

# Introduction

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Our primary objective in writing this book was to provide a comprehensive compilation of information in a single location regarding the use of performance enhancing substances (PES) by U.S. collegiate, amateur, and professional athletes. Furthermore, the authors decided that the text would primarily target (1) individuals who provide health care for the subject athletes and (2) the athletes and/or their representatives. No such text germane to the topic and targeted in this manner currently exists. The authors' second major objective was to provide a source of information that would make it less likely that prescribers and/or pharmacists would initiate actions that may be detrimental to an athlete's eligibility to compete.

For example, the following scenario is a description of an actual situation encountered by a collegiate athlete who was training for the 2016 Olympics. The subject was a professional and prospective Olympic track and field athlete who was training for the 2016 Olympics. Therefore, the athlete came under the drug testing procedures and regulations of both the United States Anti-Doping Agency (USADA) and the World Anti-Doping Agency (WADA). The athlete had been diagnosed since early childhood with asthma. The athlete was interviewed by the authors of this text for the purpose of providing this example for the readers. The athlete had moved to a new location and was experiencing wheezing and other allergic symptoms and had selected a board-certified pulmonologist to assess his/her respiratory condition. During the visit with the physician, the athlete indicated that he/she was in training for the Olympics. After visiting with the athlete, the physician prescribed Breo Ellipta, a combination of fluticasone furoate (anti-inflammatory steroid) and vilanterol (beta-2 adrenergic agonist) intended for inhalational use. The athlete began to use the product. Given that the athlete was an Olympic hopeful, he/she came under the out-of-competition USADA drug testing program. As a part of that protocol, the athlete must indicate all medications taken and thus listed Breo Ellipta on the doping control official record (DCOR). The athlete had not previously submitted a therapeutic use exemption (TUE) request. This drug was included on both the WADA and USADA banned substance lists. Even though the athlete never submitted a positive urine test for the agent, simply indicating that the medication was being administered resulted in an immediate suspension, which was retroactive to the date of the DCOR listing. This ruling meant that the athlete had to forfeit any prize money (\$100,000) or records resulting from participation in any events after that date. In addition, this suspension would have negated participation in the U.S. Olympic trials. An appeal (supported by proof of Breo Ellipta prescription, pulmonary function exam data, interview with a new pulmonologist, and a TUE for albuterol with an accompanying statement indicating this agent was best for treating the type of asthma exhibited by the athlete) was filed. The appeal was approved and the suspension was shortened from 1 year to 3 months, which luckily enabled participation in the trials.

In retrospect, what information should the athlete have initially provided the practitioner in order to have prevented the suspension? What should the athlete have done after receiving the prescription? What information should the practitioner have requested from the athlete prior to providing the prescription? Like many others, this situation involving an athlete and performance enhancing drug (PED) use could easily have been avoided if the appropriate information had been easily accessible and shared in a timely manner. Thus, this is a main objective for providing this text.

Given our unique objectives for this text, a challenge faced by the authors was formulating an appropriate title for the book. Although the text is beneficial to both sports medicine physicians and athletic trainers, the authors believed that including *sports medicine* in the title would be misleading because we do not address the prevention and/or treatment of sports-related injuries. We chose to use the term *pharmacy* instead of *pharmacology* because we discuss not only the pharmacology of drugs and supplements but also therapeutics, pharmacokinetics, drug testing, and laws related to drugs and supplements. Moreover, the text addresses issues

related to the prescribing of drugs for therapeutic purposes but that might hinder performance in some forms of athletic competition. Our decision to use performance enhancing drugs rather than *drugs* or *doping* in the title was to emphasize our desire for the text to focus on drugs and supplements used to enhance performance, rather than on the use of banned drugs by athletes for recreational purposes, even though some banned substances, such as amphetamines or amphetaminelike substances, can be used for both purposes. Perhaps the inclusion on banned lists of drugs such as marijuana, heroin, and others, which would hinder athletic performance, was out of concern for the safety of athletes; however, their presence on the listing may have also resulted from a more selfish perspective of team owners or representatives of the institutions sponsoring those teams. Similarly, we did not use the term *banned drugs* for multiple reasons. First, the list of banned drugs varies greatly across different sports governing bodies and associations. Second, *banned drugs* also implies both PEDs and drugs of abuse. Last, as per the selected title, we conceptually incorporated the use of performance enhancing supplements (PES) under the umbrella of *PEDs*. Unlike drugs, PES tend to be endogenous compounds that are normally present in the body; however, for athletic enhancement they are administered in supraphysiological doses. This makes their inclusion analogous to the inclusion of other endogenous compounds considered as drugs such as growth hormone, erythropoietin, and testosterone as PEDs.

The authors bring a unique blend of expertise to this book. They include a behavioral pharmacologist; a clinical pharmacist; a collegiate sports medicine administrator, athletic trainer, and physical therapist; and an individual with expertise in laws related to the marketing and distribution of supplements and pharmaceuticals, the intrastate and interstate practice of pharmacy, and the importation of pharmaceuticals and supplements. The authors also share a passion for athletics.

As a group, however, the authors do not have expertise in the moral, ethical, or historical perspectives concerning the use of substances to enhance physical performance. Therefore, these topics will not be addressed in any major way in the text. Certainly, the use of substances for this purpose dates back several centuries (<https://sportsanddrugs.procon.org/view.timeline.php?timelineID=000017>), but only since the 1960s has it received significant media and organizational attention on moral and ethical grounds.

It would be difficult to argue effectively that the United States is not a competitive society. Shortly after we are born, we learn to compete with our siblings for our parent's hugs, kisses, and attention. Subsequently, we compete with our classmates in preschool for the teacher's attention and verbal reinforcement. This competition continues with piano recitals, poster contests, youth sports, academic competitions, invitations to social memberships, and competing for the love of our desired spouse. Later, we find ourselves competing in boardrooms and courtrooms; for funding of grants, contracts, and business proposals; on golf courses and tennis courts; in bridge clubs and on political campaigns; and for various resources throughout life.

One could argue whether this emphasis on competition is healthy. After all, if no one gets harmed and it is done in a fair manner, such competition is assumed to be morally appropriate. Often, we may not be directly involved in the competition, but we are supportive with varying degrees of enthusiasm for those who participate. Individuals become emotionally involved regarding the awarding of recognition for movies, songs, and plays. We become deeply involved on an emotional level with certain political candidates and with singers on music competition shows on television. Fans cheer and enthusiastically support sports teams representing their alma mater, their city, their state, and their country. More recently, we find ourselves procrastinating at work due to our support and management of sports fantasy teams. Occasionally, and perhaps most notably at the collegiate level, fan support may exceed accepted standards. Generally, as long as a competition is perceived to be fair, fans are satisfied (not necessarily happy) with the results. However, if we believe that the voting is rigged or the officiating is unfair (e.g., if the referee is the opposing coach's brother, if our classmate had access to an exam prior to a test), then that is a different matter. It is at this juncture of sports and society where both the competitor and spectator have a concern with the use of PEDs. Some argue that cheating is acceptable because "everyone does it" so we should do likewise in order to be fair to ourselves. Others challenge that stance on moral and ethical grounds. These individuals argue that for athletic competition to be fair, an athlete's performance should only be predicated on his/her commitment to acceptable nutritional and training

regimens and not on factors that are independent of the athlete's work ethic and knowledge of the sport. The authors have chosen to refrain from involvement in this debate. However, the inherent assumption implicit in this discussion is that the use of PEDs does, in fact, improve performance. This issue is further explored in detail within the text. For those interested in becoming more knowledgeable regarding the pros and cons of permitting the use of PEDs in athletic competition, you are encouraged to visit the following Web site: <https://sportsanddrugs.procon.org/view.resource.php?resourceID=002352>.

Throughout the text, we incorporate examples of actual situations to demonstrate points of view. Likewise, we frequently pose questions, instead of providing opinions, in order to stimulate your consideration of these actual examples.

The authors are well aware that much of the information included herein is updated annually, especially the listings of prohibited substances and penalties. We have chosen to include the 2019 information rather than simply direct you to myriad Web sites. The site links are included to facilitate updating.

The text is divided into seven chapters. Chapter 1 includes a detailed discussion of the drug policies of the non-sport-specific regulatory bodies that govern amateur athletic competition at the secondary school, junior as well as senior college, and postcollegiate levels. We will compare and contrast the drug testing policies, penalties, and listings of banned substances of WADA, USADA, the International Olympic Committee (IOC), and the National Collegiate Athletics Association (NCAA). All aspects of these organizations are addressed as they relate specifically to policies concerning the use of traditional PEDs and to PES.

Chapter 2 consists of an extensive listing by sport of the PED policies (testing parameters, punishments, prohibited substances, policy approval process) governing professional competitors (both human and animal) participating in that sport. Chapter 3 discusses in detail the most inclusive listing of prohibited substances, the WADA list, and uses that listing as a guide to discuss both the pharmacology of each category of PEDs and the evidence of whether each is effective in enhancing competition. Chapter 4 includes information regarding comparative regulatory issues affecting product (both drug and supplement) marketing, importation of drugs and supplements, traveling team medical and pharmacy state practice regulations, and state and federal policies regarding possession and sale of controlled substances. This information is included because these substances may not be PEDs; however, they are usually included in the listing of banned drugs in sports.

Chapter 5 provides detailed information regarding the most used supplements for physical performance enhancement, the biochemical reasoning that supports their use, their proven effectiveness, adulteration/contamination concerns, and NCAA and USADA reference resources available to athletes.

Chapter 6 details drug testing procedures including manipulations to invalidate results and countermeasures, cost and security measures, and the use of biologic passports. Finally, chapter 7 discusses the therapeutic use of PEDs to treat appropriate indications in athletes, treatment algorithms for those conditions, and therapeutic exemption policies. Further, the authors discuss the appropriateness of using therapeutically or prophylactically nonbanned analgesic and anti-inflammatory agents prior to and/or during a competition to improve performance by preventing/reducing the symptoms of athletic injury. This practice is open to debate regarding the athlete's safety, but it would permit improved performance.

The authors sincerely hope that this text meets your expectations and enables you to provide more effective and appropriate medical support of the athletes under your care. For the athlete or athletic agent/advisor who reads this book, we hope to convince you of the importance of sharing appropriate information with any health care provider with whom you interact on a professional basis. Such appropriate information includes (1) that you are an athlete (high school, Olympic, collegiate, internationally competitive amateur, or professional) in a particular sport; (2) all substances you use, including prescription medication, over-the-counter medication, and supplements; (3) any medical conditions for which you are being treated; and (4) whether you have an approved therapeutic exemption for that use. By sharing such important information, the authors are hopeful that your chances of being temporarily suspended or disqualified from further participation in your sport due to inappropriate drug or supplement use will be eliminated.