Sep 29, 2025

Trans Women in Sport: What Does the Science Say?

Updated: Jan 7

Authors: Dr Sav Zwickl, Eli Ward-Smith, Arden Wong, and Prof Ada Cheung.

Content Warning: This blog contains reference to exclusion of, and discrimination against, trans people in sport.

Originally published on May 16, 2024.

A trans woman jogging (FG Trade, iStock).

Sport discussions involving trans women often spark strong opinions and heated debate. Below, we aim to lay out what we do know from the research, where uncertainty remains, and how inclusion and fairness might both be supported.

Why this matters

Sport offers huge benefits — improved health, connection, confidence, community. Yet many trans people don't participate at all, much less at competitive levels. In Australia, we found only ~1/3 of trans adults engage in regular sport, compared to 80% in the general population.

Barriers include unsafe or unwelcoming environments, gendered uniforms, exclusionary rules, lack of privacy in facilities, and fear of discrimination. So, the question shouldn't just be "can trans women compete?" but also "how do we remove unfair obstacles so everyone can participate?"

What are the common worries?

Three major concerns tend to dominate public debate:

1: Performance advantage.
That trans women might have superior strength, endurance, or speed.

2: Safety.
That trans women might pose injury risk to cisgender women.

3: Fairness of competition.
Whether the playing field remains level.

To evaluate these, we need to see what the science says — and also where evidence is lacking.

A person kneeling at the beginning of a relay race (Braden Collum, Unsplash).

How hormone therapy changes the body

Most trans women who compete are on gender-affirming hormone therapy (GAHT) — typically oestrogen plus medications to lower testosterone. This therapy leads to measurable changes in body composition and function.

Trans Health Research and collaborators have recently published two articles that review the research on the impact of GAHT on trans sporting participation and physical performance. Some key effects observed (in *non-athletic* trans women) include:

- Increase in fat mass (about 30% over 12 months).
- Decrease in muscle mass (around 5% over 12 months).
- Bone structure (e.g. height, skeleton width) does *not* change after puberty.

So, while GAHT brings substantial bodily changes, it doesn't erase everything that developed before treatment if it was started after puberty — and that is part of the uncertainty.

For example, trans athlete Hannah Mounsey described her experience of GAHT:

> "... it's massive. I lost 20 kg in the first month I was on hormone treatment, simply due to the lack of testosterone. This obviously slowed significantly because the body doesn't want to lose muscle, but the effects on my central nervous system and hemoglobin levels, things people can't see, continue at a much faster rate. The central nervous system plays a huge role in strength and force production, while hemoglobin impacts your endurance capabilities. What this means is that essentially the external doesn't necessarily match the internal. As the saying goes, don't judge a book by its cover."

A trans woman stretching in the gym (Yuya Parker, Adobe Stock).

What the evidence says about performance

Because there aren't many long-term, sport-specific studies, we mostly rely on smaller, cross-sectional ones. While research is still limited, especially in elite athletes, we can draw some key conclusions from existing studies. Here's a summary of what we *do* see:

- After 2 years of GAHT, trans women show little to no advantage over cis women in tests like running 1.5 miles or number of sit-ups.
- By 4 years on GAHT, performance differences in studied metrics tend to disappear.
- However, in strength tests (e.g. push-ups, grip strength), some small residual advantage may persist.
- In contrast, some areas suggest *worse* performance: lung function, efficiency of breathing, and fitness (Braga et al., Saitong et al., and Alvares et al.) when normalised to body size.
- In one study of national-level volleyball players, athletic trans women performed similarly to cis women (but below cis men) across multiple physical metrics.
- In a UK study, athletic trans women (on hormones for 4–6 years) had *worse* performance in lung function, jump height, and relative VO_2 max (a measure of fitness) than cis women, but absolute grip strength was higher.

In short: any advantage that exists is likely to be small, context-specific, and not universal.

Safety concerns

Despite frequent public talk, there is no robust empirical evidence that trans women increase injury risk to cisgender women in sport.

Most policies that cite safety are based on theoretical models (assuming trans women are the same as cis men, and comparing cis men to cis women), not on observed injury data.

What rules currently exist

Many sporting bodies have eligibility policies. These often require:

- Maintaining testosterone levels below a threshold (e.g. < 5 nmol/L) for a set duration (e.g. 24 months).
- Submission of performance data (times, strength metrics, prior competition data).

Some sports, however, have banned trans women entirely — but these bans tend to lack scientific justification, and they ignore the diversity among trans women in body size, physiology, training history, etc.

A trans woman with her BMX bike (FOTOGRAFIA INC, iStock).

Community-level sport: inclusion first

At grassroots and community levels, the aim should be to welcome everyone. In Australia, the Sex Discrimination Act prohibits discrimination based on gender identity, which applies to sporting settings.

Sport Australia's 2019 guidelines for the inclusion of trans and gender diverse people in sport emphasise that inclusion, wellbeing, and non-discrimination should be central to policy-making.

Many community-level sports put social inclusion ahead of competitive fairness. For example, in community-level Australian Football, all trans women may compete, unless there is a clearly demonstrated safety risk.

What we don't yet know

- How long exactly it takes for GAHT to eliminate residual advantage in different sports and for different individuals. Is it 1 year, 2 years or longer?
- Sport-specific evidence in high-level athletes in disciplines that rely heavily on power, speed, or strength.
- Longitudinal studies following the same athletes before and after transition.
- Broader data on injury incidence in mixed or women-only competitions involving trans women.

A trans woman sitting on a couch, a sombre expression on her face (Yuya Parker, Adobe Stock).

How to move forward with fairness and inclusion

Here are guiding principles:

- Use evidence-based eligibility criteria (e.g. hormone levels, treatment duration), and avoid blanket bans not grounded in data.
- Distinguish elite sport (where fine margins matter) from community sport (where inclusion and wellbeing may carry more weight). The Australian Sports Commission has separate guidelines for both.
- Invest in more rigorous, long-term research, ideally following trans athletes over time. Our world-first GAME study is currently addressing this.

- Create welcoming environments (inclusive bathrooms, changing rooms, coach education) to reduce non-policy barriers.

For further information, Australia has two national sporting inclusion programs designed to assist sporting organisations with the inclusion of people with diverse sexualities and gender; Pride in Sport and Proud 2 Play.

In summary

There is very low participation of trans people in sport due to a large number of barriers such as actual or anticipated discrimination.

Hormone therapy leads to substantial physical changes in trans women, which often narrow or eliminate many performance differences over time.

Any remaining differences are small and vary by sport. Some studies show a slight residual advantage in certain measures (e.g., handgrip strength) and a disadvantage in others (e.g., lung function and aerobic fitness). How much this matters depends on the demands of the specific sport.

Safety concerns are mostly hypothetical. To date, there is no solid evidence that trans women pose a greater injury risk to cis women in sport.

Fairness and inclusion can coexist. With thoughtful, evidence-based policies, both can be achieved without resorting to blanket bans.