

Performance, Inclusion and Elite Sports - Transgender Athletes



There is ongoing debate about the participation of transgender athletes in elite sport. This POSTnote discusses policies by sporting bodies that place a range of eligibility restrictions on some transgender athletes, including the suppression of the hormone testosterone. It also highlights stakeholder perspectives on balancing fairness, safety and inclusion in sport.

Background

In almost all sports, male athletes outperform female athletes.¹ Separate sex categories offer fairness in competition to the female category from the male performance advantage.^{2,3} Further categories to ensure fairness vary by sport but can include age, weight⁴⁻⁶ and professional or amateur status. This briefing focuses on developments surrounding the inclusion of transgender athletes in elite competitive sport. [POSTnote 682](#) discusses the inclusion of women with Differences in Sex Development (DSDs) in elite competitive sport.⁷

Transgender is used in this POSTnote as an umbrella term for individuals whose gender identity differs to their sex registered at birth. The language is contextual and evolving (see Box 1). Much of the debate centres on how to include transgender athletes in categories aligned to their gender identity in elite sport, while maintaining fairness in competition, particularly regarding the inclusion of trans women in the female category. The inclusion of trans men in the male category is also limited by some sports governing bodies.⁸

In 2003, the International Olympic Committee (IOC) allowed transgender athletes to compete in the category of their

Overview

- Male athletes have a sport performance advantage over female athletes.
- Sport is separated into sex categories to ensure competitive fairness and in some sports, on athlete safety grounds.
- Research suggests that the physical advantage from going through a male puberty is not fully removed in transgender women who undergo treatment to suppress testosterone levels.
- Sports governing bodies are adopting different approaches. Some impose eligibility restrictions; others seek to widen participation, such as via open categories.
- Some stakeholders regard restrictions on eligibility as discriminatory while others view them as necessary to ensure fairness or safety.

acquired legal gender if they had undergone medical gender reassignment and hormone therapy.⁹ This was amended in 2015 to remove the requirement for surgical intervention.¹⁰ In 2021 it replaced regulations with a framework for International Federations (IFs) to prioritise inclusion and uphold human rights.¹¹ Many IFs are updating or creating policies. The first openly transgender athletes competed in the 2020 Olympic Games.¹²

Why are there sex categories in sport?

The importance of women's sport is recognised in international sport governance, such as the IOC charter that promotes the right of all women to compete, and in UK law.¹³ Some research has analysed how athletes' human rights are protected in sport regulations.¹⁴ Section 195 of the Equality Act 2010 allows sex segregation for particular purposes, including for "gender-affected" activities, where "the physical strength, stamina or physique of average persons of one sex would put them at a disadvantage compared to average persons of the other sex as competitors in events involving the activity."¹⁵ While the Act prohibits discrimination on the basis of gender reassignment, Section 195 allows those convening sporting events to exclude transgender people from participating in "gender-affected

Box 1: Terminology

- **Sex** generally refers to biological and physiological characteristics, determined by sex chromosomes (typically XY in males and XX in females), hormones and their interactions.^{16–18} It is a protected characteristic in UK law (Equality Act 2010), and defined in binary terms: man (male) and woman (female).¹⁵ Sex and gender are sometimes used interchangeably, and often conflated.¹⁹
- **Gender** is not defined in UK law, either in the Equality Act 2010¹⁵ or the Gender Recognition Act 2004.²⁰ The Government has no agreed definition, but generally refers to it as a social construction of behaviours, roles and characteristics associated with masculinity or femininity.¹⁶
- **Gender identity** refers to an individual's self-perception and can include a range of identities such as **non-binary** where someone does not exclusively identify as male or female.²¹ A person's gender identity may not match their sex registered at birth.^{16,22}
- **Transgender** is an umbrella term for a person whose gender identity is different from their sex registered at birth.¹⁶ A trans woman is a person registered male at birth but identifies as a woman. A trans man is a person registered female at birth but identifies as a man.²³
- **Gender reassignment** is a protected characteristic under the Equality Act 2010.¹⁵ The characteristic applies if the individual is proposing to undergo, is undergoing or has undergone a process, or part of a process, to change their physiological or other sex attributes. The Gender Recognition Act 2004 allows transgender people to achieve legal recognition of their acquired gender and change their recorded sex.^{20,24}
- **Transitioning** is when an individual changes their gender presentation, which could range from changing name and physical appearance to medical interventions such as hormone therapy and gender reassignment surgery.

activity" where necessary to ensure fairness to, and safety of other competitors.¹⁵ Sex differences in sport performance are discussed in Box 2.

Testosterone, sex development and sport

Androgens are sex steroid hormones present in males and females and have a range of functions, including the development of male characteristics.²⁵ The most biologically active androgens are testosterone and the related hormone dihydrotestosterone (DHT).²⁶ Testosterone mainly has tissue-building (anabolic) functions while DHT is primarily responsible for development of external male characteristics.²⁶ They drive the development of male physiology during foetal development and later, male puberty.^{27–29} Blood testosterone levels are typically 15-fold higher in men than women and do not overlap (7.7-30.9 nmol/L in men, 0.06-2.0 nmol/L in women).^{30,31}

Blood testosterone levels and sports performance

Research has examined the effects of testosterone on the body by monitoring the impact of giving it to individuals.^{30,32–36} Testosterone increases muscle mass and strength, and decreases total body fat, key determinants of success in sports requiring power and speed.^{34–38} It promotes the mass, density and strength of bones in puberty and throughout life.³⁹ It increases the concentration of red blood cells, important for endurance events, as they carry oxygen.⁴⁰ Taking testosterone is a banned substance in sport doping rules for these reasons.⁴¹ Testosterone is widely considered as the key factor for sex differences in sports performance (Box 2), with important

Box 2: Sex differences in sporting performance

Research has documented the male performance advantage, that begins in early childhood. Pre-pubescent boys outperform girls across measures of endurance, speed and power.^{52–54} From puberty, differences in physiology maintain the performance gap in terms of speed, strength, power and endurance, and this differs across sports.^{55–59} The gap ranges from 11-13% for rowing, 8-13% for running, and 14-25% for jumping events and has remained stable since 1983.^{1,60,61} In strength and power sports, sex differences can be 50%, and up to 160% for punching.^{60,62} In some sports not heavily dependent on physical capacity the performance gap is smaller, for example archery and shooting (<5%).⁶³

effects conferred by the hormone during male puberty. However, it is not possible to determine with certainty how an individual's own naturally produced testosterone levels can predict their sporting success within a sex category.^{42–51}

Transgender athletes

There are increasing numbers of openly transgender athletes participating in elite and recreational sports.^{64–67} Key questions in the debate are whether sporting performance advantages remain in trans women after a medical transition and the extent to which athlete safety is a consideration.⁶⁸ Transitioning can include medical interventions such as hormone therapy (Box 3), although some people may choose not to take them for many reasons including barriers to accessing care and personal preference.⁶⁹ The debate focuses less on trans men, as they are not considered to have a sport advantage over men who are not transgender. However, some sports have eligibility restrictions on the participation of trans men, discussed later.

Hormone therapy and sporting performance

Most of the research used to inform policies by sports governing bodies focuses on clinical outcomes for transgender participants undergoing medical transition, who are not elite athletes. However, some consider it unlikely that the general findings would not be applicable to trained transgender athletes.⁷⁰ Studies vary in design and quality and use a range of methods: longitudinal studies follow the same group of participants, during and after transition, whereas cross-sectional studies provide a snapshot at a given time, and compare transgender people with non-transgender control groups.⁷¹ Sample sizes differ but are typically small, from 11 to 239 participants, with a range of ages, including adolescents.⁵⁹ Medical treatments for transition vary, so participants' hormone levels differ substantially, influencing a range of physiological characteristics. There is no relevant data about transgender people who took hormone treatments before puberty.

Impact of testosterone suppression in trans women

A [systematic review](#)⁵⁹ summarised 24 primary studies documenting changes in non-athletic trans women's physiology 1 to 3 years after transitioning, such as musculature and strength, body composition and red blood cells.^{59,72–90} Some studies showed a modest decrease in muscle mass and strength after transitioning and others showed no significant change; strength is thus retained at higher levels than in women who are not transgender. However, several studies showed a decrease in red blood cell levels to the range of non-

Box 3: Hormone therapy for transgender people

Gender-affirming treatment, involving hormone therapy and/or surgery, feminises or masculinises the body.⁹³

Hormone therapies vary according to age. Children may be prescribed drugs that block puberty and from age 16, cross-sex hormones that can lead to irreversible changes in sexual development.^{94,95} Hormone therapy for adult trans women can involve treatments consisting of oestrogens and drugs to suppress testosterone production, to lower and maintain testosterone levels to the range typical for pre-menopausal women.^{96–98} Trans men are prescribed androgens to produce testosterone levels in the typical male range.

transgender women. Other reviews reported similar overall findings, also observing minimal changes to physique.^{59,60,70,91,92} Two other separate studies reported decreases in fitness after transitioning. However, inferring conclusions from these two studies with certainty is limited because they both lacked adequate controls, including for training habits and varying hormone therapy.^{99,100} One found that 2 years after transitioning (but not 1 year), trans women's push-up and sit-up ability decreased to levels comparable with women who are not transgender, but trans women remained 12% faster in the 1.5 mile run.¹⁰⁰ Another found that self-reported long-distance running times (5km – marathon) in trans women were slower after transitioning, but this study involved only 8 participants and no control group.⁹⁹

Implications for sport

The goal of testosterone suppression is to maintain fairness, and safety in the case of some sports, in the female category. Research to date suggests that testosterone suppression is likely to be insufficient to reduce some of the performance advantages of trans women to the same levels as women who are not transgender, or to reverse some legacy effects gained in puberty (such as skeletal features and lung size). However, opinions differ on the best way to include trans women in sport.^{60,101,102} Scientists agree that more studies are needed on transgender athletes to determine if and to what extent any performance advantages remain after transitioning in individual sports, with some suggesting that different regulations should apply depending on each sport's physiological requirements.^{63,91,102} Research is challenging due to low numbers of eligible participants, difficulties in recruitment, high dropout rates and limited funding.^{59,102} A few groups worldwide and in the UK are conducting such studies.¹⁰³

These scientific perspectives inform policymaking that involves a range of international and national regulatory and legal frameworks. Sport regulation is managed by international and domestic bodies, with legal challenges heard in national courts or in the international Court of Arbitration for Sport.¹⁰⁴

International regulatory approaches**International Olympic Committee**

The IOC coordinates the Olympic Games¹⁰⁵ and works with IFs, which create and enforce rules for their sport.¹⁰⁶ In 2021 the IOC rescinded its previous guidelines (stipulating testosterone suppression for trans women)¹⁰, replacing it with the "Framework on Fairness, Inclusion and Non-discrimination on the Basis of Gender Identity and Sex Variations". It states that it should not be assumed without evidence that athletes have

an "unfair or disproportionate competitive advantage" and that it cannot regulate a one-size-fits-all approach across all sports. Instead, each IF should determine how to manage this in the context of their own sport, creating policies that are evidence-based, drawing on research demonstrating any disproportionate advantage and/or safety risk to competitors.¹¹

The IOC framework was welcomed by some human rights groups and LGBT+ advocacy groups for its shift in focus towards human rights in sport and for recognising and prioritising the prevention of harm for transgender athletes.^{107–110} However, some argued that this places the human rights of transgender people above those of female athletes to have equal opportunities to males.^{111,112} A survey of female Olympians reported frustration that the IOC did not consult with female athletes and prioritised inclusion of trans women athletes above competitive fairness.¹¹¹ A position statement from international sport medicine organisations, including the International Federation of Sports Medicine, criticised the IOC for ignoring scientific evidence regarding retained performance advantages in trans women, and placing the burden on IFs who may lack the funds or capacity to create and implement policy according to the IOC framework.¹¹³

Since the IOC's decision to defer policymaking to IFs, they are all now tasked with updating or creating rules for their sport. The IFs who have updated their regulations differ in their approach for elite competition. Approaches so far include restrictions on entering existing sex categories, or the introduction of open or mixed categories.¹¹⁴ Some IFs describe their policies as living documents, that can be updated as research develops.^{115,116} International Rugby League has excluded trans women from competing in the female category until a policy is finalised.¹¹⁷ National Governing Bodies (NGBs) determine policies for domestic competitions and can choose to follow the regulations of the relevant IF or draft their own, in line with the Equality Act. Several recently published guidance.^{118–120}

Regulations for trans women*Suppressing testosterone for trans women*

- **World Athletics** - 5 nmol/L or below for 12 months and during competition.¹¹⁵ From its evidence review, this is a "conservative" limit based on ranges of testosterone levels for men and women.^{30,115}
- **UCI (cycling)** - 2.5 nmol/L or below for 24 months prior to competing.¹²¹ Its scientific review considered factors such as oxygen and power uptake for endurance sports, and muscle mass for disciplines such as sprints.¹²²
- **World Triathlon** - 2.5 nmol/L or below for at least 24 months before competing and at least 48 months must have elapsed since competing as a male.¹²³

Exclusion through experience of a male puberty

- **World Rugby** - trans women who transitioned after puberty cannot participate in women's rugby.¹²⁴ This is based on its research review describing sex differences in strength, size, speed and power.^{124–126}
- **FINA (aquatics)** - testosterone suppression to 2.5 nmol/L or below beginning before the age of 12 or Tanner stage 2 (a stage of pubertal development^{127,128}), which effectively

precludes a male puberty.¹¹⁶ It has not made a scientific review publicly available, but states that after puberty there are “persistent legacy effects” giving trans women “a relative performance advantage over biological females.”

Regulations for trans men

World Athletics permits trans men to compete in the male category without restrictions.¹¹⁵ World Rugby and FINA allow trans men to compete in the male category, subject to an assessment of physical ability and acceptance of personal injury risk.^{8,116} Trans men require an exemption to take testosterone, since this would otherwise incur a doping sanction.^{8,116,121}

Regulations for non-binary people

Most IFs, except World Rugby, do not include non-binary¹²⁹ (Box 1) athletes in their regulations. World Rugby restricts the female category to those who have not experienced testosterone at puberty, while anyone can play in the male category with the same restrictions as trans men.¹³⁰

UK approach for domestic sport

The Government does not regulate sports governing bodies' policies. In a Parliamentary Question in June 2022 the Government noted that diversity in sport means that it is not possible to take one approach to transgender inclusion.¹³¹ In 2021, the Women and Equalities Committee recommended that more support for UK sports providers was needed.¹⁹ In 2021, the UK Sports Councils released guidance on drafting inclusive transgender policies for NGBs for domestic sport in the UK, covering all levels of participation from elite to grassroots.¹¹⁴ After consultation and a scientific review, it concluded that transgender inclusion, fairness and safety cannot be balanced effectively in gender-affected sport where there is meaningful competition and that there is no “one-size fits all” approach across all sports and participation levels.^{132,133} The Sports Councils guidance encouraged individual sports to draft regulations based on their requirements and priorities, following its decision-making framework and the Equality Act 2010. For NGBs that choose to prioritise fairness or safety, it advised that they should find “innovative and creative ways” to maximise inclusion. It suggested three options to consider:

- prioritise transgender inclusion within existing sex categories. For “gender-affected” sports that rely on physical capacity (such as rowing and athletics), testosterone limits should be implemented for trans women.
- restrict the female category to those registered female at birth, and an open category for all (including trans women).
- create additional categories not dependent on sex or gender (universal admission).

The Sports Councils guidance was welcomed by Women in Sport, who supported the recommendation of creating well-evidenced inclusion policies.¹³⁴ The campaign groups Sex Matters and Fair Play For Women, commended the focus on safety and fairness but were disappointed that the guidance did not restrict transgender athletes from competing in the sex category of their choice.^{135,136} The transgender youth charity Mermaids argued that the guidance misinterpreted the Equality Act 2010 and ignored lived experiences of trans people.¹³⁷ The LGBTIQ+ Sport & Physical Activity Alliance criticised the guidance for presenting “a false dichotomy of inclusion and

fairness”, and stated that the guidance will impact negatively on inclusion of transgender people in sport.¹³⁸

Stakeholder perspectives

This issue is set in the context of wider societal debate surrounding equality for transgender people.¹³⁹ A range of similar views from LGBT+ organisations have been shared following recent publication of IFs' regulations. They describe regulations as discriminatory, in contravention of the IOC framework and human rights, lacking evidence, and lacking compassion for transgender athletes, which could result in psychological harm.^{140–143} There are concerns that the age 12 cut-off in swimming is arbitrary, because the age of puberty varies,¹⁴⁴ transitioning is restricted to older ages, and access to NHS gender identity services is constrained.^{145–147}

Some proponents of restricting participation in the female category have concerns that loss of fair competition could result in loss of rankings and funding opportunities for women, resulting in decreased participation in sport.^{111,133,148} Further concern was raised that allowing anyone to self-identify into the female category could compromise both fairness and physical safety in some sports.^{3,149,150}

Implications for recreational sports

Participating in sports has well-documented mental and physical benefits.¹⁵¹ Some have highlighted a connection between regulations for elite sports and participation at grassroots level, particularly for young people.^{3,152–154} A survey found that half of transgender people reported negative experiences in sports, such as transphobic bullying and harassment by peers, coaches and fans.¹⁵⁵ Other barriers include the requirement of disclosing changes in their gender identity and feeling unsafe in gendered facilities, such as changing rooms.^{156,157} Non-binary people are also reported to face exclusion.¹²⁹ Barriers to participation in sport by women and girls mean they are less likely to be physically active than men.¹⁵⁸ Social and cultural barriers include lack of time and childcare, personal safety, funding and access to facilities.^{158–160} The consultation for the Sports Council's report heard perspectives relating to how inclusion of trans women might reduce participation in recreational sport by some women and girls who are not transgender.¹³³

Developing approaches to inclusion

Approaches to widen participation for transgender athletes vary. They include open categories¹¹⁶ alongside a protected female category, which excludes those who have gone through puberty as male.^{114,150} British Triathlon has female and open categories for competitive level participation, but no restrictions for recreational level.¹²⁰ Others have proposed creating a third category for any competitor, although it is unclear whether there would be enough participants for meaningful competition.^{102,161} Others propose handicap systems reflecting individual skill to mitigate performance advantage.^{162,163} Some propose replacing sex categories with divisions based on other metrics, such as height, skill and strength.¹⁶⁴ Diverse approaches have been taken to widen participation at grassroots level, such as mixed gender non-contact teams in rugby.¹⁶⁵ Some amateur and youth organisations allow gender-diverse players to decide which sex category to participate in.¹⁶⁶

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