ARTICLE

The World Anti-Doping Code in sport

Update for 2015

SUMMARY

Some athletes cheat by using drugs or medical methods such as transfusion to enhance their performance. However, this may put their health at risk.

The World Anti-Doping Agency prohibits certain methods and drugs that may enhance performance, harm the athlete or violate the spirit of sport. Some may be banned only during competitions, but others are banned at all times.

Prohibited substances include over-the-counter and prescription medicines. It is therefore important for athletes and health professionals to check what is permitted.

There are many resources available through organisations such as the Australian Sports Anti-Doping Authority and the World Anti-Doping Agency.

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Introduction

The World Anti-Doping Agency (WADA) was established in 1999 as an independent, international agency with the aim of creating an environment in world sport that is free of doping. WADA and associated anti-doping organisations such as the Australian Sports Anti-Doping Authority (ASADA) strive to ensure that there is a 'level playing field' in high-performance sport and to optimise the safety and welfare of athletes. The World Anti-Doping Code (the Code) is the document that provides consistency of anti-doping policies across sports and across international boundaries. It is based on five international standards aimed at bringing consistency among anti-doping organisations. It covers:

- testing and investigations
- laboratories
- therapeutic use exemptions
- the list of prohibited substances and methods
- protection of privacy and personal information.

The world of sports doping is constantly changing. One of the key functions of WADA is to support high-quality research in order to stay abreast and ahead of individuals and organisations who seek to illegally enhance sporting performance. The Code also requires frequent updating to adapt to changing knowledge and the changing doping environment. A new Code was introduced in 2015 with ramifications for athletes, sporting organisations and medical practitioners who deal with high-level athletes.

Athletes bear strict liability for any substances found within their bodies. As some commonly prescribed drugs are prohibited in sport, it is crucial that medical practitioners and others advising athletes have access to up-to-date anti-doping information. Exemptions may need to be obtained if the athlete requires the therapeutic use of a drug.

Important considerations when treating athletes

Medical practitioners need to be aware that, when treating athletes who are subject to drug testing, certain medicines that are not illegal to prescribe to the general community could result in the athlete breaching anti-doping rules. Some of these prohibited medicines are likely to stand out as being of concern for athletes, for example anabolic steroids, growth hormone and stimulants. Other medicines may not be so obvious, for example insulin, probenecid, diuretics, beta blockers and terbutaline.

Some medicines such as insulin are banned for their direct anabolic effects while other medicines such as diuretics and probenecid are banned because they can be used to mask banned substances in the urine. Beta blockers can reduce tremor in particular sports such as golf and shooting. Methylphenidate, a phenethylamine derivative, is banned in sport because of its stimulant effects.

There are some drugs that are banned during competition, but are not banned out of competition, for example oral corticosteroids. Other drugs, such as salbutamol and pseudoephedrine, are permitted, but are prohibited above a threshold serum concentration. Salbutamol can be taken by inhaler without incurring an anti-doping rule violation, but nebulised salbutamol could put the serum concentration beyond

the prohibited level. An athlete taking more than 1600 microgram of salbutamol by inhaler, within a 24-hour period, may potentially exceed the threshold serum concentration.[1] Athletes who have a therapeutic use exemption for a diuretic and are also using inhaled salbutamol may require another therapeutic use exemption for their salbutamol. This is because the diuretic could increase their salbutamol concentration above the prohibited threshold.

Most medical practitioners working with high-performance athletes refrain from prescribing pseudoephedrine on the day of competition. While an athlete could feasibly take a moderate dose of pseudoephedrine on the day of competition and remain below the threshold, there is high inter-individual variability in the urinary concentration of pseudoephedrine. WADA advises athletes to refrain from taking pseudoephedrine 24 hours before competing.

Of particular note for medical practitioners should be the rules about the use of intravenous fluids in athletes. As a result of the abuse and inappropriate use of intravenous fluids in sporting environments, the Code lists as a prohibited method:

> Intravenous infusions and/or injections of more than 50 mL per 6 hour period except for those legitimately received in the course of hospital admissions, surgical procedures or clinical investigations.

This effectively means that high-performance athletes should not be administered intravenous fluids except for medical indications.

Medical practitioners need to remember that not all athletes are young. Some international athletes in sport are aged over 50 years and are more likely to be taking prescription medicines. Drugs prescribed to older athletes may therefore require consideration of the anti-doping regulations.

The 2015 Prohibited List

Each year WADA specifies substances and doping methods that are not permitted in sport. The Prohibited List is the international standard that outlines the substances and methods that are prohibited in sport.

For a substance or method to be prohibited, it must meet at least two of the following conditions:

- The substance or method has the potential to enhance, or does enhance, performance in sport.
- The substance or method has the potential to risk the athlete's health.
- WADA has determined that the substance or method violates the spirit of sport.

The Prohibited List is complex and detailed. Even experienced sports medicine practitioners refer to the list carefully when dealing with potential doping matters. The Prohibited List is divided into broad sections (see Box).[2]

The 2015 Prohibited List came into effect on 1 January. There are some important changes from the previous list:

- Mimetics have been included in the section on peptide hormones and growth factors (S2) to reflect the fact that synthetic analogues are also prohibited substances.
- Non-erythropoietic EPO-receptor agonists have been added.
- Hypoxia-inducible factor stabilisers have been included because of their growing importance in doping, particularly in relation to the use of inhaled xenon and argon.
- Examples of chorionic gonadotrophin and luteinising hormone-releasing factors such as buserelin have been added.
- Corticorelin has been included as an example of corticotropin-releasing factor.
- Growth hormone-releasing factors have been divided in a more precise categorisation to illustrate the varying biological properties.
- The wording in relation to diuretics has been altered to clarify that diuretics are not only masking agents but can be abused for other purposes such as rapid weight loss.
- The whole family of phenethylamine derivatives has been identified to address the growing number of illegal, designer stimulants derived from phenethylamine.

Changes to the monitoring program

Certain drugs, while not prohibited, are monitored to assess their use and to guide future changes to the list. The following changes have been made to the monitoring program for 2015:

- Monitoring of pseudoephedrine will cease, but urinary concentrations above 150 microgram/mL are prohibited during competition.
- Telmisartan (angiotensin II receptor antagonist) has been added to the monitoring program as it may enhance endurance by inducing metabolic changes such as mitochondrial biogenesis and changes in skeletal muscle fibre type.
- Meldonium (Mildronate) has been added as it has potential cardiac stimulant effects.

Therapeutic use exemptions

Sporting authorities and medical practitioners working in high-performance sport are cognisant of the need to ensure that anti-doping rules do not impact negatively upon the health of the athlete. To ensure that athletes can be treated for a legitimate medical condition, WADA can provide a therapeutic use exemption for an otherwise banned substance. International and national athletes should apply for a therapeutic use exemption prospectively. In cases where a medical emergency necessitates the use of an otherwise prohibited substance, an athlete may apply for a retrospective therapeutic use exemption. Athletes should check with their sporting organisation in the first instance.

Most sporting organisations will have a chief medical officer who can assist with the therapeutic use exemption process, or the sport's administrators should be able to direct the athlete appropriately. Further advice regarding therapeutic use exemptions can be obtained by contacting the Australian Sports Drug Medical Advisory Committee (www.asdmac.gov.au/about/contact.html).

Sports supplements

The sports supplements industry is largely unregulated. The vast majority of the many ingredients found in sports supplements have not been subject to scientific scrutiny to support their use. Efficacy and safety data are lacking for many ingredients.[3]

Many sports supplements have been found to contain little or none of the active ingredients claimed by the manufacturer.[4] Even more concerning is that several studies have found a substantial proportion of sports supplements contain ingredients which are not mentioned on the label but which could result in an anti-doping rule violation.[5]

In 2013 the Australian Crime Commission reported that performance-enhancing and image-enhancing drugs, including peptides and hormones, were being used in some sections of professional sport.[6] Section S2 of the Prohibited List addresses this issue by including growth hormone, erythropoietin and 'other substances with similar chemical structure or similar biological effects'.

During 2013–14, ASADA conducted an assessment of sanctioned athletes and found that 54% of publicly disclosed anti-doping rule violations involved a prohibited stimulant found in a supplement.[7] Athletes and the professionals supporting them need to be vigilant about the dangers of an inadvertent violation of anti-doping rules occurring as a result of taking sports supplements.

Box World Anti-Doping Code Prohibited List 2015 [2]

Substances and methods prohibited at all times (in and out of competition)

Prohibited substances

S0. Non-approved substances

This includes veterinary drugs and those which have not been approved by regulatory bodies such as the Therapeutic Goods Administration.

S1. Anabolic drugs

- S1.1 Anabolic androgenic steroids
  - a. exogenous e.g. danazol
  - b. endogenous e.g. testosterone and its metabolites
- S1.2 Other anabolic agents e.g. tibolone

S2. Peptide hormones, growth factors, related substances and mimetics

- S2.1 Erythropoietin-receptor agonists
  - i. erythropoiesis-stimulating agents e.g. erythropoietin (EPO)
  - ii. non-erythropoietic EPO-receptor agonists
- S2.2 Hypoxia-inducible factor stabilisers, and activators e.g. argon
- S2.3 Chorionic gonadotrophin and luteinising hormone and their releasing factors in males
- S2.4 Corticotropins and their releasing factors
- S2.5 Growth hormone and its releasing factors

S3. $Beta_2$ agonists

Inhaled drugs, such as salbutamol, can be used within specified limits.

S4. Hormone and metabolic modulators

- S4.1 Aromatase inhibitors e.g. anastrozole
- S4.2 Selective oestrogen receptor modulators e.g. tamoxifen
- S4.3 Other anti-oestrogenic substances e.g. clomiphene
- S4.4 Drugs modifying myostatin function
- S4.5 Metabolic modulators e.g. insulin

S5. Diuretics and masking agents

The masking agents include drugs such as probenecid.

Prohibited methods

M1. Manipulation of blood and blood components

This includes retransfusion of the athlete's own blood.

M2. Chemical and physical manipulation

This includes tampering with samples.

M3. Gene doping

This includes normal as well as genetically modified cells.

Substances prohibited in competition

S6. Stimulants e.g. amphetamines, pseudoephedrine

S7. Narcotics e.g. methadone

S8. Cannabinoids

S9. Glucocorticosteroids

Substances prohibited in particular sports

P1. Alcohol (banned in air sports, archery, motor sport, motorcycling and powerboating)

P2. Beta blockers (banned in archery, motor sport, billiards, darts, golf, shooting, some skiing and snowboarding events, and some underwater events)

Harmful effects of doping

Medical practitioners need to be aware of the potential adverse effects of doping behaviour by athletes. Drugs such as anabolic steroids are associated with aggression, hypertension, impotence and infertility. Abuse of growth hormone can result in acromegaly and an increased risk of cancer. Use of erythropoietin for sporting purposes increases the risk of hypertension, thrombus formation and thromboembolic events. Athletes who decide to dope are by nature risk-takers and will often underestimate the potential health risks associated with doping behaviour.

Anti-doping resources

There are many resources available to medical practitioners to assist when there is any doubt about a medicine being prohibited. Perhaps the most useful of these is the online 'Check Your Substances' tool, hosted on the ASADA website. This site (https://checksubstances.asada.gov.au) allows medical practitioners, coaches and athletes to enter the name of the drug and receive advice about its status. The substance will be deemed to fall under one of four categories:

- permitted for use (e.g. paracetamol, amoxycillin)
- prohibited (e.g. testosterone, amphetamine)
- permitted in females only (e.g. human chorionic gonadotrophin)
- subject to certain conditions (e.g. prednisolone, pseudoephedrine hydrochloride).

The Australian Sports Drug Medical Advisory Committee website (www.asdmac.gov.au/athletes/conditions.html) contains advice relating to specific medical conditions such as asthma, attention deficit hyperactivity disorder and hypertension. There is also advice for medical practitioners on therapeutic use exemptions. In addition, there are several online educational resources that allow individuals to inform themselves about anti-doping rules (www.asada.gov.au/education/index.html).

The ASADA E-Learning webpage provides medical practitioners and others involved in sport with up-to-date educational resources to assist them when dealing with athletes on matters of anti-doping compliance (http://elearning.asada.gov.au). There is an online update covering the 2015 World Anti-Doping Code and the changes from the 2009 Code, and how this affects athletes and their support personnel. This site requires registration, but the learning module only takes a maximum of 15 minutes to complete.

Some sources of drug information, such as MIMS, provide a symbol against drugs that have potential ramifications for athletes.

Conclusion

For medical practitioners and others who are not regularly dealing with high-performance athletes, the WADA Code can appear to be a long, confusing and cumbersome document. WADA and national anti-doping organisations attempt to strike a balance between providing equity and fairness in sport, and ensuring that athletes have access to appropriate treatment for legitimate medical conditions.

The ASADA website is a useful resource. In particular, the 'Check Your Substances' page provides an easy reference for medical practitioners when there is doubt regarding the status of a particular drug. If any doubt persists and the medical problem is not urgent, the athlete should be urged to consult with their national sporting organisation. All national sporting organisations have appropriate contacts through which they can provide advice. If a medical practitioner, coach, athlete or parent has further questions that cannot be answered via the ASADA website, they can ring ASADA on 1300 027 232. <

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