

Abandon this false start

New sex testing rules for female athletes are scientifically flawed, manifestly unjust and cannot stay, say **Katrina Karkazis** and **Rebecca Jordan-Young**

IT IS just days until the start of the Olympics – an exhilarating feast of elite competition watched by the world, a chance for athletes to demonstrate their extraordinary prowess in physical contests.

Imagine if, having proved to be the best, with the eyes of the world on you, the atmosphere sours and you face rumours and allegations of an unfair advantage and the condemnation of your competitors and the watching public. Imagine that this has nothing to do with cheating or doping, but is simply because of the biology you were born with.

We're talking about sex testing for elite female athletes, a highly charged issue that has been officially resurrected for the first time in more than a decade.

The International Olympic Committee (IOC) has just released new regulations (IOC 2012) for determining whether athletes should be allowed to compete as women, along the lines of those agreed by the International Association of Athletics Federations (IAAF) last year. Both policies are based on the assertion that testosterone levels of male and female athletes are distinct and that women with testosterone levels typical for males have an "unfair" advantage – assumptions that are scientifically flawed and render the policies and their effects ethically dubious.

Both bodies were forced to confront the problems with sex determination policies in the wake of runner Caster Semenya's case. Competitors challenged the young South African's sex after she won the 800 metres world



title in 2009. Her outstanding victory and powerful physique fuelled a frenzy of speculation.

The IAAF was roundly criticised for its poorly defined approach to sex determination and handling of the case. Semenya was driven into hiding to escape the resulting scrutiny and humiliation. As a result, the IAAF and IOC faced calls to rethink their approach.

Unfortunately, the resulting policies, in our view, are flawed. In a shift from earlier routine sex testing for female athletes, which the IAAF and the IOC abandoned in the 1990s, the sports bodies no longer overtly aim to determine whether someone is "really" a woman. Instead, they focus on women with hyperandrogenism –

of us in many ways, such as rare genetic mutations that confer enhanced aerobic capacity.

So is the difference in athletic performance between males and females chiefly "due to higher levels of androgenic hormones in males" as the IAAF puts it?

Although it may be surprising, given that this is a popular belief and is stated as fact in both the IAAF and IOC policies, there is no evidence showing that successful athletes have higher testosterone levels than less successful ones.

Clinical studies do confirm that testosterone, among many other factors, helps improve muscle size, strength and endurance (*New England Journal of Medicine*, vol 335, p 1; *European Journal of Applied Physiology*, vol 111, p 2249). It may seem logical to infer, then, that having more testosterone gives an athletic advantage.

But responses to it differ dramatically between individuals, and testosterone is just one factor in a complex feedback system.

A striking counter example to the idea that testosterone is the key factor in athleticism is women with complete androgen insensitivity syndrome, whose cells are totally unresponsive to testosterone but who are overrepresented among elite athletes (*The Journal of the American Medical Association*, vol 284, p 1568). Some women with androgen insensitivity are, under the new rules, exempt from a ban. And a quarter of elite male athletes might have testosterone levels below the typical male range, with many in the typical female range, according to

naturally raised testosterone levels. The new rules effectively say they are too masculine to compete in the female category, based on the idea testosterone is the key reason for men's often superior strength and speed.

But does naturally occurring testosterone really confer athletic advantage in a predictable way, as suggested? There is little evidence and what evidence exists points away from such conclusions.

And even if such an advantage exists, is that really unfair? Elite athletes are different from most

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endocrinologist Peter Sönksen.

Add the fact that most relevant studies have focused on men and that testosterone levels for elite athletes have not been extensively studied and it is clear to us that relying on testosterone levels oversimplifies and misrepresents what contributes to athletic excellence and suggests far more certainty than is justified.

Even if a decisive link had been established, should it be viewed as any different to other biological advantages broadly accepted in some elite athletes?

For example, several runners have mitochondrial conditions that enhance aerobic ability (*Mitochondrion*, vol 11, p 774). Some basketball players have acromegaly, a hormonal condition that results in enlarged hands and feet.

Hyperandrogenism is also a naturally occurring condition, no different from other exceptional biological variation in humans. So what makes this difference important? Well, as Hida Vilorio, an intersex representative at the IOC meetings, noted in a letter to *The New York Times*, when the IOC was asked about the issue it said that these other physical and medical differences do not call the athlete's sex into question. While the IOC is adamant that these new regulations are not "intended to make any determination of sex", this looks a lot like sex testing.

Sports organisations need to stop policing biologically natural bodies, which can lead to harmful scrutiny of less feminine women, and allow all to compete, regardless of the level of naturally occurring hormones.

In short, these new sex testing policies must be scrapped. n

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One minute with... Frank Tallis

All of us are susceptible to morbid obsessions and delusions, says the novelist and former clinical psychologist

Your latest novel is about a man who is possessed. Did any of your patients have that belief?

Once a patient came in and said: "I am possessed by a demon." This guy wasn't insane, he wasn't schizophrenic - he just had this particular belief. In my day we called it "monosymptomatic delusion", but now it would be called something like "delusional disorder". That's when you're completely sound and reasonable in every respect except you have one belief that is absolutely bonkers.

Why would an otherwise well person believe something like that?

He was misattributing certain symptoms he had to a demonic presence. When you're possessed, you're supposed to get headaches, and he was getting loads of headaches.

I can't imagine making that assumption myself...

You have to have an openness to it. Lots of people are open to all kinds of spiritual and magical beliefs. An individual could have a perfectly harmless interest in the supernatural but then something happens that triggers this delusion and they get stuck with it, reinforcing it by piling up one misinterpretation after another. If you go out looking for evidence, you will find it.

What kind of evidence?

In my patient's case, he wanted to know the demon's name, so he got a Ouija board out. This shows he had a willingness to go down a particular path. When you think about the way that brains work, our natural inclination is to look for causes.

Could anyone end up with delusions like these?

Theoretically, yes, in the right circumstances. Maybe we all get such episodes in our lives. It's not that unusual for people to think they are seriously ill without much evidence. Who hasn't had a health scare for no good reason? That's taking a



PROFILE

Frank Tallis's novels draw on his 20 years as a clinical psychologist. His latest book, *The Forbidden*, written under the name F. R. Tallis, explores the idea of demonic possession

symptom and extrapolating, then finding more evidence that supports the belief.

Are there any other examples?

The big one is people suspecting that their spouse is cheating on them. Morbid obsessions about infidelity are relatively common and produce spectacular behaviours, often in individuals who otherwise are OK. In a way, falling in love is kind of monosymptomatic delusion. Even though you're a rational person, you can engage in all kinds of irrational behaviour because you are fixated on a particular individual.

Can these delusions be treated?

In the past they were treated with lots of medication or were perceived as untreatable. But these days, not just monosymptomatic delusions but all forms of psychotic illness are increasingly treated with cognitive behavioural therapy. You cultivate a sort of scientific attitude in the patient, getting them to test their beliefs. It is probably the most important new advance in psychotherapy.

Interview by Clare Wilson