

## **Doping in Sports: Catching and Preventing It An Expert Interview With Gary I. Wadler, MD**

Carol Peckham; Gary I. Wadler, MD

*As part of our coverage of the 2012 Olympics, Medscape interviewed Gary I. Wadler, MD. Dr. Wadler is an internist with special expertise in the field of drug use in sports. He is Clinical Associate Professor of Medicine at Hofstra North Shore-LIJ School of Medicine. He is also the lead author of the internationally acclaimed textbook *Drugs and the Athlete*, and an editor of the textbook *The Healthy Dancer*.*

*Dr. Wadler served as the Chairman of the World Anti-Doping Agency's (WADA) Prohibited List and Methods Sub-Committee and as an ex-officio member of WADA's Health, Medicine, and Research Committee. In addition, he was a Medical Advisor to the White House Office of National Drug Control Policy and has been a Trustee of the Board of the American College of Sports Medicine and of the Women's Sports Foundation. Among his other sports medicine activities, Dr. Wadler has served as Tournament Physician of the US Open Tennis Championships and Chairman of Nassau County Sports Commission.*

**Medscape: Would you give a brief description of WADA and how it determines which drugs are banned?**

**Dr. Wadler:** The International Olympic Committee Medical Commission first published a list of banned drugs for the 1968 Winter Olympic Games. WADA assumed oversight of it in 2004 after implementation of the World Anti-Doping Code. This List of Prohibited Substances and Methods (referred to as "The List") is now the international standard for drugs prohibited in national competition and is updated annually.

Each year, the WADA Prohibited List Committee -- a diverse group of experts, including physicians, pharmacologists, pharmacists, laboratory experts, and researchers -- begin their deliberations by reviewing the most recent list of proposed banned drugs, which became effective on the first day of the current year. Before any drug is considered for The List, it has to meet 2 out of 3 criteria: The drug must enhance performance, pose a threat to an athlete's health, and violate the spirit of the sport. Even meeting all 3 criteria doesn't necessarily mean that the drug is added to The List.

There are 4 days of intense discussions, and a lot of heavy-duty science that goes into this process. It's not like the old days. The WADA Committee then creates a draft of all the drugs it recommends for The List and sends it to more than 1700 stakeholders, which include public authorities, national and regional antidoping agencies, international para-Olympic committees, such organizations as the Olympic Games, and antidoping laboratories. The stakeholders send back there

assessments, and the WADA Scientific Committees and their experts consider their feedback in their own analysis.

The List Committee then integrates this information into a revised list, which is then presented to WADA's Health Medical Research Committee. They review it and, in turn, give their recommendations to the executive committee of WADA -- the ultimate policy-making body.

**Medscape: Could you describe the Olympic standard testing procedures for performance-enhancing drugs?**

**Dr. Wadler:** The Olympic testing procedures currently are predicated on the policies incorporated into the World Anti-Doping Code. The procedures for developing these standards are complicated, but you can find all the information on these plus banned drugs on the WADA Website.

**Medscape: How easy is it to cheat on these tests for the Olympics?**

**Dr. Wadler:** It's not easy to cheat at all. We're very good at our science. A cheating athlete can test positive on a blood or urine test, depending on the particular substance.

We also have what we call nonanalytical positives. An athlete can be sanctioned if he or she is caught in possession of a prohibited substance or manipulating these substances in any way, independent of any tests. For example, this could include criminal activities, such as trafficking in prohibited substances. We've had individuals without a positive drug test who were caught violating the policies of the World Anti-Doping Code and wind up getting sanctioned.

**Medscape: Everyone is aware of the problems with anabolic steroids, but could you just discuss them a bit?**

**Dr. Wadler:** It's important to stress that the substances that are abused in athletics are often therapeutically used by physicians like me to care for patients. These drugs were not developed to help athletes cheat.

Anabolic steroids are the synthetic derivatives of the hormone testosterone. They are available in a variety of forms, and now in new delivery systems. In the old days, anabolic steroids had to be injected frequently -- like insulin in diabetes -- in patients who needed them because of deficiencies. To make life easier, there are now delivery systems using patches and creams, which unfortunately have been abused by some athletes. So it's not only the substance itself, it's the delivery system.

**Medscape: I would think blood doping is very difficult to detect.**

**Dr. Wadler:** Erythropoietin (EPO) abuse involves using very low doses, called "microdosing." Athletes get a boost in their EPO levels, which increases oxygen, but levels stay below detection.

The use of autologous blood transfusions is particularly challenging. The athlete has some of his own blood removed weeks before an event and then refrigerates it. The body senses a loss of blood, but of course it doesn't know why -- it could have been a hemorrhage, could have been surgery, any variety of reasons. The kidney then produces EPO in response, and the bone marrow begins to make red blood cells. Right before the competitive event, the athlete who cheats reinfuses the refrigerated blood. Now there are 2 ways that blood levels have increased naturally: by increased activity in the bone marrow, plus the blood put back into their bodies.

For years, athletes used other people's blood; it wasn't autologous. But now, because it's his or her own blood, how do you detect that? We have better methods now, but this is an example of a challenge that we deal with.

**Medscape: I noticed that beta-2 agonists, beta-blockers, and diuretics are on the list of banned agents. Of course, those are used for a lot of medical conditions; EPO is too. How do you differentiate between medical use and performance enhancement?**

**Dr. Wadler:** Let me talk about therapeutic use exemptions. This is a very important area, because we want to make sure that we do not penalize people who have legitimate medical issues and need specific drugs that would eliminate them from competing. People who have a variety of medical conditions typically might take an otherwise banned substance, but are allowed to do so provided that this in compliance with the Therapeutic Use Exemption principles and protocols.

I'll give you an extreme example. There was a sailor years ago who had his testicles removed because of cancer and had very low testosterone levels. He wanted to participate in an elite sport. He couldn't just take testosterone. He had to get a Therapeutic Use Exemption.

The sailor would have to make his case before an independent panel and say, "I have a legitimate medical need" -- in this case, "I have no testicles, therefore I have very low testosterone level, and I'd like to compete." The panel would then say, "Yes, looking at the medical record, you have a legitimate deficiency. Therefore, we would allow you to take testosterone or anabolic steroids, but we will monitor the dose and the frequency, to make sure you're taking it as prescribed for medical purposes but not to enhance your performance. You're not taking megadoses, you're taking therapeutic doses."

Here, you have a situation where we are not in any way interfering with this athlete's ability to perform, but we're saying, "Here are the conditions." They need to present documents before an independent panel that proves they have a medical condition, and they have to show the acceptable doses, and then they are monitored.

**Medscape: What about human growth hormone (hGH)? I know that's one of the banned drugs, but isn't there some question about whether it actually enhances performance?**

**Dr. Wadler:** I've not been overwhelmingly convinced that hGH by itself is particularly performance-enhancing. It does have anabolic properties. What we suspect is going on is the combined use of anabolic steroids and growth hormone. Some people believe that if you take them together, you can take lower doses of anabolic steroids, which makes them harder to detect, and yet the athlete has the same level of enhancement as if he or she were taking higher doses of steroids.

This is an example of one of the issues in US professional sports, where some did not want to test for hGH. However, even if hGH by itself is not necessarily performance-enhancing, if we're not testing for it, we may miss people taking the lower doses of anabolic steroids because they are taking HGH.

**Medscape: Are there any particular drugs that are abused more often in specific sports?**

**Dr. Wadler:** Let me just go through the list with you. We have many anabolic agents. There are also peptide hormones; growth factors; and related substances, which include EPO, human chorionic gonadotropin, insulin, cortisone, and hGH. Then there are the beta-2 agonists, which we talked about briefly. Diuretics and other masking agents are also prohibited.

There are also hormones, such as estrogen, and metabolic modulators, such as aromatase inhibitors. Let me explain these. If a male athlete takes anabolic steroids, he'll become feminized, because anabolic steroids convert into the female hormone estrogen. Therefore, these male athletes wind up with breasts, a high-pitched voice, testicular atrophy, and other feminizing attributes. One way to get around that is to take aromatase inhibitors and other estrogen receptor modulators, which help prevent feminization.

**Medscape: Do women abuse drugs in a similar way? I would assume they would have a different effect.**

**Dr. Wadler:** They wind up getting masculinized. They'll get deep voices, acne, and a male hair pattern, and they'll have menstrual irregularities. So they experience different side effects related to sex hormones.

There are also prohibited procedures, which include enhancement of oxygen transfer -- including blood doping -- and intravenous infusion and or injections of saline with the intent to overhydrate and mask the use of drugs.

**Medscape: What about gene doping? Is that anywhere near a problem yet?**

**Dr. Wadler:** Gene doping, as opposed to doping with drugs, is probably going to be upon us in not too many years. We're working on controlling it and are making significant progress in that field.

**Medscape: Are the substances you mentioned banned at all times, or just during competition?**

Substances banned at all times include anabolic agents, peptic hormones, growth factors and related substances, beta-2 agonists, hormones as metabolic modulators, and diuretics and other masking agents. There are also methods that are banned at all times, which include those that enhance oxygen transfer and chemical and physical manipulation and gene doping. Some substances and methods are prohibited only in competition; these include stimulants, narcotics, cannabinoids, and glucocorticosteroids.

Stimulants are very important and fall under 2 categories: nonspecified and specified. Nonspecified are the more powerful stimulants; if an athlete tests positive or is caught using one of these, then the sanctions against sports participation are equivalent to those imposed for anabolic steroid use, which can be up to 4 years. In contrast, sanctions for specified stimulants, the less potent agents, are less severe, although sanctions against playing can still last for up to 2 years.

So you have to know which drugs are banned in competition, which ones are banned out of competition, and so on.

**Medscape: How can athletes and their coaches get all this information?**

**Dr. Wadler:** Details are spelled out on the WADA Website or the Websites of the athletes' respective sports federations. Governing bodies of particular sports -- football or track and field, for example -- have highly organized ways of disseminating this information.

**Medscape: Are the rules consistent across these governing bodies?**

**Dr. Wadler:** The WADA governance consists of 50% of sporting bodies and 50% of the public authorities worldwide.

**Medscape: I've been reading that some individuals want to legalize all performance-enhancing drugs. I'm assuming you're not in favor in this.**

**Dr. Wadler:** I'm 150% opposed. It's a matter of cheating. It's also a matter of health.

You're abusing drugs. These drugs are developed by researchers, pharmacologists, and pharmaceutical companies to help patients deal with their diseases. They're not developed to help people cheat. Peter Mere Latham in the early 1800s wrote, "Poisons and medicines are oftentimes the same substance given with different intents."

And here's another point, and it may be unique to athletic doping. When you really think about it, with anabolic steroid abuse both the seller and the user make money. The seller makes money when he sells the product, and the user can wind up getting a bigger sports contract because he performed better. It raises the

complexity of controlling something where money is dangling at both ends: the provider and the user.

What I tried to say today is this is not a simple process. It is complex, involving multiple levels of expertise, and many people don't understand the broader context.

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