

On the other hand non-elite joggers and walkers are quite capable of drinking fluid at such high rates since they travel so slowly and have ample time to stop and drink as often as they desire during 'competition'. But since such high rates of fluid ingestion exceed the real fluid requirements of persons sweating little because they are exercising at such low intensities, these high rates of fluid ingestion will cause the development of water intoxication (hyponatraemia) if sustained for more than 3 - 4 hours with potentially fatal consequences.³ Indeed runners in Wyndham and Strydom's study drank only about 100 ml per hour, which is probably similar to the current practices of world class runners in races of 5 - 42 km.^{4,5}

In general, most studies show that the voluntary rates of fluid intake during exercise are usually between 250 and 1 000 ml per hour. Perhaps the best advice is that drinking according to the personal dictates of thirst (*ad libitum*) appears to be both safe and effective. *Ad libitum* rates of fluid intake typically range between 400 and 800 ml per hour in most forms of recreational and competitive exercise; less for slower, smaller athletes exercising in mild environmental conditions, more for superior athletes competing at higher intensities in warmer environments. To ensure they do not develop water intoxication, subjects exercising for prolonged periods in extreme cold may need to drink even less.

References available on request.

DRUGS AND SPORT: UPDATE 2004

SHUAIB MANJRA, MB ChB, MMedSc, BSc (Med) (Hons) Sports Medicine, DOH Occupational and Sports Medicine Physician Rondebosch, Cape Town

An athlete presents a unique challenge to the physician. In addition to other considerations, it is imperative for the

Table I. **Categories of prohibited substances**

Substances and methods prohibited in competition

Prohibited substances

- Stimulants
- Beta-2-agonists
- Narcotics
- Cannabinoids
- Anabolic agents
- Peptide hormones
- Agents with anti-oestrogenic actions
- Masking agents
- Glucocorticosteroids

Prohibited methods

- Enhancement of oxygen transfer
- Pharmacological, physical and chemical manipulation
- Gene therapy

Substances prohibited in particular sports

- Alcohol
- Beta-blockers
- Diuretics

Substances prohibited in and out of competition

- Anabolic agents
- Peptide hormones
- Beta-2-agonists
- Agents with anti-oestrogenic actions
- Masking agents

physician to be aware of the athlete's status and the drugs and substances prohibited to the athlete. Failure to consider this, and prescribing drugs that are prohibited, can have severe consequences for the athlete, including the loss of his/her ability to continue competing and earning a living. This, in turn, can have potential ramifications for the doctor, should the athlete sue for negligence. This brief article focuses on some of the recent developments in anti-doping initiatives, particularly relating to changes to the prohibited list. It is by no means an attempt at a detailed discussion or a list of prohibited substances. The latter can be found in the 'Further sources of information' listed below.

The formation of the World Anti-Doping Agency (WADA) and the adoption of its anti-doping code in 2003 are significant steps in the har-

monisation of anti-doping measures around the world. Of significance is the clause placing absolute liability on the athlete should a prohibited substance, its metabolite or its marker be found in his/her urine. Exceptional circumstances, if considered in any case, are few. This will make it more difficult for doping cheats to escape sanction. More importantly, however, this will make it difficult for those who have 'inadvertently' taken a prohibited substance to seek remedy. Therefore there is an added imperative for doctors to be aware of the prohibited list. Sanctions in the event of a doping offence have also been standardised, and are deliberately harsh to deter violation.

Against these seemingly harsh measures, there is some relief for athletes. The prohibited list, established by the International Olympic Committee

(IOC), has been modified by WADA and will be enforced in 2004. Any 2 of the following 3 criteria will make a substance or method eligible to be included in the list:

- (i) Evidence or experience that the substance or method can enhance performance.
- (ii) Evidence or experience that use of the substance or method represents an actual or potential risk to the athlete.
- (iii) Use of the substance or method violates the spirit of sport.

The new categories of prohibited substances are given in Table I. One significant change is that certain stimulants which are found in common medicaments and resulted in many athletes having tested positive in the past, have been taken off the prohibited list — these include pseudoephedrine and phenylpropranolamine. Also removed from the list is caffeine, a ubiquitous stimulant. Phenylephrine and synephrine were removed a year ago. Ephedrine and methylephedrine remain on the list. The rationale for the removal of the abovementioned drugs is their seemingly mild stimulant, or beneficial effects, and their common usage increases the risk of inadvertent doping. Some of these will, however, continue to be monitored by WADA to detect abuse. These changes will allow a greater focus on those who deliberately cheat, using proven performance-enhancing drugs.

Corticosteroids have been retained on the prohibited list because of their dubious performance-enhancing effects despite contrary opinions from experts. Oral, rectal, intravenous and intramuscular administration are prohibited. All other administration routes will now require a formal application for therapeutic use exemption (TUE).

The beta-2-agonists constitute another group of drugs widely used for therapeutic benefit, but abused in some sports. All beta-2 agonists remain prohibited except for salbutamol, for-

moterol, salmeterol and terbutaline, which are permitted by inhalation only and will require a TUE.

Beta-blockers are prohibited in specific sports.

Diuretics, which are prohibited in and out of competition because of their masking properties, will require TUE. In sports where weight limits are important diuretics are absolutely prohibited.

A medical review panel, consisting of at least three expert physicians, will assess applications for TUE. Criteria which will be considered in an application and which should be borne in mind when doctors compile such applications, include, *inter alia*, the following:

- The athlete would experience a significant impairment to health if the prohibited substance was to be withheld in the course of treating an acute or chronic medical condition.
- The therapeutic use of the prohibited substance would produce no additional enhancement of performance other than that which might be anticipated by a return to a state of health after the treatment of a legitimate medical condition.
- There is no reasonable therapeutic alternative to the use of the otherwise prohibited substance.

Importantly, except in cases where emergency medical treatment is necessary, a TUE will not be granted retrospectively.

It is clear that the physician bears a tremendous responsibility towards the athlete-patient. Knowledge of the prohibited list is a necessary step in this duty of care.

Further sources of information

- South African Institute for Drug-Free Sport, tel (021) 683-7129, fax (021) 683-7274, e-mail: drugfree@iafrica.com, website www.drugfreesport.org.za (a complete list of permitted and pro-

hibited substances is available on the website). *The Athletes' Handbook*, detailing these substances and giving more useful information on doping, is also available from the organisation on request.

- Drug-free hotline. This call line is available during office hours and will answer any queries with regard to prohibited substances. Tel (021) 448-3888.
- World Anti-Doping Agency. Web site www.wada.com (world anti-doping code; international standard: prohibited list; international standard: therapeutic use exemption and application template).

A PRACTICAL GUIDE TO THE USE OF NUTRITIONAL SUPPLEMENTS IN SOUTH AFRICA

SHELLY MELTZER, RD (SA), MSc (Med Nutrition & Dietetics)
RYAN KOHLER, MB ChB, MPhil (Sports Medicine)
ISMAIL JAKOET, MB ChB, MSc (Sports Medicine)
TIM NOAKES, MB ChB, MD, DSc, FACSM
Sports Science Institute of South Africa, Newlands, Cape Town

Sportspersons should ensure that the decision to use a dietary supplement is a safe one. Unlike medicines, which are regulated by the Medicines Control Council, there is no governing body to control and regulate the supplement industry in South Africa. As a result many supplements may contain banned substances and there is a chance that not all the ingredients are accurately listed on the label of a supplement product. National and international sporting bodies place the responsibility of using supplements on the sportsperson. The legal clause 'strict liability' means that the sportsperson is responsible for any and all substances appearing in their urine and blood. Thus to protect