

What goes into breaking records at the Commonwealth Games

Written by Jon Buckley, Professor & Director, Alliance for Research in Exercise, Nutrition and Activity (ARENA), University of South Australia

The Commonwealth Games has seen many new records set [in the pool](#) , on the [cycling track](#) and [elsewhere](#)

. Most experts [agree](#)

that there is a limit to human performance, so there is a point beyond which records will no longer be broken. But nobody can be sure when that will be.

The continual breaking of world records is the result of complex interactions between many different factors. These include an increase in athletes with the right genetics or talents for a particular sport, advances in equipment design, and improved training and recovery practices, including nutrition.

There are no studies to show us which factors have provided the greatest contributions to breaking records. Nor is it possible to determine which factors might now be reaching the point of declining returns. But at present, new innovations are occurring in all of these areas.

Many of these records were small improvements but are still the fastest ever. The Australian men's 4,000m team pursuit cycling team clocked a time of 3 minutes and 49.804 seconds, [beating the previous record by just 0.2%](#)

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Similarly, in the pool the Australian women's 4x100m freestyle relay team broke their own world record of 3 minutes and 30.65 seconds [by 0.28%](#) .

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In recent decades the [rewards for being an athlete have increased](#) , through increases in prize

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money, sponsorship deals or incentive payments by governing bodies of individual sports. This has led to an increase in the number of individuals with [advantageous genetic attributes for a particular sport](#)

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Some of these athletes self-select for a particular sport. Others are identified through talent-spotting programs such as those [implemented by Britain during the lead-up to the 2016 Olympic Games](#)

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Increased participation results in an increase in genetically gifted individuals competing and reaching the highest levels. This is [particularly evident in women's sport](#). The increase in female participation has seen world records [dropping more rapidly for women than men](#) in a number of sports.

Read more: [***'Fast suits' and Olympic swimming: a tale of reduced drag and broken records***](#)

Technological advances in equipment design and the materials have also assisted athletes to break records. In some cases this has led to sports' governing bodies intervening, such as the [banning of full body 'fast suits'](#) in swimming events by the Federation Internationale de Nation (FINA).

These suits were designed to make the swimmer more buoyant so they would float higher in the water and reduce drag. Drag is the greatest resistance that must be overcome by a swimmer. The impact of these suits was such that [dozens of new world records were set](#) during the World Swimming Championships in Rome in 2009, which ultimately led to these suits being banned.

Similarly in cycling, the components from which the cycles and accessories (such as helmets,

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pedals and riding suits) are made are becoming increasingly light and aerodynamic. This has [contributed to the breaking of many world records](#)

Read more: [*Will women ever be able to compete against men in Olympic events?*](#)

The preparation of athletes in terms of training, recovery and nutrition practices has also improved over time. It was not really [until the 1980s](#) that “sports science” emerged as a discipline in Australia, and this coincided with the establishment of the Australian Institute of Sport (AIS) in 1981. The catalyst for the establishment of the AIS was the [poor performance of Australian athletes in the Montreal Olympic Games](#) in 1976 where they won only one silver and four bronze medals.

The Australian Institute of Sport was [created](#) to provide a more coordinated and science-based approach to the preparation of athletes, and was ultimately expanded with the establishment of a network of State-based Sports Institutes across Australia that adopted the same philosophy.

The growth of sports science resulted in a better educated workforce and, therefore, better preparation of athletes in terms of training, recovery, biomechanics, psychology and nutrition.

Sports nutrition products is a [fast growing market](#) and includes innovations like in protein supplements for [building muscle mass and strength](#), nitrate-rich beetroot juice for [improving performance](#) during repeated bouts of high intensity exercise, and carbohydrate, protein and hydration products for [promoting endurance exercise performance](#), to name but a few.

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The [increase in sports science degree programs](#) is creating pathways to train and educate more professionals, and translate research into athlete preparation.

Jason Bartram, for example, [worked with mens 4000 metres cycling team pursuit ahead of the Rio Olympic games](#), while completing a PhD in sports science. He was recently appointed sports physiologist and coach for the women's track endurance team that just [set a new Commonwealth Games record for the 4000 metres team pursuit](#).

Indeed, it would be unusual nowadays to find a high performance athlete that is not being supported by sports scientists in an effort to optimise their performance.

How long it will be before we reach the limits of human performance and records will no longer continue to be broken is anyone's guess. As long as opportunities continue to grow for people with advantages for a particular sport, there are advances in equipment design, and new knowledge that informs the better preparation of athletes continues to evolve, we will continue to see world records fall.

Jon Buckley works for the University of South Australia which is mentioned in this article

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