

# WHY DO ATHLETES TAKE DRUGS?

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## INTRODUCTION

Athletes may take drugs for a variety of reasons. The principal reasons can be categorised as:

1. Therapeutic use for the treatment of medical conditions.
2. Social and 'recreational' use.
3. Performance enhancement.

Considering this broad set of circumstances, there is a wide range of drugs that may be taken by athletes. This article will examine the more commonly used classes of these drugs. Particular reference will be made to those drugs that appear on the World Anti-Doping Agency (WADA) Prohibited List of Substances and Methods<sup>1</sup>, since deliberate or inadvertent use of such prohibited drugs carries significant consequences for athletes.

## THERAPEUTIC USE OF DRUGS FOR THE TREATMENT OF MEDICAL CONDITIONS

Athletes are generally in peak physical condition. However, some athletes may have long-term conditions, such as asthma, that

require medical intervention. Additionally, athletes, like any member of the general population, are not immune to short-term conditions such as coughs and colds. Drug treatment for any of these conditions requires vigilance in relation to athletes.

Table 1 shows some of the medical conditions for which athletes may require drug treatment. Although this list is not comprehensive, it illustrates those conditions which are more likely to be experienced by athletes and for which drugs that appear on the WADA Prohibited List may be required.

For each condition, the more commonly used classes of drugs are listed. Those classes of drugs subject to WADA regulations are highlighted. Athletes who need WADA prohibited drugs for legitimate treatment of medical conditions can apply for Therapeutic Use Exemption, as described later in this article.

For most of the classes of drugs listed in Table 1, a valid medical practitioner's prescription is required. However, some

classes of drug may be purchased over-the-counter from a pharmacy or other outlet. In all circumstances, extreme care must be taken by the athlete or healthcare professional to ensure that the athlete does not contravene WADA regulations.

As we will see below, the WADA regulations relating to these classes of drugs can be complex but are precise. This requires prescribers to be fully up to date with these regulations.

### *Insulin and diuretics*

The use of these drugs in sport is prohibited at all times (both in-competition and out-of-competition).

### *Beta-blockers*

Beta-blockers are only prohibited in particular sports. The current (2013) WADA regulations for beta-blockers are shown in Table 2.

The sports in which beta-blockers are prohibited reflect the potential beneficial effects that may be derived from the anti-

TYPE OF MEDICAL CONDITION	MEDICAL CONDITION	DRUG CLASSES COMMONLY USED
Long-term chronic conditions	Asthma	Beta-2 agonists Glucocorticosteroids Leukotriene antagonists
	Diabetes mellitus (Type I)	Insulin
	Diabetes mellitus (Type II)	Oral antidiabetics
	Hypertension	Diuretics Beta-blockers ACE inhibitors Calcium channel blockers Angiotensin II receptor antagonists
Short-term acute conditions	Hay fever	Antihistamines
	Viral cough and cold	Antitussives Decongestant stimulants Non-narcotic analgesics
Sports injuries	Musculo-skeletal damage and inflammation	Non-steroidal anti-inflammatories Non-narcotic analgesics Narcotic analgesics Glucocorticosteroids

**Table 1:** Medical conditions for which athletes may require drug treatment. Drugs highlighted in pink are those subject to WADA Prohibited List (2013) regulations.

tremor and, perhaps to a lesser degree, anti-anxiety effects variably exhibited by beta-blockers.

*Beta-2 agonists, glucocorticosteroids, decongestant stimulants, narcotics*

These classes of drugs are prohibited only in-competition. The restrictions relating to each class are precisely defined by WADA and are outlined in Tables 3 to 6.

The WADA regulations relating to Beta-2 agonists are designed to ensure that athletes who require bronchodilation with these drugs limit their use to recommended therapeutic dose regimes.

Other Beta-2 agonists, such as terbutaline or other routes of administration for salbutamol, formoterol or salmeterol are subject to Therapeutic Use Exemption regulations, as described later in this article.

Clearly, the administration of glucocorticosteroids by topical routes, such as creams, ointments and eye drops or as inhalers for the treatment of asthma,

is permitted. Likewise, local injection of glucocorticosteroids such as by the intra-articular route, is permitted.

For decongestant stimulants that are subject to WADA restriction, the regulations are shown in Table 5.

Some decongestant stimulants such as phenylephrine, phenylpropanolamine and synephrine are not prohibited by WADA, although their use by athletes is tracked through the WADA Monitoring Programme<sup>2</sup>.

Other decongestants such as oxymetazoline, xylometazoline and ipratropium are not prohibited by WADA.

Less potent narcotics, such as codeine, dihydrocodeine and tramadol, are not prohibited by WADA.

*How to identify if a medicine contains a prohibited substance*

Clearly, it is in the athlete's interest to ensure that accurate identification of those medicines that contain prohibited substances is undertaken on each occasion

that a medicine is taken. The online web site Global DRO<sup>3</sup> provides an up to date reference source for athletes and healthcare professionals to identify whether or not a medicine contains a prohibited substance. Global DRO was developed through a partnership between UK Anti-Doping (UKAD), the Canadian Centre for Ethics in Sport (CCES) and the United States Anti-Doping Agency (USADA).

**extreme care must be taken to ensure that the athlete does not contravene WADA regulations**

## BETA-BLOCKERS

*Unless otherwise specified, beta-blockers are prohibited in-competition only in the following sports:*

- Archery (also prohibited out-of-competition)
- Automobile
- Billiards (all disciplines)
- Darts
- Golf
- Shooting (also prohibited out-of-competition)
- Skiing/snowboarding: ski jumping, freestyle aerials/halfpipe and snowboard halfpipe/big air

**Table 2:** WADA Prohibited List (2013) regulations relating to beta-blockers. Information was obtained from the WADA 2013 Prohibited List International Standard<sup>1</sup>.

## BETA-2 AGONISTS

*All Beta-2 agonists, including all optical isomers where relevant, are prohibited except:*

- Inhaled salbutamol (maximum 1600 µg over 24 hours).
- Inhaled formoterol (maximum delivered dose 54 µg over 24 hours).
- Salmeterol when taken by inhalation in accordance with manufacturer recommended therapeutic regimen.

*The presence of salbutamol in urine in excess of 1000 ng/ml or formoterol in excess of 40 ng/ml is presumed not to be an intended therapeutic use of the substance and will be considered an Adverse Analytical Finding unless the athlete proves, through controlled pharmacokinetic study, that the abnormal result was the consequence of the use of the therapeutic inhaled dose up to the maximum indicated above.*

**Table 3:** WADA Prohibited List (2013) regulations relating to Beta-2 agonists. Information was obtained from the WADA 2013 Prohibited List International Standard<sup>1</sup>.

## GLUCOCORTICOSTEROIDS

*All glucocorticosteroids are prohibited when administered by oral, intravenous, intramuscular or rectal routes.*

**Table 4:** WADA Prohibited List (2013) regulations relating to glucocorticosteroids. Information was obtained from the WADA 2013 Prohibited List International Standard<sup>1</sup>.

Visitors to the site can search for specific information on products sold in the UK, Canada and the USA.

The website asks the user to provide information on:

- User type (athlete, coach, health professional etc).
- The user's sport.
- The country in which the medicine was obtained.
- The name of the medicine.

From this information, Global DRO provides details on the active ingredients of the medicine and their permitted or prohibited status, in-competition or out-of-competition, relative to the country of purchase and sport within which the medicine is to be used.

### *Therapeutic use exemption*

As we have seen in Table 2, there are several classes of drugs that athletes may need to take for legitimate therapeutic reasons but which appear on the WADA Prohibited List. Under these circumstances, the athlete, with their medical practitioner, may apply for a Therapeutic Use Exemption (TUE), details of which appear in the WADA International Standard for TUEs<sup>4</sup>.

The broad criteria for granting a TUE are:

- The athlete would experience a significant impairment to health if the prohibited substance or prohibited method were to be withheld in the course of treating an acute or chronic medical condition.
- The therapeutic use of the prohibited substance or prohibited method would produce no additional enhancement of performance other than that which might be anticipated by a return to a state of normal health following the treatment of a legitimate medical condition.
- There is no reasonable therapeutic alternative to the use of the otherwise prohibited substance or prohibited method.
- The necessity for the use of the otherwise prohibited substance or prohibited method cannot be a consequence, wholly or in part, of the prior use, without a TUE, of a substance or method which was prohibited at the time of use.

## DECONGESTANT STIMULANTS

- *Cathine is prohibited when its concentration in urine is greater than 5 µg/ml.*
- *Ephedrine is prohibited when its concentration in urine is greater than 10 µg/ml.*
- *Methylephedrine is prohibited when its concentration in urine is greater than 10 µg/ml.*
- *Pseudoephedrine is prohibited when its concentration in urine is greater than 150 µg/ml.*

**Table 5:** WADA Prohibited List (2013) regulations relating to decongestant stimulants. Information obtained from the WADA 2013 Prohibited List International Standard<sup>1</sup>.

## NARCOTICS

*The following are prohibited:*

- *Buprenorphine*
- *Dextromoramide*
- *Diamorphine (heroin)*
- *Fentanyl and its derivatives*
- *Hydromorphone*
- *Methadone*
- *Morphine*
- *Oxycodone*
- *Oxymorphone*
- *Pentazocine*
- *Pethidine*

**Table 6:** WADA Prohibited List (2013) regulations relating to narcotics. Information obtained from the WADA 2013 Prohibited List International Standard<sup>1</sup>.

### TYPE OF USE

### DRUGS COMMONLY USED

<i>Beverages</i>	<i>Caffeine</i> <i>Alcohol</i>
<i>Smoking</i>	<i>Nicotine</i>
<i>'Recreational'</i>	<i>Amphetamines</i> <i>Narcotics</i> <i>Cocaine</i> <i>Cannabinoids</i>

**Table 7:** Drugs that are commonly used in society. Drugs highlighted in pink are subject to WADA Prohibited List (2013) regulations.

TUEs are normally granted to athletes by International Federations or National Anti-Doping Organisations. Requests are dealt with by a panel of independent physicians (Therapeutic Use Exemption Committee). In a paper, Fitch, as Chair of the IOC Therapeutic Use Exemption Committee, provides an interesting insight into the medical indications and pitfalls in the TUE process<sup>5</sup>.

#### SOCIAL AND 'RECREATIONAL' USE OF DRUGS

Drugs are used widely within society, throughout the world, for social and recreational purposes. These drugs range from caffeine, a constituent of many beverages, through to illegal drugs of abuse, such as cocaine. As members of society in general, athletes may follow these trends towards social or recreational use of drugs.

Some of the more common drugs that are used in this context are shown in Table 7.

Caffeine is taken on a daily basis through the consumption of tea and coffee. Despite its stimulant properties, caffeine was removed from the WADA Prohibited List in 2004.

Alcohol is a drug that is legally consumed in many cultures, worldwide. It appears in the WADA Prohibited List as a "substance prohibited in particular sports". These sports mainly involve the use of machinery or equipment that could impart danger to others if operated under the influence of alcohol. The WADA regulations that apply to alcohol are shown in Table 8.

'Recreational' misuse of drugs is an increasingly common aspect of society in many countries. The more frequently used recreational drugs, which appear on the WADA Prohibited List, were shown in Table 7. These drugs are categorised on the WADA Prohibited List as 'substances and methods prohibited in-competition'.

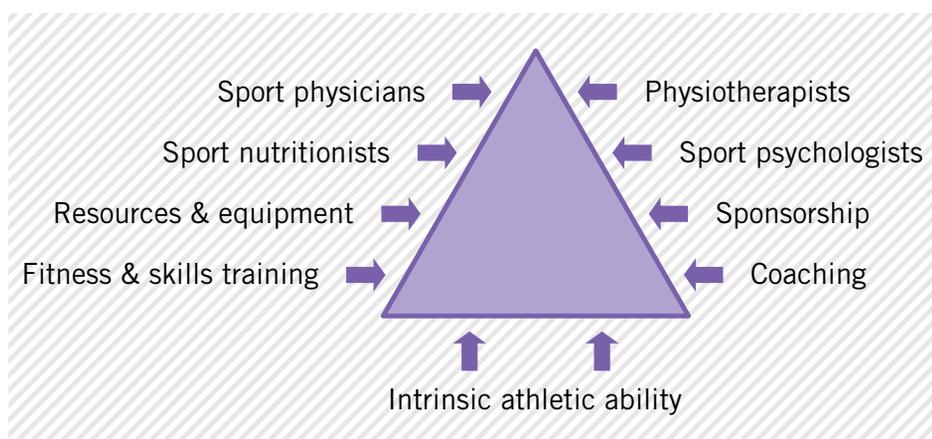
## ALCOHOL

*Alcohol is prohibited in-competition only, in the following sports:*

- *Aeronautics*
- *Archery*
- *Automobile*
- *Karate*
- *Motorcycling*
- *Powerboating*

*Detection will be conducted by analysis of breath and/or blood. The doping violation threshold (haematological values) is 0.10 g.L*

**Table 8:** WADA Prohibited List (2013) regulations relating to alcohol. Information obtained from the WADA 2013 Prohibited List International Standard<sup>1</sup>.



**Figure 1:** Factors influencing the attainment of excellence in sport.

TYPE OF USE	DRUGS COMMONLY USED
<i>Legal supplements</i>	<i>Vitamins Proteins Creatine</i>
<i>Illegal performance-enhancing drugs</i>	<i>Any substances on the WADA Prohibited List</i>

**Table 9:** Drugs that are used to enhance performance. Highlighted in pink are drugs subject to WADA Prohibited List (2013) regulations.

Some athletes take such drugs in a social environment, without intent to enhance performance. However, in addition to these drugs having potential performance-enhancing properties, an athlete who is under the influence of such drugs may pose a danger to fellow competitors.

It is interesting to note that, in recent years, cannabinoids have been the second or third most frequently identified class of prohibited substances appearing on the WADA annual laboratory statistics. This probably reflects the widespread use of cannabinoids within society and the lack of understanding by many athletes regarding the period of time that substances can remain in the body after consumption.

Drugs that are used in a social context probably confer little advantage with respect to performance enhancement. However, the inclusion of many of these drugs on the WADA Prohibited List poses significant problems for athletes. In addition

to the risk of recording an adverse analytical finding during routine dope testing, these drugs may impart an ergolytic effect on performance.

#### THE USE OF SUBSTANCES TO ENHANCE PERFORMANCE

Athletes are constantly striving to achieve excellence within their chosen sport. There are many factors which can influence an athlete's attempt to reach this goal which may include resorting to the use of performance-enhancing drugs.

In addition to an athlete's innate ability and commitment to training, there are many external factors that influence performance and the attainment of the ultimate goal of being 'the best'.

Some of the more important influencing factors on athletes are shown in Figure 1.

Inevitably, there are many athletes who achieve excellence in their sport but who never reach their ultimate personal

goal. It is these athletes, as well as those who seek a shortcut to glory, who may be tempted to experiment with performance enhancement through pharmacological means.

It is pertinent to note that there has been a culture within sport of using substances to enhance performance which dates back over 2,000 years to the Ancient Olympic Games.

#### How can we classify performance-enhancing substances?

Substances that are used in an attempt to enhance performance can be broadly divided into two types, as shown in Table 9.

#### Legal supplements

Anecdotal evidence suggests that the majority of today's athletes, at every level of achievement, use supplements. A recent study by Backhouse et al (2013)<sup>6</sup> concluded that doping use is 3.5 times more prevalent in nutritional supplement users than in non-users. The authors suggested that their results offered support for the gateway hypothesis, whereby athletes who engage in legal performance enhancement practices appear to embody an "at risk" group for transition toward doping.

#### Are supplements safe to use?

The landmark study by Geyer et al (2004)<sup>7</sup> showed that of 634 non-hormonal nutritional supplements purchased in 13 countries, 14.8% contained anabolic androgenic steroids that were not declared on the label. Athletes are therefore vulnerable to the inadvertent use of prohibited substances. There have been many cases reported in recent years involving athletes recording adverse analytical findings following supplement use.

#### Advice regarding supplement use

WADA advise extreme caution:

*"The use of dietary supplements by athletes is a concern because in many countries the manufacturing and labelling of supplements may not follow strict rules. This may lead to a supplement containing an undeclared substance that is prohibited under anti-doping regulations. A significant number of positive tests have been attributed*

## SUBSTANCES AND METHODS

### I. Substances and methods prohibited at all times (in- and out-of-competition)

#### S.0 Non-approved substances

#### S.1 Anabolic agents

#### S.2 Peptide hormones, growth factors and related substances

#### S.3 Beta-2 agonists

#### S.4 Hormone and metabolic modulators

#### S.5 Diuretics and other masking agents

#### M.1 Manipulation of blood and blood components

#### M.2 Chemical & physical manipulation

#### M.3 Gene doping

### II. Substances and methods prohibited in-competition

All the categories under Section I, plus:

#### S.6 Stimulants

#### S.7 Narcotics

#### S.8 Cannabinoids

#### S.9 Glucocorticosteroids

### III. Substances prohibited in particular sports

#### P.1 Alcohol

#### P.2 Beta-blockers

**Table 10:** WADA Prohibited List of Substances and Methods (2013). Information obtained from the WADA 2013 Prohibited List International Standard<sup>1</sup>.

to the misuse of supplements and taking a poorly labelled dietary supplement is not an adequate defence in a doping hearing.”<sup>8</sup>

#### Checking supplements

Informed-Sport (<http://www.informed-sport.com/>) is an organisation which provides a risk-minimisation programme for sports nutrition products. The programme certifies that specified batches of nutritional supplements and/or ingredients that bear the Informed-Sport logo have been tested for banned substances in their laboratory. However, this still does not guarantee a supplement is completely free from prohibited substances as there can even be differences in ingredients within the one batch.

#### Illegal performance-enhancing drugs

We have already reviewed some of the classes of drugs that are included in the WADA Prohibited List. The current (2013)

WADA list of Prohibited Substances and Methods is shown in Table 10.

The detailed criteria for including substances and methods on the WADA list are specified in the World Anti-Doping Code<sup>9</sup> and is summarised below.

*A substance or method shall be considered for inclusion on the Prohibited List if WADA determines that the substance or method meets any two of the following three criteria:*

1. *The substance or method, alone or in combination with other substances or methods, has the potential to enhance or does enhance sport performance.*
2. *The use of the substance or method represents an actual or potential health risk to the athlete.*
3. *WADA's determination that the use of the substance or method violates the spirit of sport.*

The Prohibited List is subject to annual review with revised lists coming into force each January.

#### Why do athletes use illegal performance-enhancing substances?

The reasons athletes use drugs that appear on the WADA Prohibited List are manifold, complex and vary from athlete to athlete. In a review of 33 studies, published between 2000 and 2011, Morente-Sánchez and Zabada (2013)<sup>10</sup> reported that the initial reasons given by elite athletes for using banned substances included:

- Achievement of athletic success by improved performance
- Financial gain
- Improving recovery
- Prevention of nutritional deficiencies
- The idea that others use them.

In addition, this study found that there is a belief by athletes about the inefficiency of anti-doping programmes and athletes criticise the way tests are carried out.

Some of the compounding factors that encourage the use of prohibited substances are:

- **Media coverage:** In their attempt to sell newspapers and other promotional material, the media tend to give extensive coverage to doping scandals within sport. This may give the athlete a misleading impression of the extent to which performance-enhancing drugs are used in sport.
- **Peer pressure:** Athletes may directly observe or hear of the practices of fellow athletes who use performance-enhancing drugs. Alternatively, athletes may be offered performance-enhancing drugs by their fellow competitors or team members.
- **Support team pressure:** Those people who support athletes such as family members, coaches and healthcare professionals may instil additional pressure on athletes to improve performance by any means available.
- **Availability of substances:** In addition to the more traditional sources of drug supply, an athlete can now obtain virtually any product they wish through the internet.
- **Misleading information:** Some apparently safe supplements may contain traces of prohibited substances. In addition, the labelling of some supplements may not be complete or accurate.



- **Lack of understanding:** Athletes are not pharmacologists and the plethora of information that appears on medicinal products can be confusing to the untrained eye.

#### *Specified substances*

There are occasions when an athlete may take a prohibited substance inadvertently. For this reason, WADA have introduced a Specified Substances clause which applies to certain classes of substances and methods on the Prohibited List. For Specified Substances, sanctions should be made more flexible where an athlete or other person associated with an adverse analytical finding can clearly demonstrate that he or she did not intend to enhance sport performance.

#### THE ROLE OF HEALTHCARE PROFESSIONALS

Healthcare professionals are the experts with respect to medicines and should use this expertise to ensure the effective, safe and legal use of drugs in sport. There are a number of ways in which healthcare professionals can guide and support athletes with regard to their use of drugs within a sporting context:

- Provide appropriate, rational prescribing of drugs for medical conditions.
- Be fully up to date with WADA regulations.
- Spread the anti-doping message as widely as possible.
- Liaise with colleagues to share knowledge, expertise and experiences.

#### SUMMARY

- There are many reasons why athletes may take drugs, ranging from routine social behaviour through to illegal performance enhancement.
- The prescribing of drugs that appear on the WADA Prohibited List, when used for legitimate medical conditions, may invoke Therapeutic Use Exemption procedures.
- The factors that may influence athletes to take illegal performance-enhancing drugs are complex.
- Athletes are subject to severe penalties for inappropriate use of prohibited drugs.
- Healthcare professionals can provide invaluable expert advice and support to ensure effective and legal use of drugs in sport and to promote the anti-doping message.

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