Gender Verification in sports
Tal Schiller
In 2009 Caster Semenya, 18, won the 800m run in the Berlin World Championship. This evoked a frenzy of questions about her sex because she was perceived to be “too masculine.”
• Through the years gender verification was implemented in order to avoid:
  • Male athletes attempt to compete as women
  • To identify women that has an intersex condition giving an alleged unfair advantage
In order for sport events to be fair you have to be either a man or a women
SO...
How to determine Sex?
Phenotype? Genetics? Hormone levels?
Disorders of sex development (DSD)

• DSDs are medical conditions involving the way the reproductive system develops from infancy (and before birth) through young adulthood
• The term refers to congenital conditions in which development of chromosomal, gonadal, or anatomical sex is atypical
• Also termed intersex traits or conditions
• Clinicians involved in DSD treatment usually try to make clear distinctions between biological sex, social gender, and sexual orientation
Normal Sexual Development

Sex Chromosome = XY
Gonads = Testes
External Genitalia = Male

Sex Chromosome = XX
Gonads = Ovaries
External Genitalia = Female

MALE

FEMALE

Normally chromosomal sex determines gonad sex which determines phenotypic sex
Androgen insensitivity syndrome (AIS)
Complete insensitivity to AR

<table>
<thead>
<tr>
<th>Genetics</th>
<th>XY</th>
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<tbody>
<tr>
<td>mutation</td>
<td>(AR) Xq11-q12</td>
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<tr>
<td>Gonadal Sex</td>
<td>Male (undescended Testis)</td>
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<tr>
<td>Androgen levels</td>
<td>Male</td>
</tr>
<tr>
<td>Phenotypic Sex</td>
<td>Female</td>
</tr>
<tr>
<td>Secondary Sex Characteristics</td>
<td>Female</td>
</tr>
</tbody>
</table>
Phenotypes

1 PAIS
Male genitals, infertility

2 PAIS
Male genitals, mildly 'under-masculinized', isolated hypospadias

3 PAIS
Predominantly male genitals, severely 'under-masculinized' (undescended testes, and/or bifid scrotum)

4 PAIS
Ambiguous genitals, severely 'under-masculinized' (phallic structure that is indeterminate between a penis and a clitoris)

5 PAIS
Female genitals (including separate urethral and vaginal orifices, mild clitoromegaly)

6 PAIS
Female genitals with pubic/underarm hair

7 CAIS
Female genitals with little or no pubic/underarm hair
<table>
<thead>
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<th>Genetics</th>
<th>XX</th>
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<tr>
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<tr>
<td>Gonadal Sex</td>
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<tr>
<td>Androgen levels</td>
<td>Variable some can reach 10-1000 female normal range</td>
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<tr>
<td>Phenotypic Sex</td>
<td>Ambiguous genitalia</td>
</tr>
<tr>
<td>Secondary Sex Characteristics</td>
<td>Female</td>
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</table>
The History of Gender Verification In Sports
Physical examinations (Nude parade)

• The idea born shortly after the 1936 summer Olympics in Berlin: a system to be established to examine female athletes
• Began in 1966 with the International Association of Athletics Federation (IAAF) at the European Athletics Championships
• The International Olympic Committee (IOC) followed in 1968
Chromosome testing

• Introduced by the IOC in 1968, at the Mexico City Olympics (X chromatin, the SRY gene)
• The practice of chromosome testing came under scrutiny from those who feel that the testing was humiliating, socially insensitive, and not entirely accurate or effective
• The IAAF ceased sex screening for all athletes in 1992 but retained the option of assessing the sex of a participant should suspicions arise
• A resolution was passed at the 1996 International Olympic Committee (IOC) World Conference on Women and Health "to discontinue the current process of gender verification during the Olympic Games."
• The IOC's board voted to discontinue the practice in June 1999. Chromosome testing was last performed at the Atlanta Olympic Games in 1996
Gender Verification in the Olympics

Joe Leigh Simpson, MD
Arne Ljungqvist, MD
Malcolm A. Ferguson-Smith, MB, ChB, FRCPath
Albert de la Chapelle, MD, PhD
Louis J. Elsas II, MD
A. A. Ehrhardt, PhD
Myron Genel, MD
Elizabeth A. Ferris, MBBS
Alison Carlson

For nearly 15 years, we have advocated abolition of laboratory-based, on-site testing for gender verification in sports competition.1-11 The ostensibly goal of gender verification is to ensure that female athletes do not unwittingly compete against men. Given that men presumably would have an unfair competitive ad-

JAMA; 2000, September 27;284(12):1568-69
the basis of speed or muscle mass, such a policy superficially seems endorseable on the grounds of fairness. In reality, gender verification tests are difficult, expensive, and potentially inaccurate. Furthermore, these tests fail to exclude all potential impostors (e.g., some 46,XX males) are discriminatory against women with disorders of sexual development, and may have shattering consequences for athletes who "fail" a test. 

female genitalia. Many different forms of male pseudohermaphroditism exist. A second problem is that only women, not men, were stigmatized by gender verification testing. Systematic follow-up was rarely available for female athletes "failing" the test, which often was performed under very public circumstances. Follow-up was

pseudohermaphroditism. Noteworthy was the courageous contribution of the Spanish hurdler Maria Martinez Patino in documenting abuse by sports authorities. Patino had complete androgen insensitivity, and like most male pseudohermaphrodites she was raised as female. If athletic, these individuals naturally compete as women. Few if any plausible athletic advantages exist, especially given that gonadal extirpation usually has occurred by adulthood; however, abnormalities in external genitalia and gonads understandably create confusion.
María José Martínez Patiño
• At the 1996 Summer Olympics in Atlanta, Ga, 8 of 3387 female athletes were found to be SRY positive (1 per 423). This frequency may be higher than expected in the general population; however, 7 of the 8 had complete or partial androgen insensitivity.

• The other SRY-positive female athlete was a gonadectomized woman who probably had 5α-reductase deficiency, a disorder in which testosterone cannot be converted to dihydrotestosterone.

• Overall, the prevalence of male pseudohermaphroditism has been estimated to be 27 in 11,373, or 1 in 421, through 5 Olympics.

• No men posing as women have been detected at either the Olympics or other international events at which X chromatin analysis or SRY testing has been performed.
Hormone testing (Hyperandrogenism)

• In the wake of the Semenya case, testosterone testing was introduced to identify testosterone levels above an arbitrary level.
• In June 2012, before the 2012 London Olympics, the IOC released the *IOC Regulations on Female Hyperandrogenism*.
• The regulation states "Nothing in these Regulations is intended to make any determination of sex. Instead, these Regulations are designed to identify circumstances in which a particular athlete will not be eligible (by reason of hormonal characteristics) to participate in 2012 OG Competitions in the female category. In the event that the athlete has been declared ineligible to compete in the female category, the athlete may be eligible to compete as a male athlete, if the athlete qualifies for the male event of the sport."
Out of Bounds? A Critique of the New Policies on Hyperandrogenism in Elite Female Athletes

Katrina Karkazis, Stanford Center for Biomedical Ethics
Rebecca Jordan-Young, Barnard College
Georgiann Davis, Southern Illinois University at Edwardsville
Silvia Camporesi, King’s College London

You Say You’re a Woman? That Should Be Enough

By REBECCA JORDAN-YOUNG and KATRINA KARKAZIS  JUNE 17, 2012

The International Olympic Committee’s new policy governing sex verification is expected to ban women with naturally high testosterone levels, a condition known as hyperandrogenism, from women’s competitions, claiming they have an unfair advantage. I.O.C. officials portray this as a reasonable compromise in a difficult situation, arguing that the rules may be imperfect, but that sports are rule-based — and that the rules should be clear.
• Average testosterone levels are markedly different for men and women. But levels vary widely depending on time of day, time of life... Moreover, cellular responses range so widely that testosterone level alone is meaningless
• There is no evidence that successful athletes have higher testosterone levels than less successful ones
• Doping with testosterone will most likely improve your performance, but you cannot predict how well athletes will do in a competition by knowing their relative testosterone levels
• So what is a better solution?
• Female athletes should be allowed to compete throughout any investigation. Suspension violates their confidentiality and imposes sanctions
• **The best bet might be to let all legally recognized women compete!**
• Sex testing of female athletes will always be discriminatory. Men continue to enjoy freedom from scrutiny, even though they, too, have greatly varying testosterone levels, along with other variations in natural attributes that affect athletic performance.

• Unlike in doping cases, women with hyperandrogenism have not cheated. There is no reason to disqualify women whose bodies produce any of the complex ingredients that add up to athleticism, be they superb vision, big lungs, flexibility, long legs or testosterone.
• Policies on hyperandrogenism were suspended following the case of Dutee Chand v. Athletics Federation of India (AFI) & The IAAF, in the Court of Arbitration in Sport, decided in July 2015
• Chand had been dropped from the 2014 Commonwealth Games at the last minute after the AFI stated that hyperandrogenism made her ineligible to compete as a female athlete
• The ruling found that there was insufficient evidence that testosterone increased female athletic performance. In doing so the court suspended the practice of hyperandrogenism regulation used by the IAAF
• The practice will be declared void if the organization fails to present better evidence by July 2017
• In November 2015, the IOC held a meeting to address both its hyperandrogenism and transgender policies

• In regards to hyperadrogenism in female athletes, the IOC encouraged reinstatement of the IAAF policies suspended by the Court of Arbitration for Sport

• In February 2016, the IOC decided to not introduce its own policies that would impose a maximum testosterone level for the 2016 Summer Olympics
• Over the years Elite women athletes have been humiliated, excluded, and suffered human rights violations as a result of sex verification testing
• Cases have included female genital mutilation and sterilization
• In 2013, it was reported that four elite female athletes from developing countries were subjected to partial clitoridectomies and gonadectomies (sterilization) after testosterone testing revealed that they had an intersex condition
• Psychological harm, sex and identity crises, demeaning reactions, social isolation, depression, and suicide
Transgender athletes

• At the heart of controversy are concerns that transgender women would outperform cisgender women due to their more masculine body structure and higher T levels.

• The intense scrutiny of transgender athletes has focused on trans women because it is generally assumed that transitioning from female to male would not confer a competitive advantage.

• In 2004 the IOC allowed transsexual athletes to participate in the Olympic Games.
• In 2003, a committee convened by the IOC Medical Commission drew up new guidelines for participation of athletes who had undergone sex reassignment.
• The report listed three conditions for participation:
  • 1. athletes must have undergone sex reassignment surgery including changes in the external genitalia and gonadectomy
  • 2. athletes must show legal recognition of their assigned sex
  • 3. athletes must have undergone hormone therapy for an appropriate time before participation, with two years being the suggested time
# IOC Consensus Meeting on Sex Reassignment and Hyperandrogenism

**November 2015**

<table>
<thead>
<tr>
<th>Participants</th>
<th>Position</th>
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<tbody>
<tr>
<td>Prof Dr Uğur Erdener</td>
<td>Chairman, IOC Medical &amp; Scientific Commission</td>
</tr>
<tr>
<td>Prof Arne Ljungqvist</td>
<td>Former Chairman, IOC Medical Commission</td>
</tr>
<tr>
<td>Dr Stéphane Bermon</td>
<td>Monaco Institute of Sports Medicine &amp; Surgery, IAAF Medical &amp; Scientific Senior Consultant</td>
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<tr>
<td>Michael Beloff, QC</td>
<td>Barrister, Blackstone Chambers</td>
</tr>
<tr>
<td>Prof Gerard Conway</td>
<td>Professor of Clinical Medicine, University College London</td>
</tr>
<tr>
<td>Prof Myron Genel</td>
<td>Professor Emeritus of Pediatrics and Senior Research Scientist, Yale Child Health Research Center, Yale University School of Medicine</td>
</tr>
<tr>
<td>Ms Joanna Harper</td>
<td>Chief Medical Physicist, Radiation Oncology, Providence Portland Medical Center</td>
</tr>
<tr>
<td>Prof Angelica Linden Hirschberg</td>
<td>Department of Woman &amp; Child Health, Division of Obstetrics &amp; Gynecology, Karolinska Institutet</td>
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</table>
• C. It is necessary to ensure insofar as possible that trans athletes are not excluded from the opportunity to participate in sporting competition.

• E. To require surgical anatomical changes as a pre-condition to participation is not necessary to preserve fair competition and may be inconsistent with developing legislation and notions of human rights.
1. Those who transition from female to male are eligible to compete in the male category without restriction.

2. Those who transition from male to female are eligible to compete in the female category under the following conditions:

2.1. The athlete has declared that her gender identity is female. The declaration cannot be changed, for sporting purposes, for a minimum of four years.

2.2. The athlete must demonstrate that her total testosterone level in serum has been below 10 nmol/L for at least 12 months prior to her first competition (with the requirement for any longer period to be based on a confidential case-by-case evaluation, considering whether or not 12 months is a sufficient length of time to minimize any advantage in women’s competition).

2.3. The athlete’s total testosterone level in serum must remain below 10 nmol/L throughout the period of desired eligibility to compete in the female category.

2.4. Compliance with these conditions may be monitored by testing. In the event of non-compliance, the athlete’s eligibility for female competition will be suspended for 12 months.
Chris Mosier

- American transgender triathlete and advocate
- He started his athletic career before transitioning, started his transition in 2010, and in 2015 earned a spot on the Team USA sprint duathlone men's team for the 2016 World Championship, making him the first known out trans athlete to join a U.S. national team
Schuyler Bailar

- American swimmer, and the first openly transgender NCAA Division I swimmer.
- The first publicly documented NCAA D1 transgender man to compete as a man in any sport.
- Bailar was recruited in 2013 as a member of the women's team. After transitioning he was offered a spot on the men's team despite the obvious challenges that it presented.
Fallon Fox

- American MMA (mixed martial arts) fighter
- The first openly transgender athlete in MMA history
- Sparked a controversy whether a person birth-assigned as a male should be able to fight in women’s divisions in MMA fighting
<table>
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<tr>
<th></th>
<th>n</th>
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<td>23.0-29.0</td>
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<td>T, nmol/L</td>
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<td>DHEAS, µmol/L</td>
<td>A4, nmol/L</td>
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<td></td>
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<td>(19–29)</td>
<td>(15.6–29.3)</td>
<td>(3.7–3.9)</td>
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<td>Doping</td>
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<td>(2.8–11.7)</td>
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<td>P value</td>
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<td>.05</td>
<td>.02</td>
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### Endocrine Parameters in Athletes Not Using OC, in Different Phases of the Menstrual Cycle

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<th>Menstrual Status</th>
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<th>T&lt;sub&gt;1&lt;/sub&gt;, nmol/L</th>
<th>DHEAS, μmol/L</th>
<th>A4, nmol/L</th>
<th>SHBG, nmol/L</th>
<th>FT, pmol/L</th>
<th>LH, IU/L</th>
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<td>Follicular phase</td>
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<td>0.76 (0.59–1.04)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>6.34 (5.29–7.79)&lt;sup&gt;a, b&lt;/sup&gt;</td>
<td>3.90 (3.14–5.13)&lt;sup&gt;a, b&lt;/sup&gt;</td>
<td>53.4 (37.2–71.2)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>8.38 (5.74–12.26)</td>
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<td>Luteal phase</td>
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<td>0.73 (0.52–0.96)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>3.80 (3.34–4.26)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>3.60 (2.74–4.47)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>59.9 (43.7–75.3)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>9.39 (6.59–13.25)</td>
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<td>Oligo- or amenorrhea</td>
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<td>0.54 (0.40–0.79)</td>
<td>2.00 (1.59–2.49)</td>
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<td>Fisher's F&lt;sup&gt;c&lt;/sup&gt;</td>
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תודה על ההקשהה