

## Educational Opportunities and Anti-Doping Roles and Responsibilities for Pharmacists

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(Received August 31, 2011)

Drug use and abuse by athletes has become a common problem. Pharmacists can assist by managing the legitimate medication needs of athletes to prevent them from accidentally using a banned substance. Pharmacists can also educate athletes and the public about the health consequences of using performance-enhancing substances. Pharmacists can play a variety of roles to assist with anti-doping. Such roles include educating, advising, dispensing and monitoring medications and supplements; and working with anti-doping agencies. There are few established educational opportunities for pharmacists and pharmacy students. Educational programs in sports pharmacy and doping control need to be developed for instruction in the classroom, for post-graduate training and for experiential programs. Classroom instruction should include information about performance-enhancing substances and general principles of doping control. Student activities for an established advanced pharmacy practice experience include education on performance-enhancing substances and assay technologies, preparing and providing presentations to athletes and others regarding these substances, performing literature research on drugs and dietary supplements used to improve athletic performance, writing a monograph on these substances, and participating in doping control programs.

**Key words**—doping control; pharmacy practice; pharmacy education; sports pharmacy

### INTRODUCTION

The use and abuse of medications, dietary supplements and other substances by athletes has become a common and problematic phenomenon. It is no longer a surprise when it is reported that an athlete tested positive for a banned substance and is then penalized for a doping violation. Athletes often seek a competitive advantage, and some resort to using performance-enhancing substances. This is not only true of elite athletes, but has been reported in children, as well, who likely do not understand the harm that many performance-enhancing substances can do to their bodies.<sup>1)</sup> However, athletes also need medical care and have legitimate need for prescription and non-prescription medicines. This can become a potential problem for them if a needed medication is banned for their sport and sport-sanctioning organization, particularly if they don't follow the appropriate policies and procedures. Further, athletes use dietary supplements for nutritional purposes, since they often have special dietary requirements; and they may not realize that a product contains banned ingredients.

Athletes who compete in sports with doping regulations are confronted with complicated rules and banned substance lists. This creates a situation where there is a significant risk of athletes innocently consuming banned substances, either by self medication or even having been prescribed by a physician. One of the most notorious examples of this occurred in the 2000 Olympic Games in Sydney, Australia.<sup>1)</sup> In this unfortunate case, a team physician made the mistake of prescribing a common cold medication for an athlete, which then resulted in the athlete testing positive for the banned substance. It was generally agreed that this was the result of a medication prescribing error and not intentional doping, however, it still resulted in the forfeiture of a gold medal.

### ANTI-DOPING ROLES FOR PHARMACISTS

It seems obvious that pharmacists and the pharmacy profession should be utilized to educate and assist athletes, coaches, athletic trainers, sports medicine and team physicians, and the public in general. In fact, the International Pharmaceutical Federation developed and approved a "Statement of Professional Standards" on "The Role of the Pharmacist in the Fight against Doping in Sport," in 2005.<sup>2)</sup> In this statement, the Federation provides recommendations for governments, pharmaceutical associations, phar-

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This Review is based on the content of Symposia 36 (S36) of the 131st Annual Meeting of the Pharmaceutical Society of Japan.

macists, and pharmaceutical manufactures. In particular, it encourages pharmaceutical associations to participate with anti-doping agencies and to provide basic and continuing education to pharmacists about doping and the health consequences. Further, the Federation recommends that pharmacists be familiar with the World Anti-Doping Agency's Code, and to provide information to assist athletes and others to understand which medicines are listed in that code.

The general objectives of doping control are to ensure fair and equitable competition, and to protect the health and safety of all the athletes. Thus, the roles for pharmacists should parallel this objective and include educating, advising, dispensing and monitoring medications and supplements, and working with anti-doping agencies. Further, pharmacists can help prevent athletes from accidentally using a banned substance. Educational needs should be based on these new roles, and opportunities should be created to meet these needs.

To advise and counsel athletes that have legitimate medication needs, pharmacists must be intimately familiar with the banned substance lists for various sports and sports organizations. Coaches, athletic trainers and physicians also need help in understanding the banned substance lists. This can help prevent athletes from accidentally taking a banned substance. This is particularly true for dietary supplements, where the listed ingredients may hide banned substances by using herbal and botanical names. However, even if the pharmacist is not an expert, the pharmacist can advise athletes to contact their sports-governing organization and inquire about the banned status of a particular medication. Such organizations have a mechanism for athletes to obtain this information and the pharmacist can assist the athlete with this. Often, the major sports organizations have interactive websites and telephone services where athletes can check their medications and supplements to determine if they are banned or permitted.<sup>3)</sup> Pharmacists can assist with this, particularly in helping with drug names and other ingredients.

Pharmacists can educate athletes and the public about the dangers of doping and the consequences these substances can cause. This can be done at all levels of competition, including school children. Pharmacists can also serve as doping control officers and work with the various sports-governing agencies, such as the Japan Anti-Doping Agency. Medication

and supplement histories are often obtained, and the pharmacist is very knowledgeable about these. Sports organizations may also consult with pharmacists regarding their policy of which medications to ban or permit, since pharmacists have considerable knowledge of pharmacology.

### EDUCATIONAL OPPORTUNITIES

Sports pharmacy and anti-doping roles for pharmacists are relatively new and emerging fields. Thus, there are few established educational programs in existence. Pharmacists that wish to practice in these roles will need to be pioneers and will need to seek opportunities to learn and to be involved. For the future, we need to create curricula and practice models for pharmacy students. This includes instruction in the classroom, experiential training, and post-graduate training. Pharmacists that are involved in these activities can serve as instructors, role models and mentors.

A fundamental component of a curriculum to prepare pharmacists to practice in anti-doping roles should include information on substances that are used for performance enhancement. This would contain information on the pharmacology and the proposed mechanism of action of these substances, and how they affect athletic performance. Pharmacists should learn skills on how to evaluate data to support or dispute claims that are made of performance-enhancing substances. This is particularly important for dietary supplements, where advertisements are notorious for making bold and unsubstantiated claims and for which there is little scientific research.

Communication skills are also very important. Pharmacists will be consulting with physicians and scientists, as well as athletes of all ages who may have little technical knowledge. Advising and educating athletes and the public will require the ability to communicate at their level of understanding to provide unbiased and factual information. To build and maintain credibility, both the positive and negative effects of performance-enhancing substances should be discussed.

Pharmacists should learn about the general principles of doping control and the rules and regulations regarding banned substances. For example, some drugs may be banned only during competition, while others are banned at all times. For some medications, therapeutic use exemptions may be available, but re-

quire documentation and following a specific process. Thus, familiarity with the policies and banned substance lists for the major sports organizations is required. It is also beneficial for pharmacists to understand the process of sample collection (blood and urine) for doping control. The exact process may vary for the different sports organizations, however, the general principles are similar. Having expertise in this area would allow pharmacists to be doping control officers where they perform the specimen collections, which may include obtaining histories of the recent use of medications and dietary supplements.<sup>4)</sup> Although a thorough understanding of assay techniques and drug detection is not required, knowledge of general principles of these technologies is helpful for pharmacists to understand the full picture of doping control.

Many of the above topics can be taught in the classroom with lectures and perhaps some laboratory exposure. However, experiential practice provides an opportunity for the pharmacy student to actually use the knowledge and skills learned. In the USA, there are few opportunities for advanced pharmacy practice experiences (APPEs) in sports pharmacy and doping control. In 2006, an APPE in sports pharmacy was created for senior pharmacy students at the University of California, San Francisco.<sup>5)</sup> This six-week clerkship has been offered once a year since then, with 6–9 students per session. The preceptor for this APPE has participated in the drug testing and

education program for the National Collegiate Athletic Association (NCAA) since 1986; and has served as a doping control officer at the Olympic Games in Atlanta (1996), Sydney (2000) and Beijing (2008).

The objectives of the APPE are listed in Table 1. There are a variety of activities that the students engage in to achieve these objectives. They are given lectures about performance-enhancing substances, and are then assigned to groups of 2–3 students for them to prepare their own presentations. In the process, the students learn about these substances more in depth. Then, throughout the six weeks, the students give presentations at local colleges to athletes, athletic trainer students, athletic trainers, and in kinesiology classes as guest lecturers. All the students in the APPE attend each of the presentations with the preceptor.

Students also gain drug information experience by researching the answers to questions by NCAA athletes and personnel who inquire about the banned status of substances. This is conducted with the National Center for Drug Free Sport (NCD FS), which manages the drug testing and education program for the NCAA.<sup>6)</sup> In addition, each student is assigned to research and write a monograph on a specific drug or dietary supplement, which is provided to the NCD FS to post on their website. Each student shares and reads their monograph to the preceptor and the other students for feedback, critique and suggestions before

Table 1. Learning Objectives for an Advanced Pharmacy Practice Experience in Sports Pharmacy

1. Demonstrate three ways that pharmacists can participate in doping control or drug education programs in sports.
2. Explain and defend the two primary purposes of doping control in sports to mixed audiences.
3. List and describe five classes of drugs that are commonly used by athletes as ergogenic aids.
4. Counsel athletes on why banned drug lists can be problematic for them if they compete for more than one sports—governing organization.
5. Explain three reasons to athletes why dietary supplements are a particular concern for them since they are subject to drug testing.
6. Obtain relevant medication histories from athletes during a drug-testing event.
7. Conduct sample collections, describing in detail the proper procedures and techniques for drug testing.
8. Select appropriate assay procedures commonly employed in doping control, and compare and contrast the advantages and disadvantages of each.
9. Given a list of medications, determine if each is banned, restricted or permitted by a specific sports-governing agency (*e.g.*, NCAA, USADA, NFL, *etc.*) and advise athletes accordingly.
10. Present a topic relevant to sports pharmacy to instructor and fellow students and/or other audiences (*e.g.*, high school students, college athletes, athletic drug trainers).
11. Prepare a monograph on a drug or dietary supplement on its use or abuse in sports, suitable for publication.

they finalize the monograph.

The APPE students are also taught the basics of drug assays and techniques to detect doping. Students then visit and tour a laboratory accredited by the World Anti-Doping Agency and the Anti-Doping Research Institute, Inc.<sup>7)</sup> Students are also taught how to perform urine specimen collections, and they participate with their preceptor in several real collections for the NCAA's drug testing program at local universities and championships. The process and protocol are very technical to protect the integrity of the specimen, and requires the students to test the specimens for adequate volume, pH and specific gravity before accepting the specimen for shipment to the laboratory. Students also blind the samples from laboratory personnel with code numbers, as per policy.

### CONCLUSION

Pharmacists are needed to assist athletes in their medication needs, and to join in the cause against doping. There are many roles that they can serve in this regard, which include counseling athletes, advising physicians and athletic personnel, educating the public on the effects of performance-enhancing substances, and participating in the anti-doping programs of sports organizations. Currently, there are

few established educational opportunities for pharmacists and pharmacy students. Examples of topics that should be included in such educational programs are presented, including a unique APPE in sports pharmacy.

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