NUFFIELD COUNCIL ON BIOETHICS

BACKGROUND PAPER

Sports science and medicine: ethics

Kate Harvey, Senior Research Officer, Nuffield Council on Bioethics

Forward Look
13 May 2014

NUFFIELD COUNCIL ON BIOETHICS

Forward Look
13 May 2014

Sports science and medicine: ethics

Background paper

Summary

1 This paper addresses ongoing ethical challenges faced by sports science and medicine. It is divided into two parts.

2 The first part forms its primary focus, and will highlight the technologies, law, and ethical issues associated with enhancements that aim to improve or control elite sports performances. The second (shorter) part of this paper explores the role of medical professionals in elite sport, given potential conflicts of interest in practitioner-patient relationships. It addresses issues relevant primarily to professional sports, although some of its considerations might also be relevant to amateur sports.

Part one: enhancement in elite sport

3 Sports science has emerged from a desire to provide specialist treatment and advice to elite sportspeople. It is an interdisciplinary field that includes the application of biomechanics, physiology, nutrition, and psychology to sporting performance,[1] and now forms the basis of a number of university courses.[2] The methods employed by sports science are diverse, and span a wide spectrum of intervention on athletes that, among other aims, attempt to improve or enhance performance. In light of the breadth of this spectrum, part one of this paper therefore addresses three subcategories of enhancement: sports science methods used to enhance performance; genetic technologies that can enhance performance; and performance-enhancing drugs.

1 The British Association of Sport and Exercise Sciences (2014) *About BASES*, available at: http://www.bases.org.uk/About.

2 See, for example, Edinburgh Napier University's MSc course on sport performance enhancement that "applies the scientific principles underpinning sport to the context of performance enhancement": http://www.courses.napier.ac.uk/W74713.htm.

Sports science and medicine: tests and methods to enhance performance

4 The aim of all elite sport is to 'be the best'; athletes, coaches, and teams are focused wholly on doing everything they can in order to achieve this aim. The question therefore arises as to *what* forms of enhancement are acceptable and *why*.

Training methods and nutrition

5 Coaches may be employed to improve the strength and conditioning of athletes. A recent report noted that "high quality coaching input is widely acknowledged as being the most important external input to an athlete's development in the sport."[3] Equally, identifying how athletes' performance can be best supported by other factors such as diet, and even dental health, have also become a significant area for sports scientists to consider in enhancing performance.[4]

Devices, equipment, and non-genetic technology

6 A number of devices are available for athletes who wish to improve or enhance their performance. At the 2009 World Swimming Championships, 43 world records were broken by swimmers who wore suits that were 100 per cent polyurethane, rather than textile-based.[5] The championships were given the moniker 'the plastic games' and several complaints were made that the suits conferred an unfair advantage for the swimmers who wore them. FINA – the international governing body for swimming – later banned the suits.[6] Organisations such as FINA, and other governing bodies, take responsibility for regulating the use of devices and equipment in individual sports.[7] Where products used for sporting performance are considered to be medical devices (for example, where the primary function of a piece of gym equipment is to measure heart rate), they fall within the terms of the Medical Devices Directive.[8]

7 For some Paralympic sports, devices or 'adaptive equipment' such as prosthetics may also *enable* athletes to compete. The use of such equipment to improve,

---

3 England Athletics (2011) *Bridging the gap: research to provide insight into the development and retention of young athletes* (Sheffield: England Athletics).

4 BBC News (5 April 2014) *Good teeth may help sporting success*, available at: http://www.bbc.co.uk/news/health-26885343.

5 BBC Sport (3 August 2009) *Swimming world records in Rome*, available at: http://news.bbc.co.uk/sport1/hi/other_sports/swimming/8176121.stm.

6 FINA (28 July 2009) *PR58 - FINA bureau meeting*, available at: http://www.fina.org/H2O/index.php?option=com_content&view=article&id=976:pr58-fina-bureau-meeting&catid=197:2009&Itemid=248.

7 Other examples include the International Olympic Committee, the International Tennis Federation, and the Football Association.

8 Medical Devices Directive 93/42/EEC. See: MHRA (2014) *Guidance on legislation: borderlines with medical devices* (London: MHRA), at page 5.

enhance and enable has been the subject of much debate and media attention,[9] and it falls to the International Paralympic Committee (IPC) to monitor the use of technology and equipment in Paralympic events. Factors taken into consideration in IPC assessments include "whether or not equipment and/or prosthetic components are commercially available to all athletes (i.e., prototypes that are purpose built by manufacturers exclusively for the use of a specific athlete should not be permitted)." Equally, adaptive equipment should not confer an "unrealistic enhancement" of an athlete's stride length or height of release in throwing events. These prohibitions are made in light of the IPC's requirement that the use of technology and equipment should be fair, so that "the athlete does not receive an unfair advantage that is not within the 'spirit' of the event they are contesting."[10]

Physical medical interventions

8 Interventions that sit within 'standard' medical practice such as surgery or physiotherapy may also be used to enhance athletic performance. Surgeries that enhance performance are not prohibited by WADA (the independent international organisation responsible for coordinating and monitoring doping). One such example is that of laser eye surgery for athletes in sport where good vision is important. The case of the golfer, Tiger Woods, for example, has been cited, who obtained 20/15 vision through eye surgery in 2006 and subsequently won ten events in a row, in strong contrast with his pre-surgery performance.[11]

Genetic technologies that can enhance performance

9 Two types of genetic technologies are addressed here. The first relates to so-called 'gene doping'. The second focuses on recent reports of genetic tests that are marketed as being able to give athletes better information about how their genes affect the way they should train.

Gene doping

10 Gene doping refers to the non-therapeutic manipulation of a person's genome to enhance athletic performance. It has been described as a move "from the world of 'traditional' drug enhancement to the world of gene transfer".[12] The possibility of gene doping has arisen out of developments in the field of gene therapy for medical treatment. Unlike gene therapy, however, gene doping would not target

---

9 See, for example, The Guardian (3 September 2012) *Oscar Pistorius row: what are the rules on blade at the Paralympics?*, available at: http://www.theguardian.com/sport/2012/sep/03/oscar-pistorius-rules-blades-paralympics.

10 International Paralympic Committee (2014) *Athletic rules and regulations 2014-2015* (Bonn: International Paralympic Committee), at 3.3.2.

11 Laser Vision (1 February 2010) *Laser eyed athletes*, available at: http://www.laservision.ie/content/news/6/80/Laser-eyed-athletes.

12 Friedmann T, and Koss JO (2001) Gene transfer and athletics: an impending problem *Molecular Therapy* **3(6)**: 819-20, at 819.

those with a serious illness, but would rather seek to change the function of normal cells in a group of people who are at the peak of physical health.[13]

11 WADA lists gene doping (defined as specifically "the transfer of polymers of nucleic acids or nucleic acid analogues; the use of normal or genetically modified cells.") as a prohibited method of enhancement.[14] This transfer might be performed by undertaking one of three procedures: injecting DNA directly into the athlete's muscle; inserting genetically modified cells into the athlete's body; or disabling a virus so that it can be used as a vector to deliver the gene.[15]

12 It has been argued that the possibility of gene doping is not feasible at the current time, a claim that gains some credence from the fact that, as yet, there have been no reported cases of gene doping. However, concerns are raised in the literature about the possible use of gene doping in the near future and, in particular, at the 2016 Olympic Games in Rio de Janeiro. In light of these concerns, consideration has been given to how gene doping might be detected, and although a reliable test has not yet been developed, WADA notes that the effects of the added gene could be measured – for example, it could produce a measurable change to a particular protein or enzyme, or there could be an increase in an athlete's production of red blood cells between doping tests.[16]

13 One possible candidate for gene doping is the modification of the gene that regulates an athlete's levels of erythropoietin (EPO). EPO is a naturally occurring hormone; however its synthetic form (epoetin alfa) can be used to boost red blood cells, and raise oxygen and endurance levels. This synthetic form of EPO is listed as a prohibited substance by WADA (see paragraphs 15 to 18 for further discussion on performance-enhancing drugs).

Genetic testing to tailor training regimes

14 The sporting media have also highlighted how genetic tests purport to help athletes find out "whether they are getting the most out of their sporting genes."[17] Jenny Meadows, an 800m runner, has used a genetic test supplied by the

---

13 There are over 200 genes linked to human fitness or athleticism. See: Bray MS, Hagberg JM, Pérusse L *et al.* (2009) The human gene map for performance and health-related fitness phenotypes: the 2006-2007 update *Medicine and Science in Sports and Exercise* **41(1)**: 35-73. A paper published in the journal *Nature* in 1998 was the first to indicate specific genes that could affect athletic performance. See: Montgomery HE, Marshall R, Hemingway H *et al.* (1998) Human gene for physical performance *Nature* **393(6682)**: 221-2.

14 World Anti-Doping Agency (2014) *The 2014 prohibited list: international standard* (Montreal: World Anti-Doping Agency), at page 7.

15 Unal M, and Unal D (2004) Gene doping in sports *Sports Medicine* **34(6)**: 357-62.

16 CBC News Health (2013) *Gene doping test for athletes in the works*, available at: http://www.cbc.ca/news/health/gene-doping-test-for-athletes-in-the-works-1.1410525.

17 The Telegraph (17 March 2014) *Jenny Meadows and Premier League football clubs look to gain an advantage using DNA testing*, available at: http://www.telegraph.co.uk/sport/othersports/athletics/10703964/Jenny-Meadows-and-Premier-League-football-clubs-look-to-gain-an-advantage-using-DNA-testing.html.

Athletic Talent Laboratory Analysis System (ATLAS)[18] in order to tailor her training regime to the results of the genetic test. Meadows suffered a severe Achilles tendon injury before the London 2012 Olympics, and suggests that she would have perhaps trained differently had she known the results of the test beforehand (which found that she had a genetic predisposition to soft tissue injuries).

Performance-enhancing drugs

15 Performance-enhancing drugs and 'doping' are clearly of more relevance to some sports than others; for example, cyclists might benefit from taking banned substances in a way that snooker players would not. For those sports which do face the fact that some of their athletes may use banned substance, reference would be made to WADA's prohibition of the use of a number of performance-enhancing drugs, which includes anabolic steroids, hormone and metabolic modulators, stimulants, and diuretics and masking agents.[19] They fit broadly into two categories: those that improve power; and those that improve stamina.[20]

16 The effect of performance enhancing drugs on athletes' abilities can be dramatic. For example, one small-scale study found that when athletes used human growth hormone (HGH) supplements alone, and in combination with testosterone, their sprint capacity increased by four per cent.[21] For sports that rely more heavily on endurance (e.g., long distance running), an athlete's performance could improve by 'blood doping', where their red blood cells are increased to enable more oxygen to be delivered to their muscles, thus delaying tiredness and enabling the athlete to run for longer and with increased vigour.[22] There may, therefore, be significant appeal to taking performance-enhancing drugs for a competitive edge.

The extent of doping in elite sport

17 The inherent secrecy sought by athletes who take banned substance to enhance performance means that evidence about how many athletes use these substances must be treated with a degree of caution.[23] However, official sources

---

18 ATLAS Sports Genetics (2014) *ATLAS Sports Genetics homepage*, available at: http://www.atlasgene.com/.

19 World Anti-Doping Agency (2014) *The 2014 prohibited list: international standard* (Montreal: World Anti-Doping Agency).

20 The Guardian (9 August 2004) *Faster, stronger, higher*, available at: http://www.theguardian.com/sport/2004/aug/09/athensolympics2004.olympicgames.

21 Meinhardt U, Nelson AE, Hansen JL *et al.* (2010) The effects of growth hormone on body composition and physical performance in recreational athletes: a randomized trial *Annals of Internal Medicine* **152(9)**: 568-77.

22 One study found that blood doping increased stamina in a sample of non-athletes by 34 per cent. See: Buick F, Gledhill N, Froese A, Spriet L, and Meyers E (1980) Effect of induced erythrocythemia on aerobic work capacity *Journal of Applied Physiology* **48(4)**: 636-42.

23 As one author notes, "establishing the prevalence of prohibited substances by use of drug testing would be similar to establishing the prevalence of driving under the influence of alcohol by the

published by WADA in 2012 found that of 184,955 samples tested for athletes competing in Olympic sports, there were 2,894 findings (1.56%); in 21,436 samples taken for non-Olympic sports, there were 865 findings (4.03%).[24] However, other researchers suggest that "using typical values of detectability… the probability of detecting a cheater who uses doping methods every week is only 2.9 per cent per test."[25]

18 Concerns in relation to these statistics may be increased by high profile cases of doping. The most famous case of doping in recent years is perhaps that of Lance Armstrong and the US Postal Service Pro Cycling team who, according to USADA "ran the most sophisticated, professionalized and successful doping program that sport has ever seen."[26]

Ethics issues in enhancement

19 Each of the three types of enhancement discussed in raise a number of ethical issues.

Equity and social stratification

20 Fairness questions can be identified in most of the enhancements discussed by this paper. Many of these questions focus on the gulf between financial resources available to athletes from developing countries in comparison to those from wealthier nations.

21 Questions of fairness also arise in both legal and illegal methods of enhancement. In training athletes, the advantage of accessing the expertise of experienced coaches is well-recognised. However, the opportunities for athletes from poorer countries to have access to excellent coaches may be significantly fewer than for those from developed countries with funding mechanisms in place for sports training. This has led to several programmes being funded to allow athletes from developing countries to train under scholarship schemes in other countries,[27] and the advent of the Olympic Solidarity organisation, which shares

---

number of arrests for drinking and driving." See: Butch AW (2011) The quest for clean competition in sports: are the testers catching the dopers? *Clinical Chemistry* **57(7)**: 943-7.

[24] World Anti-Doping Agency (2012) *Anti-doping testing figures report* (Montreal: World Anti-Doping Agency), at page 7. Includes adverse analytical findings ((AAF) where samples contain a prohibited substance, its metabolites or markers), and atypical findings (ATF), where a laboratory report warrants further investigation.

[25] This presumes a typical window of detectability of 48 hours, sensitivity to doping tests at an average of 40 per cent, with tests performed every three months. The probability of detection would rise to an estimated 33 per cent if the tests were carried out monthly. See: Hermann A and Henneberg M (14 August 2013) *Exposing dopers in sport: is it really worth the cost?*, available at: https://theconversation.com/exposing-dopers-in-sport-is-it-really-worth-the-cost-16464.

[26] USADA (12 October 2012) *Statement from USADA CEO Travis T. Tygart regarding the US Postal Service Pro Cycling team doping conspiracy*, available at: http://cyclinginvestigation.usada.org/.

[27] KenSAP (2013) *Selection of candidates*, available at: http://www.kensap.org/about-kensap/selection-of-candidates/.

revenue from Olympics broadcasting with poorer National Olympic Committees.[28] It has also led to situations where athletes have adopted a new home nation to access better facilities, for example.[29] Concerns about the transfer of athletes from one country to another have led to the development of regulations that reduce potential for exploitation. For example, FIFA regulations state that where a young footballer is signed from the club where he trained to a different club, the second club has to pay training compensation. This means that wealthy clubs cannot 'poach' promising players from clubs with fewer financial resources without being required to pay a percentage of their training costs. This requirement is also known as the 'solidarity contribution'.[30] Such initiatives may help, at least to a small degree, to address concerns about social stratification. However, the inevitability of such financial and social inequities was asserted by John Scott, Director of Drug Free Sport in evidence to the Select Committee on Science and Technology: "If someone has an exceptionally good health medical system that is available to that athlete in that country to heal themselves more quickly, it is absolutely fair and right. It would be wonderful if everyone could have access to that but we do not live in an equitable world."[31]

22 At the heart of debates around fairness lies the paradox that elite sport should enjoy a level playing field, but that the whole point of competitive sport is to *challenge* equality in pursuing the aim of 'being the best'. This can be seen in debates around Paralympic running equipment, where the length of blades and their impact on performance, has been the subject of fierce argument: are running blades are an enhancement, or simply restore the equivalent of 'normal' function? The IPC, for example, describes them as "adaptive equipment" designed to restore a loss of function, rather than an artificial means of enhancing body length or performance.[32]

23 The debate around blades proved problematic for Oscar Pistorius during the 2012 Olympic Games. Before the games, he argued that no advantage was conferred by the blades, to persuade the IAAF to allow him to run in an able bodied race; however, when another competitor with longer blades beat him at the Paralympics, he was reportedly unable to ask for a change to his own blades for fear that the argument might be made that they conferred an advantage.[33] The distinction between equipment deemed adaptive, and that deemed to be an

---

28 Olympic Solidarity Commission (2014) *Olympic Solidarity Commission: mission*, available at: http://www.olympic.org/olympic-solidarity-commission?tab=mission.

29 See, for example, BBC News (21 August 2008) *Nation-switchers trouble for Olympic chiefs*, available at: http://news.bbc.co.uk/1/hi/7574379.stm.

30 FIFA (2013) *Regulations on the status and transfer of players* (Zurich: FIFA), article 20 and annex 4.

31 Select Committee on Science and Technology (2006) *Minutes of evidence: examination of witnesses*, available at: http://www.publications.parliament.uk/pa/cm200607/cmselect/cmsctech/67/6071903.htm.

32 The Guardian (3 September 2012) *Oscar Pistorius row: what are the rules on blade at the Paralympics?*, available at: http://www.theguardian.com/sport/2012/sep/03/oscar-pistorius-rules-blades-paralympics.

33 Ibid.

enhancing device therefore has clear practical ramifications for the athletes who use it.

'Different enhancement, same result'

24 Some very different methods of performance enhancement have the same physiological effect. For example, hypoxic air machines claim to improve circulation and increase the production of red blood cells,[34] which mirrors the effect offered by the synthetic form of erythropoietin (EPO), a banned substance. However, in 2006, WADA ruled that although hypoxic devices enhance performance and violate the 'spirit of sport', they would *not* be added to its list of banned substances and methods. A question therefore arises as to why such devices are permitted, but drugs which produce the same effect are not banned. Possible distinctions include the fact that the hypoxic devices are relatively new; and that evidence of their effectiveness is scarce. In addition, there may be a meaningful difference between enhancements that are ingested and those that form part of a training regime. There may also be a perceived difference between technologies and pharmacological interventions. One official from the Australian Football League summarises the discomfort arising from these distinctions: "it is the sort of thing which makes you a little bit uncomfortable, because it is trying to use an artificial means to gain an advantage in a contest where you really want man against man."[35]

25 The inequity of cost between these two methods adds to the inconsistency between the regulation of these two types of enhancement. One author notes that EPO is more affordable for athletes from poorer countries than legal hypoxic training facilities, and argues that it is only through permitting the use of (currently) illegal drugs that a 'level playing field' may be obtained.[36]

Naturalness

26 A number of commentators suggest that if a technology is deemed 'unnatural', it should not be used in sporting contexts. For example, with gene doping it is suggested that its inception could impact on justice and fairness, and intervene unfairly in a "natural lottery".[37] Others are more positive about the appeal of the techniques: "insofar as genetic science is able to create safer, more effective techniques of human modification, then it may be an appealing route through which to modify athletes to safeguard the future of elite sports as enterprises of

---

34 The Wall Street Journal (29 August 2011) *Novak Djokovic's secret: sitting in a pressurized egg*, available at: http://online.wsj.com/news/articles/SB10001424053111904787404576532854267519860.

35 Spriggs M (2005) Hypoxic air machines: performance enhancement through effective training—or cheating? *Journal of Medical Ethics* **31(2)**: 112-3.

36 Savulescu J, Foddy B, and Clayton M (2004) Why we should allow performance enhancing drugs in sport *British Journal of Sports Medicine* **38(6)**: 666-70.

37 Parker LS (2012) In sport and social justice, is genetic enhancement a game changer? *Health Care Analysis : HCA* **20(4)**: 328-46.

human excellence."[38] Again, however, the issue of social stratification arises; namely that the expense associated with the development of genetic technologies could lead to a two-tier system in competitive sport where – if these technologies could be developed safely and effectively – the performance of those with rich backers would be given an unfair advantage over those from poorer backgrounds.

27 The use of 'naturalness' as a distinction to explain why some enhancements should be allowed and others not does appear to run into some difficulties. It is not immediately clear, for example, why eye surgery is natural in a way that performance enhancing drugs are not.

Risks to athletes

28 Athletes who use performance enhancing drugs or techniques may be subject to a number of risks. In the context of gene doping, WADA notes that gene therapy is "far from being mastered", and that "the chances of success are very low and the risks are still very high."[39] Indeed, risks are *already* high if a person has artificially elevated levels of EPO in their body, as the increase in the red blood cells' capacity means that blood becomes thicker, thus increasing the risk of stroke and heart attack.[40] Others suggest that athletes would, in essence, be first in human volunteers, but without regulatory safety mechanism in place to protect them from high risk research.[41]

29 If, however, the risks of performance-enhancing drugs can be managed and safety ensured, then some argue that athletes should be able to take *any* drug for performance.[42] This argument represents the idea that manipulating human bodies is part of sport, and if every athlete were allowed to use performance-enhancing substances, the spirit of fair competition would not be compromised because everyone would have the same opportunities.[43] A related argument suggests that the only reason performance-enhancing drugs are abhorred is because they break rules that are currently in place; if those rules were changed,

---

38 Miah A (2012) Genetics and sport: bioethical concerns *Recent Patents on DNA & Gene Sequences* **6**: 197-202.

39 World Anti-Doping Agency (2005) *Play true: gene doping* (Montreal: World Anti-Doping Agency).

40 It is possible, however, for athletes to have higher levels of EPO naturally. For example, Eero Mantyranta, a Finnish cross-country skier, had a mutation that made his body's EPO receptors more efficient. See: Thompson H (2012) Performance enhancement: superhuman athletes *Nature* **487(7407)**: 287-9.

41 Camporesi S, and McNamee M (2014) Performance enhancement, elite athletes and anti doping governance: comparing human guinea pigs in pharmaceutical research and professional sports *Philosophy, Ethics, and Humanities in Medicine* **9(4)**: 4.

42 See, for example, the views of Professor Andy Miah, in Thompson H (2012) Performance enhancement: superhuman athletes *Nature* **487(7407)**: 287-9.

43 Savulescu J, Foddy B, and Clayton M (2004) Why we should allow performance enhancing drugs in sport *British Journal of Sports Medicine* **38(6)**: 666-70.

the abhorrence would discontinue.[44] Indeed, on the basis of research showing no significant difference in times by sprinters caught taking banned substances and those not, some have argued either that most athletes must already be taking substances (and just not getting caught) or that those substances are in fact are less effective than thought (see also paragraph 17 above).[45]

Lessened entertainment value

30 One argument against introducing a rule change to allow safe performance-enhancing drugs is that, if this were to go ahead, the entertainment value of sport might diminish, with pharmacologists more integral to sporting success than strength and conditioning coaches. It could, however, be argued in response that in hugely popular sports such as Formula 1, the team of engineers is just as much part of competition as the driver.

Impact on autonomy

31 The introduction of a policy that allows safe performance-enhancing drugs could lead to a negative impact on athletes' autonomy. Under the current rules on performance-enhancing substances, individual athletes are able to *choose* whether they wish to take a drug to improve their performance (although for some athletes, the influence of their team and coach may be significant), or whether to be '100% Me'.[46] However, if a system were to be introduced where every athlete was allowed to take a performance-enhancing drug to 'level the playing field', athletes who chose *not* to partake might be unable to keep up with their competitors, leading to a situation where athletes were effectively forced to take performance-enhancing substances in order to have any chance of winning.

Privacy and regulatory considerations

32 Under current regulations, privacy rights of athletes are potentially impaired by the fact that they have to alert WADA to their whereabouts so that doping tests can be carried out on them without notice. In addition, athletes are also required to be subject to 'biological passports', so that biological variables can be monitored overtime so as to identify potential doping breaches.[47] However, as noted in paragraph 17 above, it is far from clear that doping athletes are reliably detected by current tests. This suggests that, regardless of the barriers to doping put in place by WADA, there are a significant number of athletes who already perform with the assistance of banned substances. Therefore, it could be argued

---

44 Savulescu J (14 January 2014) *Asafa Powell may be guilty of doping but he's also a victim*, available at: http://theconversation.com/asafa-powell-may-be-guilty-of-doping-but-hes-also-a-victim-21978.

45 Hermann A and Henneberg M (14 August 2013) *Exposing dopers in sport: is it really worth the cost?*, available at: https://theconversation.com/exposing-dopers-in-sport-is-it-really-worth-the-cost-16464.

46 UKAD (2014) *What is 100% me?*, available at: http://www.ukad.org.uk/athletes/100percentme.

47 World Anti-Doping Agency (2013) *Athlete biological passport*, available at: http://www.wada-ama.org/en/Science-Medicine/Athlete-Biological-Passport/.

that the playing field could be levelled by introducing open access to performance-enhancing drugs.

Policy issues in enhancement

33 A significant policy issue that arises in sporting enhancement surrounds punishment and sanctions.

34 Punishments for using banned performance-enhancing drugs are significant, and can include life bans.[48] If an athlete tests positive for a banned substance, he or she is subject to the rule of strict liability. In practice, this means that they can be punished regardless of whether or not they *intended* to take the banned substance, or did so negligently. This rule has been subject to a number of objections from athletes who claim that they did not know that they had taken a substance that was banned, leading to infighting between athletes and former trainers or advisors.[49] However, if the athlete can demonstrate that he or she is not at fault, the sanctions that can be applied following the breach may be avoided or reduced.[50] Whether strict liability is an appropriate means of assessing culpability in cases of doping in sport is therefore an important policy question.[51]

35 A further question relates to whom the punishment targets. The influence of coaches and teams on athletes' choices may be significant, and athletes may often act on external advice. Therefore, in a situation where an athlete is found to have taken a performance-enhancing substance, a question arises as to whether it is the athlete who is solely culpable, or whether punishments should extend to the team, and team doctors, who support them. A further question might also focus on whether teams should have a responsibility to check the credentials of the medical professionals in their employ – for example, whether they have relevant training in knowledge of drugs that are on WADA's prohibited list. A related issue might focus on GPs' knowledge of banned substances, and the risk of an athlete being prescribed a drug without realising the consequences.[52]

36 More robust punishments levelled at the *athlete* have also been suggested. Currently, if an athlete is found to be using a banned substance, he or she is

---

48 See, for example, The Guardian (24 August 2012) *US Anti-Doping Agency's full statement on Lance Armstrong lifetime ban*, available at: http://www.theguardian.com/sport/2012/aug/24/us-anti-doping-agency-statement-lance-armstrong.

49 See, for example, BBC Sport (17 July 2013) *Asafa Powell: trainer refuses to be 'scapegoat' over dope test*, available at: http://www.bbc.co.uk/sport/0/athletics/23342680.

50 World Anti-Doping Agency (2008) *Q&A: strict liability in anti-doping* (Montreal: World Anti-Doping Agency).

51 Dikic N, McNamee M, Günter H, Markovic SS, and Vajgic B (2013) Sports physicians, ethics and antidoping governance: between assistance and negligence *British Journal of Sports Medicine* **47**: 701-4.

52 For example, in Greenway P, and Greenway M (1997) General practitioner knowledge of prohibited substances in sport *British Journal of Sports Medicine* **31(2)**: 129-31, it was found that GPs only 35 per cent of GPs in West Sussex were aware of guidelines on banned substances in sport.

subject to a two-year ban for their first offence. However, it might be suggested that this is too short a period of time to deter athletes from taking banned substances, and that the potential benefits of doping (for example, breaking a record, or winning a championship) might therefore be 'worth the risk' of a two-year ban. A further question therefore arises as to whether immediate lifetime bans should be introduced as a tougher deterrent.

37 Other policy questions may include:

- Should performance enhancing drugs be sanctioned, to 'level the playing field', so that 'cheating' through taking substances no longer confers an advantage?
- Do sanctions (or compensation?) need to be put in place to avoid athletes being transferred from their home nation to (richer) countries?
- Does better funding need to be provided for developing countries so that their athletes have a fairer opportunity at competing at the highest level?
- Should the efficacy of genetic tests that purport to give athletes better information about how they should train be tested further?

Part two: the role of medical professionals and researchers in elite sport

38 While it is easy to focus on the role of the individual athlete, the nature of sporting competition means that they actually operate as part of a team. Teams involve coaches and practitioners, as well as (in the case of team sports) other team members in the usual sense. The 'team' aspect of elite sport may generate particular ethical challenges for the healthcare practitioners involved.[53]

39 Some of the issues that arise for healthcare practitioners have been illustrated by recent high profile media stories. For example, in 2009, Harlequins RFC was fined £200,000 when one of its physiotherapists provided a player with a fake blood capsule to bite so that he could be substituted for a more able kicker for his 'blood' injury. (It was later alleged that the team's doctor had cut the player's lip to hide the fact that fake blood had been used.).[54] Athletes have also claimed to be victims of state-sponsored doping where doctors were complicit in providing them with performance-enhancing substance.[55]

Sport as a 'team' game and conflicts of interest

40 Healthcare practitioners who work for sports teams have, broadly, responsibilities to two parties.[56] The first is to their patient (the athlete), which sits squarely within

---

53 The primary focus is on physicians, but the issues raised can be applied to other healthcare professionals who work in elite sport.

54 Holm S, and McNamee M (2009) Ethics in sports medicine *BMJ* **339**: 984-5.

55 The Guardian (1 November 2005) *Forgotten victims of East German doping take their battle to court*, available at: http://www.theguardian.com/sport/2005/nov/01/athletics.gdnsport3.

56 Testoni D, Hornik CP, Smith PB, Benjamin DK, and McKinney RE (2013) Sports medicine and ethics *The American Journal of Bioethics* **13(10)**: 4-12.

the boundaries of the nature and purpose of standard medical practice. The second responsibility, however, arguably undermines the first, as it encompasses a *contractual* responsibility to their employer. This brings about a potential conflict of interest in their responsibility to support the health and wellbeing of the patient as a '*sportsperson'*, and the health and wellbeing of the patient as a '*person'*.[57] However, even without contractual responsibilities, healthcare practitioners who treat athletes in the context of sports competitions may experience similar conflicts. The ethical challenges arising out of this dual responsibility to athlete and to team/employer are summarised below.

Developing methods of enhancement: the role of scientists and researchers

41 Scientists and researchers may play an active role in the development of methods of performance enhancement explored in part one of this paper, and a number of considerations may be taken into account when considering the role of this group.

42 The first concerns a situation where methods of performance enhancement have dual use; for example, where they are developed for medical treatment, but later get appropriated for elite sport. An example of this is the use of selective androgen receptor modulators (SARMs), a group of drugs that have been developed as a substitute for anabolic androgenic steroids and which induce fewer unpleasant side effects. In medical contexts, these relatively new drugs are used to treat conditions such as osteoporosis and muscle-wasting conditions such as muscular dystrophy.[58] However, when used in sports, the lack of side effects and their ability to build lean muscle mass may appeal to athletes who wish to take performance-enhancing drugs,[59] and these drugs are therefore listed on WADA's list of prohibited substances.[60] The question then arises as to what, if any, responsibility those developing, producing and marketing these drugs have in connection with potential illicit uses.

43 The second starts from the premise that, if there is demand for performance-enhancing drugs and technologies, then scientists and researchers have a legitimate role in addressing that demand. As well as market-led demand, scientists and researchers may also be encouraged to work in this field through state-sponsored use of illicit performance-enhancing substances, as illustrated

---

57 Conflicts of interest may also arise for medical professionals in other contexts, such as in prisons or in treating members of the armed forces. See: Holm S, and McNamee M (2009) Ethics in sports medicine *BMJ* **339**: 984-5.

58 Bhasin S, Calof OM, Storer TW *et al.* (2006) Drug insight: testosterone and selective androgen receptor modulators as anabolic therapies for chronic illness and aging *Nature Reviews Endocrinology* **2(3)**: 146-59.

59 MIT Technology Review (26 October 2007) *Next-generation sports doping: new drugs in clinical trials for muscle-wasting diseases could become the next big thing for athletes*, available at: http://www.technologyreview.com/news/408954/next-generation-sports-doping/.

60 World Anti-Doping Agency (2014) *The 2014 prohibited list: international standard* (Montreal: World Anti-Doping Agency), at page 3.

by the example of the German Democratic Republic, whose scientists worked on experimental drugs for performance-enhancing purposes from the 1960s to 1990.[61]

44 A third consideration is the role that scientists and researchers may also have in developing the techniques required to identify where banned substances have been used. In turn, athletes may turn to researchers to facilitate their use of performance-enhancing substances, or to help them avoid 'being caught' doing so.[62] Those developing and undertaking the laboratory analysis necessary to identify athletes who have used performance-enhancing substances may thus find themselves in a constant battle with individuals and teams who seek to use them.[63]

The role of medical professionals and researchers in elite sport: ethical issues

45 A range of ethical issues arise where medical professionals and researchers work in elite sport.

The role of best interests

46 Best interests considerations are of clear relevance for medical professionals who work in elite sport. For example a question might arise as to whose best interests the practitioner should take into consideration. In some games or competitions, treatments for short-term gain (applying local anaesthetics) may be preferred over treatment which will improve the athlete's future prospects (instructing an athlete to stop competing because of long-term injury risks). This raises the question of how 'harm' should be defined in sports medicine: and whether physical or psychological harm to the athlete might be undermined by considerations such as financial losses for the club or team for whom they play. Similarly, it may be the case that healthcare professionals who treat patients in sporting competitions do so in a situation where "health promotion is often a secondary concern",[64] and the need for a team member to play until the end of a match might mean that he or she is treated differently (e.g. an injury might be strapped as a short term solution, instead of removing a them from the field of play) for the good of the team. It might also be argued that practitioners in this field have a particular duty to ensure that any supplements that they provide to athletes (who take them in good faith, assuming that the practitioner is acting with their best interests in mind) do not contain any banned substances. More

---

61 Franke WW, and Berendonk B (1997) Hormonal doping and androgenization of athletes: a secret program of the German Democratic Republic government *Clinical Chemistry* **43(7)**: 1262-79.

62 See, for example, BBC News (19 March 2014) *New sports doping test '1,000 times more sensitive'*, available at: http://www.bbc.co.uk/news/science-environment-26636371, which notes: "A detailed knowledge of the length of time a substance is detectable has been used by many cheating athletes and their scientific advisers to avoid being caught."

63 Butch AW (2011) The quest for clean competition in sports: are the testers catching the dopers? *Clinical Chemistry* **57(7)**: 943-7, at page 946.

64 Holm S, and McNamee M (2009) Ethics in sports medicine *BMJ* **339**: 984-5.

controversially, the opposite might be asserted: that when practitioners collude in enhancing performance by banned means, that they are doing so with the 'best interests' of the team as a whole in mind, in the interests of winning.[65] The General Medical Council (GMC) makes it clear that this is unacceptable: "You must not prescribe or collude in the provision of medicines or treatment with the intention of improperly enhancing an individual's performance in sport."[66] However, despite guidance such as this, medical professionals do provide banned substances, as displayed by the fact that three doctors were struck off as a result of their involvement with the US Postal Service cycling team's doping system.[67]

Autonomy

47 In standard relationships between patients and medical professionals, there are usually just two parties involved; however, in sports, the relationship often involves three parties – the sportsperson, the doctor, and the sportsperson's team/agent. This change in dynamics could lead to decisions being made by doctors/employers rather than by patients and doctors together, thus impacting on the athlete's/patient's autonomy.

Privacy and confidentiality

48 When treating athletes, there is potential for their privacy and confidentiality to be compromised. For example, if a medical professional is aware of a condition that might affect the athlete's future performance, they may be faced with a dilemma as to whether to inform their employer, or allow the individual to play on.

The role of informed consent

49 Maintaining the principle that a patient should give sufficiently informed consent to healthcare decisions may also prove difficult for medical professionals practising sports medicine. For example, the patient may feel under pressure to finish a game, to the extent that his or her ability to consider carefully all relevant factors associated with a proposed treatment may not be met fully.

---

65 See, for example, the dispute over the case of Jamaican sprinter Asafa Powell who tested positive for the banned substance oxilofrine, and argued that the supplement that contained the substance was provided by his physiotherapist, and therefore taken in good faith: BBC Sport (17 July 2013) *Asafa Powell: trainer refuses to be 'scapegoat' over dope test*, available at: http://www.bbc.co.uk/sport/0/athletics/23342680.

66 GMC (2013) *Good practice in prescribing and managing medicines and devices* (London: GMC), at paragraph 75.

67 BBC News (14 June 2012) *Three doctors charged in Armstrong doping case*, available at: http://www.bbc.co.uk/news/science-environment-18441436.

Policy issues

50 Questions for policy makers on the role of medical professionals in sports contexts include:

- Should healthcare professionals who work for sports teams or agents be employed by an umbrella organisation or foundation, instead of being employed directly by teams?
- Should it be mandatory for healthcare professionals who treat sportspeople to undertake a qualification in sports medicine (including regularly updated awareness training on banned substances)?

A possible role for the Nuffield Council?

51 In selecting topics for future work, the Council must take account of its Terms of Reference which require it to "identify and define ethical questions raised by recent advances in biological and medical research in order to respond to, and to anticipate, public concern". Selection criteria developed by Council include the following factors:

- Is the topic associated with recent advances in biological and medical research and/or are there 'new' reasons for looking at longstanding issues or revisiting issues covered in previous Council reports?
- Does the issue raise complex ethical questions?
- Would input from the Council be timely?
- Could the Council make a distinctive contribution?
- Would action by the Council anticipate or respond to public concern?
- Is there sufficient reason to consider this topic over others?

Kate Harvey, April 2014