**Blood Doping: A Major Threat to the Success of the London 2012 Games?**

Case Study

Blood Doping

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Doping can be defined as the: ‘*Administering of drugs to (a racehorse, greyhound, or athlete) in order to inhibit or enhance sporting performance’*.[[1]](#footnote-1) The International Olympic Committee (IOC) conforms to the rulings of WADA (the World Anti-Doping Federation) in order to monitor, control and minimise the threat of doping at all levels of Olympic and Paralympic competition.

The British Olympic Association (BOA) has adopted a hardline policy against drugs offences. Currently, the BOA permanently bans athletes from competing at Olympic level, if they have served a ban of 6 months or longer for drug-related offences. Such a tough regulatory stance reflects the goal of the BOA to maintain a clear ethical stance against doping, in order that they can provide clean and fair drug free competition for all athletes. The concept of a ‘level playing field’ remains central to the values of the modern Olympic Games.

However, the BOA now face a legal battle to defend its hardline ethical stance, as its position places it in direct contravention to the rulings of the World Anti-Doping Agency (WADA), who state that; *"The BOA's non-compliance is based on the Court of Arbitration for Sport (CAS) decision of October 4, 2011 that advised the International Olympic Committee (IOC) that its Rule 45 was non-compliant because it was, in effect, a double sanction. In light of this ruling, the BOA's bylaw number 74 renders the BOA non-compliant."*

Unless the BOA accepts the CAS ruling and amends its stance, it faces WADA sanctions. The BOA is currently defending its position, however, and states that it is fully prepared to fight the threat of sanctions.

**Blood Doping**

Whilst a great number of banned substances and banned practices of doping exist (as defined by the WADA 2011 Prohibited Drug List), the most prevalent danger of recent times could be considered to be the practice of blood doping.

Blood doping is defined by **WADA** (the World Anti-Doping Agency) as ‘the misuse of techniques and/or substances to increases ones red blood cell count.’[[2]](#footnote-2) It is thought that blood doping as a performance aid has been used for decades. It has risen to prominence recently due the introduction of scientifically robust testing techniques that can detect the use of blood doping by athletes.

There are two forms of blood doping: autologous and homogolous. **Autologous** blood doping is a process that allows athletes to gain a competitive advantage via the extraction and reintroduction of blood into their body before competition. The process generally involves the freezing of around 2 pints of the athletes’ extracted blood, which is then thawed 1-2 days before competition. WADA is currently funding research activity in order to develop a robust and efficient test for the misuse of autologous transfusions.

**Homogolous** blood doping involves the use of blood extracted from a donor whose blood type matches that of the athletes, and the immediate injecting of the aforementioned donor’s blood into the athlete. Tests to detect homogolous doping were launched at the Athens Summer Olympic Games in 2004.

There are three dominant substances/methods used in the blood doping process, all of which are prohibited under WADA’s List of Prohibited Substances & Methods:

1. erythropoietin (EPO),
2. synthetic oxygen carriers, and
3. blood transfusions.

The first substance identified above is **EPO**. EPO is banned by WADA, as it gives the athlete a competitive advantage by increasing red blood cells and thereby increasing the amount of oxygen that can be transported to the athlete’s muscles during competition. The red blood cell level, as a percentage of the blood, is called *haematocrit*. For men and women, normal haematocrit ranges are 40-54%, and 37-47% respectively. In cycling, a sport prone to blood doping, authorities now test haematocrit levels and ban athletes whose levels are above 50%. Whilst it is possible for an athlete to possess naturally high haematocrit levels, the athlete must submit to regular testing over a series of months to prove that they have naturally occurring levels.

At one stage, measurement of haematocrit

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levels provided the only means of banning an athlete for blood doping violations (i.e. if levels were above 50%). This fundamentally meant that athletes could notionally engage in blood doping as long as they retained artificially increased levels that did not rise above 50%. During the 1998 Tour de France

the situation reached a head when several team doctors and team personnel were caught with thousands of doses of EPO and other banned substances. Ultimately, 50% of the teams competing in the event withdrew, either because they had been found guilty of cheating, or because they wished to protest against the endemic level of doping prevalent amongst other teams that made the competition untenable for their athletes.

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It also facilitates greater buffering of lactic acid – a key factor in fatigue. EPO itself has been used to great effect in the treatment of anaemia.

However, misuse by athletes as a doping aid carries dangerous side effects; thickening of the blood in this manner increases the risks of auto immune diseases and cardiopulmonary diseases such as heart disease, stroke, and cerebral or pulmonary embolism. Blood and urine testing to detect EPO was first introduced at the Sydney 2000 Olympic Games.

**Synthetic oxygen carriers** involve the use of haemoglobin based oxygen carriers (HBOCs) or perflurocarbons (PFCs), purified proteins / chemicals that enable the transport of oxygen. Whilst SOC’s have proven vital in emergency purposes where human blood is not available, or where the risk of infection is high. However, misuse as a doping agent

raises the risks of cardiovascular disease, stroke, myocardial infarction and embolisms. Testing for Synthetic oxygen carriers began in 2004 at the Athens Olympic Games.

Blood **transfusions** also carry the risk of serious side-effects. For example, the donor from whom the blood is transfused may carry a virus such as HIV.

**Recent Cases of Blood Doping**

Perhaps the most famous case of blood doping in professional sport is Operación Puerto, an investigation that was carried out in 2006 by Spanish police. A medic named Dr. Eufemiano Fuentes was accused of assisting 200 professional athletes (many of whom were Olympic and Tour de France athletes) in the illegal practice of blood doping. The investigation uncovered evidence concerning some of the most famous cyclists in the world. Floyd Landis, that year’s Tour de France winner, was subsequently stripped on his title. Landis confessed to a history of doping that stretched back many years, and implicated seventeen other well known riders – including Lance Armstrong – in the repeated use of EPO.

Six Austrian cross-country skiing athletes

received a life ban for their involvement in a blood doping scandal during the 2006 Winter Games in Turin. Furthermore, Austria’s results within the competition were annulled. The action taken by the IOC against the Austrian athletes represented the first time that athletes had received punishment without having testing positive during drug tests, or by missing drug tests.

Action was instead based on evidence seized by Italian police that led to their conviction of involvement in a doping conspiracy, following a raid on the athlete’s living quarters. Italian police involved in the raid reported the seizing of a great quantity of medical equipment, including materials utilised in the collection, storing, freezing and transfusing of blood, and in the measuring of blood level counts.

Athletes were identified as biathletes Wolfgang Perner and Wolfgang Rottman, and cross-country skiers Martin Tauber, Juergen Pinter, Johannes Eder and Roland Diethart.

**The Athlete Passport**

The ongoing threat of blood doping to the issue of fair play in sport has led to the WADA-backed initiative of an **Athlete Passport**. WADA’s Executive Committee approved WADA’s Athlete Biological Passport Operating Guidelines with immediate effect on December 1, 2009. The Athlete Biological Passport will be used to test for rule violations of Article 2.2 of the World Anti-Doping Code (WADA Code) – the Use or

Attempted Use by an Athlete of a Prohibited Substance or a Prohibited Method. The Passport was developed by WADA in conjunction with a wide range of international sports governing bodies (such as the FIS, IBU, ISU, UCI, and IAAF).

Discussions regarding a Passport system began within WADA in 2002, and reached a crescendo during the 2006 Winter Games when a number of national governing bodies suspended their athletes after testing artificially high haemoglobin levels. The Passport works by monitoring the blood profile of an athlete over an extended period of time, and by detecting markers of erythropoiesis that allows the identification of enhanced oxygen transport, including recombinant erythropoietin abuse and any form of blood transfusion or manipulation.

In addition to the current developments, WADA is undertaking extensive research to extend the capabilities of the Passport to

include steroid profiling. The monitoring of athlete profiles over the competitive career of the athlete would significantly enhance the ability of WADA and governing bodies (including the IOC) to win the fight against doping.

**Future Directions in Doping Control**

The combination of toxicology (urine and blood) tests with biological monitoring methods (using the Athlete Passport) are valuable weapons in the fight against current and future biotechnological methods of doping that continue to blight the sporting landscape.

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The fight against doping relies on several strategies, including the direct testing of athletes as

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well as evidence gathered in the context of non-analytical doping violations. By combining these strategies, and seeking new ones to address emerging threats, the global fight against doping is more effective.

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**OTHER DOPING THREATS**

The threat of blood doping exists alongside a tranche of other potential violations, including:

* + **Stimulants** such as cocaine and adrafinil that stimulate physical functions, such as heart rate and brain activity;
  + **Anabolic steroids**, such as testosterone, androstanolone and tetrahydrogestrinone (THG), that stimulate muscle growth and facilitate more intense levels of training, and an enhanced ability to recover;
* **Narcotics,** such as morphine and heroin, that are used to block pain associated with athletic injuries or to allow the athlete to train harder for longer:
* Peptide hormones, such as insulin and human growth hormone, that enhance muscle growth, increase the production of red blood cells and enhance oxygen delivery:
* Beta2 agonists, such as sabutamol and terbutalene, that relax the airways, allowing more oxygen to enter the blood – or, if injected – may provide some anabolic steroids:
* Diuretics (caffeine, alcohol),, which can be used to mask traces of other performance enhancing drugs, increase the production of urine, facilitate rapid weight loss to make the required weight for competition (a common requirement in equestrian sports and boxing).

**FURTHER INFORMATION**

* WADA 2011 Prohibited Drug List:
* **(http://www.wada-ama.org/Documents/World\_Anti-Doping\_Program/WADP-Prohibited-list/To\_be\_effective/WADA\_Prohibited\_List\_2011\_EN.pdf)**
* *Play True:* the official magazine of WADA:

*(*[*http://www.wada-ama.org/Documents/Resources/Publications/PlayTrue\_Magazine/PlayTrue\_2011\_2\_Widening-the-Net\_EN.pdf*](http://www.wada-ama.org/Documents/Resources/Publications/PlayTrue_Magazine/PlayTrue_2011_2_Widening-the-Net_EN.pdf)*)*

* The WADA Athlete Biological Passport Operating Guidelines :

**(http://www.wada-ama.org/Documents/Resources/Guidelines/WADA\_ABP\_OperatingGuidelines\_EN\_2.1.pdf)**

**DISCUSSION**

1. Is drug taking in sport legal?
2. If you could take a little red pill, that does not include any ingredients on the WADA prohibited list, that no other athletes know about – but that would give you a tremendous competitive advantage – would you take it?

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1. What ethical questions do your and your classmates answers to Q. 2 raise?
2. Bodybuilding is the only amateur competitive sport in the world that has natural and non-natural federations. This has led to far greater competitive choice for athletes who wish to compete with, or without, steroids. Do you think that other sports might also benefit from this approach?

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1. Merriam-Webster Dictionary [↑](#footnote-ref-1)
2. http://www.wada-ama.org/ [↑](#footnote-ref-2)