

## Cuba in the World's Tough Battle for Drug-Free Sport

By Mario Granda, MD, MSpMed

In 1982, Chicago physician Bob Goldman began conducting surveys every two years of sprinters, swimmers, powerlifters and other athletes—most of them US Olympians or aspiring Olympians. As reported in a *Sports Illustrated* cover story, the 1995 poll of 198 such athletes produced this chilling result:

“Scenario I. You are offered a banned performance-enhancing substance, with two guarantees: 1) You will not be caught; 2) You will win. Would you take the substance? One hundred and ninety-five athletes said yes: three said no.

“Scenario II. You are offered a banned performance-enhancing substance that comes with two guarantees: 1) You will not be caught. 2) You will win every competition you enter for the next five years, and then you will die from the side effects of the substance. Would you take it? More than half the athletes said yes.”[1]

These athletes' willingness to violate their bodies and the spirit of sports—their willingness to die to win—is the human expression of an ever-more powerful drive to promote doping worldwide. In recent scandal-marked history, doping has been incited or tolerated by unscrupulous pharmaceutical manufacturers; drug “gurus” and traffickers; promoters and businessmen with millions riding on their teams and athletes; glory-bound sports authorities, managers, coaches and athletes; and corrupt physicians and trainers.

Since the 1972 Munich Summer Olympics—where official tests were first performed at a multi-sport international event—suppliers have pushed to make performance-enhancing drugs more powerful, profitable and invisible, while regulators strive to enact stricter international codes and sanctions, formulate more comprehensive lists of prohibited substances and methods, and develop more precise testing to detect offenders.[2-4] Efforts by the World Anti-Doping Agency (WADA), set up in 1999 by the International Olympic Committee (IOC), have been reinforced by two international covenants: the World Anti-Doping Code passed in 2004 (revisions in effect this year), which was designed to harmonize rules and sanctions internationally and has been signed by some 600 sports organizations, the IOC and the International Special Olympics Committee; and UNESCO's International Convention against Doping in Sport, now ratified by 109 governments and in effect since 2007.[5]

The current international anti-doping infrastructure is supported by 34 WADA-certified anti-doping laboratories throughout the world, as well as national anti-doping programs and agencies in most countries.

**Table 1: WADA-Accredited Anti-Doping Laboratories**

Region	Laboratories	Countries	% of Total Labs
Americas	6	5	18
Europe	18	16	53
Asia	7	7	20
Africa	2	2	6
Australia	1	1	3
TOTAL	34	31	100

Source: World Anti-Doping Agency, 2009

### Cuba's Anti-Doping Laboratory

Located in Havana, the Cuban Sports Medicine Institute's Anti-Doping Laboratory was opened in 2001 by President Fidel Castro, the product of a US\$2.7-million government investment. As the facility was being built, additional training for laboratory technicians and technology transfer were provided in large part by Barcelona's anti-doping laboratory, which had played an important role in testing at the 1991 Pan American Games in Cuba. Cuban laboratory personnel were also trained in Madrid, Lisbon and Cologne. On September 23, 2003, the lab received dual certification from WADA and the IOC, after passing four examinations in 2002 and 2003, and meeting International Laboratory Standards (ISO 17025). Havana's facility thus became the fifth such laboratory (now six) in the Americas, garnering kudos in 2002 from IOC President Jacques Rogge as “one of the most modern on the continent”.[6,7] Among the analytical methods used at the lab are gas chromatography (GC), gas chromatography–mass spectrometry (CG–MS), CG–ion trap MS, isotope ratio mass spectrometry (IRMS), immunological assays, and hematological and biochemical parameters.



International Olympic Committee President Jacques Rogge (r) at the Havana Anti-Doping Laboratory in 2002.

As with all anti-doping laboratories, Cuba's must receive annual re-accreditation, based on four comparative WADA-monitored proficiency examinations each year.[8] The challenge is enhanced by the ever-longer list of prohibited substances, metabolites and methods: the list has doubled since 2003, now up to about 200. This means performing a greater array of tests (many on the same athlete), incorporating blood as well as urine testing, and testing more often between competitions. In the early years, most tests were carried out in competition with gas chromatography techniques; later, out-of-competition testing became more common and other analytical methods were incorporated (such as liquid-chromatography—mass spectrometry in advanced configurations), and finally, analytical approaches involving protein chemistry).[3,9]

Such constant upgrading requires additional training, equipment and investment for each laboratory. Like many others, Cuba's lab is

**Table 2: World Anti-Doping Code's 2009 List of Prohibited Substances and Methods****Substances and methods prohibited at all times (in and out of competition)**

## Prohibited Substances

- S1. Anabolic agents
  - 1. Anabolic androgenic steroids (AAS)
    - a. Exogenous AAS (e.g. methyltestosterone, nandrolone, stanozolol)
    - b. Endogenous AAS when administered exogenously (e.g. testosterone, androstenedione, dehydroepiandrosterone, dihydrotestosterone)
  - 2. Other anabolic agents (e.g. clenbuterol, selective androgen receptor modulators)
- S2. Hormones and related substances (e.g. erythropoietin/EPO, human growth hormone/hGH, insulin-like growth factors/IGFs, insulins)
- S3. Beta-2-agonists (e.g. salbutamol, salmeterol, terbutaline, and formoterol taken without Therapeutic Use Exception/TUE)
- S4. Hormone antagonists and modulators (e.g. anti-estrogens, myostatin inhibitors)
- S5. Diuretics and other masking agents (e.g. diuretics, probenecid, plasma expanders)

## Prohibited methods

- M1. Enhancement of oxygen transfer (e.g. blood transfusions, use of blood derivatives and analogs)
- M2. Chemical and physical manipulation (e.g. tampering with samples, intravenous infusions)
- M3. Gene doping

**Substances prohibited in competition**

- S6. Stimulants (e.g. amphetamines, cocaine, methamphetamines)
- S7. Narcotics (e.g. morphine, heroin)
- S8. Cannabinoids (e.g. hashish, marijuana)
- S9. Glucocorticosteroids

**Substances prohibited in particular sports**

- P1. Alcohol
- P2. Beta-blockers

Source: *The 2009 Prohibited List International Standard. The World Anti-Doping Agency, 20 Sep 2008.*  
[www.wada-ama.org/rtecontent/document/2009\\_Prohibited\\_List\\_ENG\\_Final\\_20\\_Sept\\_08.pdf](http://www.wada-ama.org/rtecontent/document/2009_Prohibited_List_ENG_Final_20_Sept_08.pdf)

government financed. It charges laboratory fees to WADA or event organizers (regional or national institutions, and sports federations) requesting the tests. The Cuban laboratory offers services primarily to countries in Latin America and the Caribbean in support of their national anti-doping programs. Since 2001, the lab has tested some 14,000 samples (in pre-accreditation years, validated by the Barcelona lab). Of the lab's over 2,000 annual samples, approximately 70% are taken from athletes out of competition.

The Havana laboratory staff includes physicians, chemists, pharmacists, technicians (in analytical chemistry, clinical and biochemical laboratory), biomedical engineers and information technologies specialists.

WADA data indicate that in 2007 the Cuban Anti-Doping Laboratory analyzed 2,448 samples, reporting 71 (2.90%) Adverse Analytical Findings (AAF). These included 65 anabolic agents, 5 diuretics or other masking agents, and one stimulant. In Olympic sports, 65 AAFs were reported in 2,332 samples; in non-Olympic sports, 6 AAFs in 116 samples. The international AAF average for the same year was 1.97%, up 0.5% from 2006 results. Of the AAFs reported worldwide in 2007, 47.9% were anabolic agents, 16.4% stimulants, 11.9% cannabinoids, 8.2% Beta-2 agonists, 7.4% diuretics and other masking agents, and 5.9% glucocorticosteroids, with all others under 1%.<sup>[9]</sup>

**The Cuban National Anti-Doping Program**

Guided by the requisites of the International Convention against Doping in Sport and the World Anti-Doping Code, Cuba's National Anti-Doping Program is directed by the Cuban Olympic Committee. The Program carries out activities in areas such as information, education, control and sanctions, as well as science and research.

**Updated information and systematic education** are the responsibility of the Cuban National Anti-Doping Agency, which includes representatives from various ministries (education, higher education, public health, sports, interior, and justice) and agencies (customs and others). They work together to address education in specific sectors; for example, the ministries of education and higher education work with the National Sports and Recreation Institute (INDER) to develop school-based programs at all levels. The Ministry of Public Health is charged with educating health professionals throughout the country, while the Sports Medicine Institute and INDER design and implement educational programs for sports physicians, psychologists, coaches, athletes, and sports authorities.

**Doping control** is carried out by the National Anti-Doping Team in coordination with the Cuban Olympic Committee's Medical Commission. The team's 180 members include doping control officers and chaperones who are responsible for athlete notification and chaperoning through sample collection, ensuring sample chain of custody, and anonymous sample submission to the lab. The Medical Commission oversees out-of-competition testing of Cuban athletes.

To guard against doping during training, about 70% of tests on Cuban athletes are performed out of competition. The principle is that every athlete is eligible at all times to be tested, and stricter World Anti-Doping Code rules on athlete whereabouts and availability are being applied. A given athlete can be tested as many as seven times a year, depending upon his or her ranking. Internationally-ranked Cuban athletes are tested most frequently, since they are likely to be included in registered testing pools of international federations, which decide where testing should be

done, and they are also more apt to be tested by international event organizers.

In competition testing in Cuba, athletes who place first, second, or third are automatically tested. Among those placing fourth through eighth, one is selected at random for testing. Additional random selections are made until at least 25% of athletes in a given competition are tested. Tests are also applied at public-participation events such as marathons. Since the Anti-Doping Laboratory opened in 2001, a total of ten adverse analytical results (AAFs) have been registered in Cuban athletes, primarily anabolic agents and diuretics, with one case each of stimulants and beta-blockers.

In doping cases, **sanctions** are imposed by the National Anti-Doping Agency's Disciplinary Commission, a select group composed of all-star athletes (inactive), physicians, and sports authorities who do not belong to any national sports federation. A three-member independent Appeals Board has also been established.


In deciding sanctions, the Commission applies the revised World Anti-Doping Code which became effective January 1, 2009. The Code is at once firmer and fairer,[10] introducing the possibility of stronger sanctions in the case of aggravating circumstances and reduced sanctions if, for example, an athlete can clearly prove that performance enhancement was not intended.

### Challenges Ahead

Getting ahead of the trafficking, underground laboratories, Internet drug sales, and the new substances and methods continually introduced into sports, is undoubtedly a great challenge for national anti-doping programs worldwide.

After major events such as the Beijing Summer Olympics, specimens are kept for eight years, so that when new tests are developed, previously invisible prohibited methods and substances can be detected. Looking ahead, we see gene doping as another big challenge just around the corner, for which WADA established its Working Group on Gene Doping in 2003. Substances are already in existence that can be used for this purpose, such as GW1516 and AICAR.

Perhaps the biggest challenge of all is to bring together all the stakeholders—governments, regulatory agencies, health authori-

ties, educators, athletes and their federations—into an effective movement for drug-free sports. Doping is not only dangerous for sports and health, but it also violates the values on which sports are based. In the end, it will be education—not controls or sanctions—that will determine whether we win or lose the fight against doping. 

---

### References & Notes

1. Bamberger M, Yaeger D. Over the edge. *Sports Illustrated* [serial on the Internet]. 1997 Apr [cited 2009 Feb 20];86(15):[about 8 p.]. Available from: <http://vault.sportsillustrated.cnn.com/vault/article/magazine/MAG1009868/index.htm>.
2. Tansey B. Sports doping detection a never-ending science. *San Francisco Chronicle* [serial on the Internet]. 2008 Aug 11 [cited 2009 Mar 20];[p. A-1]. Available from: <http://www.sfgate.info/cgi-bin/article/article?f=c/a/2008/08/11/MNPC127135.DTL>
3. Botre F. New and old challenges of sports drug testing. *J Mass Spectrom.* 2008;43:903-7.
4. Dohrmann G. Balco blows up. *Sports Illustrated* [serial on the Internet]. 2004 Dec 13 [cited 2009 Mar 3];101(23):[about 2 p.]. Available from: <http://vault.sportsillustrated.cnn.com/vault/article/magazine/MAG1114659/index.htm>.
5. See <http://portal.unesco.org/la/convention.asp?KO=31037&language=E&order=alpha> for a full list of governments which have ratified the UNESCO convention.
6. Since 2004, WADA has been the exclusive accrediting agency for anti-doping laboratories worldwide. See <http://www.wada-ama.org/en/dynamic.ch2?pageCategory.id=333> for a full list of laboratories. Others in the Americas are located in Brazil (1), Canada (1), Colombia (1) and the United States (2).
7. IOC president praises Cuba's anti-doping laboratory. Associated Press. Havana. 2002 Nov 18 [cited 2009 Mar 20]. Available from: [www.encyclopedia.com/doc/1P1-69646939.html](http://www.encyclopedia.com/doc/1P1-69646939.html).
8. WADA [homepage on the Internet]. 2007 Adverse Analytical Findings Reported by Accredited Laboratories; [cited 2009 Feb 20]. Available from: [http://www.wada-ama.org/rtecontent/document/labstats\\_2007.pdf](http://www.wada-ama.org/rtecontent/document/labstats_2007.pdf). It should be noted that AAFs are not the same as Anti-Doping Rule Violations (ADRV), since some may refer to substances later allowed under the Therapeutic Use Exemption (TUE) and the AAF figures also correspond to multiple measurements performed on the same athlete.
9. Hemmersbach P. History of mass spectrometry at the Olympic games. *J Mass Spectrom.* 2008;43:839-853.
10. Fahey J. Address by the President of the World Anti-Doping Agency. WADA Media Symposium, 2009 Feb 24; Lausanne, Switzerland [cited 2009 Mar 20]. Available from: [http://www.wada-ama.org/document/Media\\_Symposium\\_JFahey\\_Speech\\_24\\_02\\_09.pdf](http://www.wada-ama.org/document/Media_Symposium_JFahey_Speech_24_02_09.pdf).