest in 'sprint events' (50, 100 and 200 m) and smallest in 'endurance events' (400, 800 and 1,500 m). Panel C is the legend for panel B. The y-axis for panel C is sex difference (%).
While males and females are competitive through childhood and still to some extent in early adolescence, by mid-to-late adolescence and throughout the adult athletic career, the best females are no longer competitive with the best males; indeed, the results data are clear that by late adolescence, the very best females are no longer competitive even with second-tier males. This is true in high school, in college, and in open elite competition.

Figure 7 shows the California high school regional high jump results from 2019, including the performance gap between the best boy and the best girl which ranges from 14 to 20%. (Athletics.net, 2019).

<table>
<thead>
<tr>
<th>REGION</th>
<th>BEST BOY</th>
<th>BEST GIRL</th>
<th>% DIFFERENCE</th>
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</thead>
<tbody>
<tr>
<td>Central</td>
<td>2.0828</td>
<td>1.778</td>
<td>14.63%</td>
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<td>North Coast</td>
<td>2.0828</td>
<td>1.651</td>
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<td>Northern</td>
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<td>1.6764</td>
<td>14.29%</td>
</tr>
<tr>
<td>Oakland</td>
<td>1.8034</td>
<td>1.4732</td>
<td>18.31%</td>
</tr>
<tr>
<td>Sac-Joaquin</td>
<td>2.032</td>
<td>1.73355</td>
<td>14.69%</td>
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<tr>
<td>San Diego</td>
<td>2.032</td>
<td>1.7907</td>
<td>11.88%</td>
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<tr>
<td>San Francisco</td>
<td>1.8288</td>
<td>1.4732</td>
<td>19.44%</td>
</tr>
<tr>
<td>Southern</td>
<td>2.1336</td>
<td>1.7399</td>
<td>18.45%</td>
</tr>
</tbody>
</table>
Figure 8 shows where the Girls’ American Record in the high jump, set by Team USA’s Vashti Cunningham when she was a teenager, would place among US high school boys’ performances in the single year 2019. Since high school, over the last decade, Vashti has been among the best female high jumpers in the US and the world.

Figure 9 shows where the personal bests of Team USA’s Allyson Felix and Sanya Richards-Ross would place among boys and men in the single year 2017. Both have been among the very best female 400 meters specialists in the world over the last decade.