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Original Paper

A Historical Timeline of Doping in the Olympics (Part III 1989–2006)

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Abstract

This is the last part of a three part paper on a timeline history of doping in the Olympics. Part three of the timeline focuses on the creation of the World Anti-Doping Agency (WADA), new doping drugs, known drugs that are not detectable to current drug tests, new drug testing procedures and improvements in the sanctioning of athletes. The years 1989–2006 saw a coming together of the world sports community to fight doping. WADA has worked as a powerful umbrella group supporting this fight. It has succeeded in standardizing drug test procedures and sanctions across all Olympic sports disciplines. It has also led to the independence of doping organizations within individual Olympic member countries. This has cut down on cheating at the organizational level.

However, doping by athletes continues. WADA monitors doping in many ways: by providing support to research scientists as they devise new tests for known and, as yet, undetectable doping drugs, improved monitoring of athletes like unannounced and out of competition testing, and a sense of fair play whereby superstars are held to the same standard as regards doping as any other competitive Olympic athlete. These programs, unfortunately, are just the beginning. Doping is real, doping continues, doping will be around as long as competitive sport is.

Introduction

Part three of *A Historical Timeline of Doping in the Olympics* covers the period from 1989–2006. This time period witnesses the rise and implementation of an Olympic wide drug testing system under an independent entity known as the World Anti-Doping Association (WADA). Major advances in drug testing are achieved and increases in positive drug tests are recorded. However, both known and unknown drugs, incapable of being tested for, are proliferating. By 2006, through WADA, the Olympic movement is seriously taking on drug use for performance enhancement in Olympic sport. Some athletes, however, with the help of their coaches and trainers, are seeking out drugs undetectable to any Olympic drug test. The timeline will show the intersection that has developed between WADA, drug testing and punishment on the one hand, and the athletes and there supporters still looking for ways to cheat on the other. A solution to this problem may never be achieved but what can be done are things like increased funding for research and implementation of new drug testing equipment, and hard uniform sanctions for drug cheats. Only

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when athletes realize that their drug use can be adequately tested for will they think twice about using it. However, as the timeline for drug positives will show, drugs that can be successfully tested for are still being used by athletes. A theme that has run through this paper is that some athletes are willing, through doping, to risk their lives for Olympic glory. No effective drug test or sanction will end that.

The timeline follows the creation and work of WADA, new and undetectable drugs, the advances in drug testing and the sanctions that go along with a positive test. The paper ends with a discussion of possible solutions to the use of drugs for performance enhancement in Olympic sport.

The Creation and Effectiveness of WADA

The creation of WADA was brought on by an inability of the various independent sports organizations under the umbrella of the International Olympic Committee (IOC) to control doping. This lax oversight occurred in both national sports organizations and individual worldwide sports organizations affiliated with the Olympic movement. But in the end, it was the IOC, and its leadership, led by IOC president Juan Antonio Samaranch, that showed an unwillingness to face the doping problem. A change in this leadership turned out to be one of many turning points in the fight against doping.

Events leading to the creation of WADA occurred over time. But what is clear is that each alleged doping positive, before the creation of WADA, was adjudicated on a case by case basis. This led to a sanctioning system that was haphazard at best. It also gave an advantage to rich countries who could afford to appeal rulings that they did not like. This had to stop for the testing program to be seen as fair. WADA does not just radically appear thanks to one event. Many instances of nefarious, dishonest activities are revealed. A few Olympic leaders even wanted to give up on drug testing altogether. The timeline shows this gradual process:

In 1989, Ben Johnson admits to the Canadian Dubin Inquiry on drugs in sport that he had been using human growth hormone (hGH) and anabolic steroids for 8 years leading up to the 1988 Summer Olympics. He is stripped of his 1987 World Championships 100m title and his world record of 9.83 seconds set at that championship is taken away. In 1991, after serving a two year suspension for steroid use, Ben Johnson is reinstated to athletic competition [1].

In 1993 the Court of Arbitration for Sport (CAS) becomes an independent entity. Created by IOC president Juan Antonio Samaranch in 1983, CAS seeks to bring about the resolution of sports-related disputes through ordinary arbitration or through appeal against the decisions of sports bodies or organizations [2].

On March 6, 1993 the sprinter Ben Johnson is suspended for life by the International Association of Athletics Federations (IAAF) after failing a drug test carried out on January 17 in Montreal. Johnson tests positive for the steroid related substance testosterone [3].

1996

In February, 1996 American swimmer Jessica Foschi, who tested positive for a steroid at the 1995 national championships, is suspended for two years by the board of directors of U.S. Swimming as required under the rules of FINA, the international governing body for swimming. Foschi had claimed evidence of sabotage in her case. A week later, however, FINA rules that the Australian swimmer Samantha Riley does not have to serve a two year suspension for a positive drug test because the illegal drug, an analgesic, part of prescription headache medication, did not actually enhance performance and had been taken accidentally. FINA instead suspends her coach for two years. Within days U.S. Swimming reverses its suspension for Foschi. It said the Riley case made reversal imperative because otherwise Foschi's family would bring court

action against U.S. Swimming and would probably win [4].

At the 1996 Olympic Trials, Mary Slaney tests positive for the steroid nandrolone. She claims her positive test result comes from her birth control pills. She is suspended in 1997, but later reinstated. The IAAF then refers her case to arbitration. In 1999, Slaney sues the IAAF and the United States Olympic Committee (USOC) for administering the drug test. She claims the test cannot tell the difference between androgens caused from banned steroids and the androgens caused by a birth control pill. All athletes who participate in the 1996 Atlanta Summer Games must sign an agreement which gives CAS the final word on any disagreements over drug testing [5].

The IOC uses a high-resolution mass spectrometer (HRMS) for the first time at Atlanta. The machine is reportedly three times more sensitive than the machines used in 1992 at Barcelona. It supposedly is able to catch athletes who use steroids in the previous two or three months. The HRMS revealed five positive tests for anabolic steroids. The IOC, however, threw the results out. Olympic officials feared lawsuits because the HRMS is still new and relatively untested [6].

For the first time at the Olympics a private company pays for the right to administer drug testing at the Olympics. SmithKline Beecham Laboratories pays \$2,500,000 to the IOC for the privilege of drug testing all the athletes at the Atlanta Summer Games. At the same time SmithKline also manufactures and sells androgens, in SmithKline's case testosterone and testosterone patches (Andropatch), which administer the steroid through the skin. This brings up the potential of a conflict of interest when you have a commercial drug manufacturer of steroids involved in Olympic drug testing. At the very least the IOC demonstrates a lack of interest in the integrity of its own doping control operation. In November, 1996 the London *Sunday Times* publishes an interview with Don Catlin, head of the IOC accredited laboratory in Los Angeles and co-head of the Olympic drug testing laboratory in Atlanta, in which he says: "There were several other steroid positives from around the end of the Games which we reported. I can think of no reason why they have not been announced." All laboratory results end up, according to IOC procedures, in the hands of Prince Alexandre de Merode, head of the IOC Medical Commission. He admits to discarding the urine samples in question due to "technical difficulties" with the new HRMS machines [7].

In December 1996 Prince Alexandre de Merode argues that strict doping sanctions for professional athletes are no longer realistic: "Strict sanctions were appropriate when we were dealing with top amateurs, but since sport has become a profession, we are faced with a major social problem. These sanctions have deep repercussions on people and their standard of living." He seems to be advocating protecting athletes from themselves and adjusting penalties to accommodate their doping habits [8].

1997

When an Olympic athlete tests positive two separate IOC committees must accept the results. The committees meet in private and have been accused of putting the interests of the sport or country of the athlete ahead of the drug testing rules. Charles Dubin, the Ontario Supreme Court judge who headed the government 1989 inquiry into drug use in sport concluded that the IOC had by omission covered up more drug use than it had uncovered.

"It's very difficult for sports organizations that depend on sponsorship money" to have their athletes caught taking performance enhancers. "The IOC fears exposing the high levels of drug use. It turns off the public. The IOC is very nervous about testing. Quote from Dr. Robert Voy. In 1989 Voy quit his position as director of drug testing for the USOC because he said the IOC and USOC weren't committed to eliminating performance enhancers [9].

"There may be some sportsmen who can win gold medals without taking drugs, but there are very few.

If you are especially gifted, you may win once, but from my experience you can't continue to win without drugs. The field is just too filled with drug users." Quote from Michel Karsten, a Dutch physician who claims to have prescribed anabolic steroids to hundreds of world-class athletes. "Athletes are a walking laboratory, and the Olympics have become a proving ground for scientists, chemists and unethical doctors. The testers know that the [drug] gurus are smarter than they are. They know how to get in under the radar." Quote from Dr. Robert Voy, the director of drug testing for the USOC at the 1984 and 1988 Games [10].

1998 Winter Olympics Nagano

On February 14, the Canadian giant slalom gold medalist snowboarder Russ Rebagliati becomes the first Olympic gold medalist to lose his medal for testing positive for marijuana. His medal is returned, however, when an arbitration panel rules the IOC failed to follow correct procedures, noting the IOC's lack of explicit pot policies. IOC rules don't ban marijuana explicitly but snowboarding's governing body sets strict limits, which Rebagliati narrowly exceeded [11].

In 1998 U.S. authorities excuse Dennis Mitchell's positive drug test by blaming high testosterone levels on an excessive amount of sex and beer the night before the test [12].

From Feb. 3-5, 1999 the IOC hosts the World Conference on Doping in Sport in Lausanne, Switzerland. It is hoped that the world's sports federations can agree to establish a new anti-drug agency with standardized testing procedures and a minimum two-year ban for athletes caught using performance enhancing drugs. Delegates from outside the IOC call for any new anti-doping agency to be run outside the control of the IOC [13]. A "Lausanne Declaration on Doping in Sport" is agreed to. Among its provisions is that there will be a minimum suspension of two years for use of "major doping substances" or "prohibited methods" (not ALL doping substances or prohibited methods) and that an anti-doping agency will be in effect for the Sydney Olympics.

On October 24, 1999 the USOC approves the creation of an independent agency to oversee testing of American athletes, the U.S. Anti-Doping Agency (USADA). It will be responsible for testing all athletes who will participate in the Olympic and Pan American Games.

On November 10, 1999 the World Anti-Doping Agency (WADA) is established. WADA's membership is comprised equally of delegates from the Olympic movement and international government authorities. WADA is an independent organization. It manages drug testing for all Olympic sports with special emphasis on "out of competition testing".

The Orange County Register Expose on the USOC and Its Doping Procedures

In April 2003 the Orange County Register newspaper runs a special investigation on how the USOC covered up at least 114 failed drug tests from 1988-2000. Their source is Dr. Wade Exum, the former USOC director for drug control from 1991 to 2000. The positive tests should have disqualified those athletes from the Olympics but the vast majority are ruled "inadvertent use" or without explanation by U.S. officials. A half dozen are put on probation but allowed to compete. Another half dozen are sanctioned but appeal and win. At the U.S. Track & Field Trials two months prior to the 1988 Olympics in Seoul, 100 meter gold medalist Carl Lewis, 200 meter gold medalist Joe DeLoach and 400 hurdle gold medalist Andre Phillips tested positive for banned stimulants. Lewis and DeLoach, members of the same track club, tested positive for three stimulants, pseudoephedrine, ephedrine and phenylpropanolamine. U.S. guidelines called for a six-month suspension for a first-time offense. But the guidelines also allowed for wiggle room

by saying doping is taking a substance with the sole intent of cheating. Without proof that an athlete intentionally took the substance there is no doping violation. So the athletes knew they could say they took something over the counter and get a reduced sentence. Phillips is the only one of the three who declared that he took a cold medicine (pseudoephedrine) before the competition. He says that it is the informal policy of the USOC to not sanction athletes who inadvertently take a banned substance and/or declare the drug on their test form. Lewis and DeLoach list nothing on their forms. In the end the three athletes are simply given warnings. Documents show that 12 athletes from six sports received letters in 1988 from the USOC saying they got off with a warning because of inadvertent drug use. Experts agree that the three stimulants that Lewis, DeLoach and Phillips tested positive for contain compounds that give athletes a boost in competition. The drugs have been shown to potentially make you run faster, react quicker and be able to summon more muscle fiber for strength. The U.S. Soccer Federation has at least nine athletes test positive between 1988 and 1999. Of these, all but one are allowed to compete. In 1992 the soccer star Alexi Lalas has an elevated ratio of testosterone to epitestosterone, which can indicate steroid use. Lalas, however, is allowed to compete at the 92 Olympics. U.S. Skiing takes no action against 11 skiers who test positive between 1991 and 1998. U.S. Hockey has 15 positive tests and 15 players not penalized [14].

Baaron Pittenger, the executive director of the USOC in 1988 says that he concluded the level of banned stimulants in Carl Lewis' drug test results were consistent with accidental use. The levels of stimulant were less than 10 micrograms per millileter and the rules at the time allowed for him to determine intent. Pittenger also notes that if the test is conducted now it does not even require the drug testing lab to notify doping authorities. Two years ago the IOC makes a new rule that ephedrine levels at 10 micrograms per millileter or higher will be considered positive. The penalties also change. A first positive results in a three-month probation and a second positive results in a suspension [15].

On September 24, 2003 the USOC presents its report defending itself from allegations that it systematically covered up drug positives from 1985–2000 to the IOC. The USOC acknowledges that 24 U.S. athletes who tested positive for drugs won Olympic medals from 1985–2000. But it also says that in all but one of the cases the U.S. correctly followed its own procedures. That exception is Jerome Young, who won a gold medal on the 1600 meter relay team at the 2000 Summer Olympics after being exonerated by USA Track & Field after a 1999 positive test for nandrolone. The USOC says there is no documentation in its files offering a reasonable explanation for USA Track & Field's decision to exonerate Young. Of the 24 athletes 19 tested positive for low-level stimulants, with the punishment being a warning or three month suspension according to the rules in place at the time. The IAAF says it cannot sanction Young because it is bound by the January decision of the Court of Arbitration for Sport (CAS) that USA Track & Field does not have to provide the names of 13 athletes who tested positive for banned drugs from 1996–2000. Dr. James Betts, a key member of the USOC's anti-doping program from its inception in 1983 to 2000 says that his committee was frustrated that doping policies were routinely undermined by administrators for American sports federations, known as national governing bodies. The USOC collected testing samples and reported positives to the respective federations. The federations then managed the sanction and appeal process. The USOC typically did not second guess. Betts is not interviewed by the USOC for its report submitted to the IOC [16].

On July 21, 2005 CAS overturns a decision by the IAAF to strip the 2000 Sydney Olympic 1600m relay gold medal from the U.S. because team member Jerome Young tested positive for nandrolone in 1999. CAS ruled that only Young should be stripped of his medal. CAS says that international rules at the time did not allow for the whole team to be penalized. Those rules have since been changed and an entire relay team is now subject to disqualification if one person tests positive for a performance enhancing drug. Young was banned for life in 2004 for a second drug offense when he tested positive for EPO at a meet in

Paris [17].

On October 27, 2005 the International Olympic Committee officially strips sprinter Jerome Young of his 2000 1,600 meter relay gold medal. In 2003 it was revealed that Young tested positive for steroids at the U.S. nationals in 1999 but was cleared by a U.S. panel on appeal and allowed to compete in Sydney. The IAAF ruled that Young should have been suspended for two years in 1999, and thus not allowed to compete at Sydney. CAS ruled in July that Young should be stripped of his medal and the IOC executive board complied with the ruling today, asking the U.S. Olympic Committee to return Young's medal [18].

2000

In 2000, the U.S. Olympic Committee says 33 track and field athletes failed drug tests in 1999. 5 positives were for anabolic steroids, 26 for stimulants and 2 for "other substances". 15 of the athletes have been as yet unidentified. The IOC and IAAF accuse USA Track & Field of using the excuses of confidentiality and due process to hide the names of the athletes.

In March 2000 Dr. David M. Joyner, chairman of the USOC Sports Medicine Committee, says at a meeting, "The only reason the USOC has a drug-control program is because two reasons - public pressure and the IOC requires it [19]."

WADA as an Established Entity

In March 2003 the Copenhagen declaration is signed. All major sporting federations and 73 governments approved a resolution accepting the WADA world doping code as the basis for the fight against doping. The code has a uniform standard for banned substances and drug testing in all Olympic sports. The new guidelines and penalties include a fixed, two year suspension for steroid use and a possible lifetime ban for a second suspension. The code also calls for year round testing. By the end of 2004 WADA's global code, with uniform doping penalties, worldwide no-notice testing and increased spending on research, is now adhered to by all 202 Olympic countries and all 35 international sports federations. New tests for hGH and blood doping are conducted at Athens. The Greek sprinters Kostas Kenteris and Katerina Thanou, who missed tests in Tel Aviv and Chicago before the Olympics (whereabouts information violations) and failed to submit to doping control at the Athens Olympics, count as having tested positive. Refusing a followup test, like Adrian Annus, also counts as a positive. And coaches, like the one for the Greek sprinters, face disciplinary proceedings for distributing prohibited substances, assisting the athletes with their use and tampering with the doping control process.

2005

How WADA has emboldened doping control organizations

On May 19, 2005 U.S. sprinter Michelle Collins accepts a four year suspension from USADA and a disqualification of her competitive results. She also drops her pending appeal before CAS. Collins' case is the third non-analytical case involving athletes tied to BALCO. She is suspended for use of THG and other drugs tied to BALCO and the evidence in her case is provided by documents obtained from BALCO and received by USADA from the U.S. Senate; not from a positive drug test.

On October 13, 2005 Australian Canoeing reports that kayaker Nathan Baggaley tests positive for the steroids stanozolol and methandienone. The positive result came from an out of competition test. Baggaley

is a three time world champion and won two silver medals at Athens [20]. CAS later finds him guilty and bans him for 15 months.

On November 15, 2005 the International Weightlifting Federation (IWF) banned Turkey from competition until next spring for repeated anti-doping violations by athletes and officials. The Turkish federation was also fined \$100,000 and was ordered to identify all lifters using banned substances and implement anti-doping education programs to be approved and monitored by the IWF. Turkey will be allowed to compete again on May 31, 2006 [21].

On December 7, 2005 three-time Olympic weightlifting champion Halil Mutlu was banned for two years for steroid use. Mutlu, from Turkey, tested positive for nandrolone at the European Championships in Bulgaria in April. He was banned until April 2007. Mutlu says he never knowingly took steroids. Another Turkish lifter, Sedat Artuc, was also banned for two years for failing to submit a sample for testing [22].

In 2005 it is announced that there will be a 71% increase in drug tests compared to past games. The IOC will be in charge of testing, delegating procedures to Turin organizers and WADA. The 2006 list of banned substances compiled by WADA will be used (not the 2005 list). Hyperbaric chambers (simulate high-altitude conditions and help boost endurance) will be prohibited in the Olympic village. They are banned under Italian law but not specified in the World Anti-Doping Code. 1200 drug tests will be carried out. 838 urine tests and 362 blood tests [23].

On January 4, 2006 the U.S. Anti-Doping Agency announced that archer Mark Hainline was suspended for two years after refusing to take a doping test last year. An arbitration panel ruled that Hainline's refusal to take a doping test at the April 16 Arizona Cup constituted a first doping violation. The suspension dates back to April 27, when he was given a provisional suspension [24].

2006

Example of WADA controlling a doping situation started by country negligence

January 14, 2006 Zach Lund, top ranked USA Skeleton slider, has been suspended for testing positive for the steroid masking agent finasteride at a World Cup race in Calgary, Alberta. However, the U.S. Bobsled and Skeleton Federation admitted that, initially, it failed to notify the mandatory anti-doping agency when confronted with a positive drug test. Lund's positive test was referred by the international federation to the USBSF. The USBSF, however, failed to turn the case over to the United States Anti-Doping Committee. The federation's executive committee decided that Lund's prior declaration that he had used the anti-baldness drug Propecia, whose main ingredient is finasteride, was sufficient to allow him to compete. So the international federation intervened and suspended Lund instead (week of Jan. 8–14). After the suspension, the American federation submitted the test results to the USADA. The case is now in the hands of the USADA [25].

On Jan. 23, 2006 USA skeleton racer Zach Lund received a public warning from the U.S. Anti-Doping Agency for his failed drug test from last November. The public warning will allow Lund to compete at the 2006 Turin Winter Olympics because he was not suspended. The U.S. Olympic Committee, which approves the Turin delegation, said it would credential Lund for the games. The USADA ordered Lund to forfeit his second place finish from the season's opening World Cup race in Calgary, Alberta in November. That was the competition where Lund had the positive test. Lund has taken hair restoration products since 1999 and has always declared them on his medical forms that get filled out before competitions. He has now discontinued taking the drug [26].

On Feb. 11, 2006 Zach Lund, the USA skeleton racer and currently ranked No. 1 in the sport, was

officially barred by CAS. He cannot race for one year after losing his appeal for testing positive in November for a masking agent, finasteride, which can also be used as a treatment for hair loss [27].

As is clear from the timeline, uniformity in testing and sanctioning athletes for doping offenses is the key to fighting doping in sport. Also, WADA, as a trustworthy organization athletes are supposed to rely on, is vital to the fairness of the system. The Lund case is cause for hope as this process moves forward. Mechanisms to catch slipups or sloppy work were in place. In this case, the inherent bias of the national committee toward doing everything to allow its athletes to compete was superseded by the international organization. This allowed the country's anti-doping committee, an independent entity, to take over and look at the case. Its ruling was seen as too lenient. An appeal process took over and Lund was suspended from competition. It is only hoped that these procedures will be perceived as fair and allowed to continue with constant vigilance and ever improving systems in the future.

New Drugs and Undetectable Drugs

New drugs and undetectable drugs are the major obstacles facing WADA in its fight against doping. The major new drugs are the designer steroids while hGH is the undetectable drug causing the most trouble for the Olympic movement. As for new drugs, the BALCO scandal and its main doping drug, the designer steroid tetrahydrogestrinone or THG, have by far dominated the headlines. As for hGH, rumors of an effective test have made the rumor rounds, but as of 2006 no reliable test was available. The timeline is mainly concerned with the BALCO scandal:

In 1989, the East Germans introduce a new drug, Piracetam. It allows the athlete to control increased aggressive tendencies and thus channel that aggression into the competitive sport [28].

1990s

British sprinters and hurdlers at the 1992 Barcelona Summer Olympics are the first to use creatine. Creatine is a natural substance found in raw meat and fish. It locates in muscles and is critical for high intensity muscle contractions. During brief, intense, anaerobic actions, like sprinting, jumping, or weightlifting, creatine regenerates adenosine triphosphate (ATP) to provide the energy necessary for muscle contractions. It delays fatigue and helps buffer the lactic acid that accumulates in muscles during intense exercise [29].

The declared prevalence of exercise induced asthma (EIA) among American Olympians shoots up from just over 10% at the 1984 Summer Games to nearly 60% at the 1994 Winter Olympics in Lillehammer, Norway. This may show that American athletes think the beta2 agonist albuterol is ergogenic. Albuterol is legal for asthma and only in an inhaled form. A three week study of a slow release oral form of albuterol seems to increase, though inconsistently, the voluntary strength of young men. Another study in which young men took oral albuterol suggests that resistance exercise may augment any strength gain from albuterol [30].

In 1997 it is reported that some female gymnasts may intentionally retard their growth by taking "brake" drugs. One such drug is cyproterone acetate, a substance sometimes used to reduce the sex drive in hyperlibidinous men [31].

In 1997 it is also clear that for sprinters and other strength athletes the most popular banned substance is hGH. It helps an athlete's muscles recover speedily from intense workouts and thereby enables the athlete to train harder and more often. Urine tests don't detect hGH. It costs about \$1500 a month for hGH injections [32].

In January 1998, at the World Swimming Championships in Perth, Australia Chinese swimmer Yuan Yuan's luggage is checked at customs and found to have a thermos bottle filled with 13 vials of hGH. There is enough hGH in the thermos to treat the entire Chinese swim team for the length of the meet. Yuan and her coach are immediately pulled from the meet. Chinese swimmers have failed 23 drug tests in the 1990's [33].

At the 1998 Nagano Winter Olympics a Russian medical officer enquires as to whether the use of insulin is restricted to those people with insulin-dependent diabetes. This draws the attention of the IOC to its performance enhancing capabilities and it places insulin on its list of banned substances. However, no drug test for insulin exists. Insulin is used by athletes to increase muscle bulk prior to events and in recovery. They take regular injections of short acting insulin together with high carbohydrate diets. It is also used to help with stamina, which allows for speeded up post-event recovery and longer heavy training periods. It is also well known from scientific experiments that insulin-treated patients with diabetes have an increase in lean body mass when compared to matched controls [34].

THG and the BALCO Scandal

In June 2003 at the USA Track & Field Championships, four athletes test positive for THG. The athletes include the shot putter Kevin Toth and the 1500 meter runner Regina Jacobs. Each type of designer steroid has a unique signature that shows up in the urine of the user. Because drug testers look only for the signatures of commercially available steroids, a steroid whose signature has been changed will be much more difficult to detect. The positive tests occurred because a vial of THG was anonymously given to the drug lab.

On August 1, 2003 in Germany, European 100 meter champion Dwain Chambers of Great Britain tests positive for THG in an out of competition test [35].

In August 2003, at the World Track and Field Championships in Paris, Kelli White wins the 100 and 200 meter women's gold medals. In an after competition drug test she tests positive for modafinil, a stimulant. Modafinil is classified by the IAAF as a weaker stimulant. If sanctioned, White would be given a public warning and disqualified from the World Championships, which could mean she would lose her gold medals in the 100 and 200 meters. With advice from Victor Conte, head of the Bay Area Laboratory Co-operative (BALCO), she concocts a story that she took modafinil for narcolepsy, a sleeping disorder. Conte gets a psychiatrist, Dr. Brian Goldman, who has worked as a consultant for Conte, to say publicly that he diagnosed Kelli White for narcolepsy and prescribed her Provigil (contains modafinil) for the condition. BALCO specializes in taking blood and urine samples of athletes and then prescribing a regimen of supplements to compensate for various vitamin and mineral deficiencies [36].

On September 9, 2003 the IAAF formally rejects White's explanation for testing positive for modafinil. She did not notify the IAAF she was taking the drug and failed to get a waiver. The IAAF refers the case to the USATF. It delegates responsibility to the USADA. White is not suspended pending her hearing before the USADA.

On Nov. 6, 2003 Tim Montgomery testifies to the grand jury investigating BALCO. BALCO is the source of the new steroid THG. Its founder Victor Conte and three other men, including Kelli White's coach Remi Korchemny, are charged in a federal investigation with distributing steroids and laundering money. Montgomery testifies that Conte gave him a steroid called the "clear" (THG) and that Dr. Brian Goldman wrote him a bogus prescription for Clomid, a drug that helps to boost testosterone production [37].

On Nov. 7, 2003 British sprinter Dwain Chambers is suspended following a B-sample second positive

for THG. He now faces a British disciplinary hearing where he faces a minimum two-year suspension and a lifetime Olympic ban. If Chambers is found guilty Great Britain would lose the silver medal it won in the 400 meter relay at the Track & Field World Championships in France in August. Chambers was the anchor in the race [38].

On February 24, 2004 British sprinter Dwain Chambers receives a two year ban from competition and a lifetime ban from the Olympics from UK Athletics after testing positive for THG. He can appeal to CAS or let the ruling stand [39].

In May 2004 Kelli White admits to the USADA that she does not have narcolepsy and has taken modafinil, steroids and EPO for competitive advantage. She is suspended from competition for two years and agrees to help the USADA fight future doping. She admits her use after being presented with documentary evidence. This is known as a nonanalytical positive.

By 2004 the BALCO doping scandal affects nearly a dozen American athletes in track and field before the Olympics. Two American hammer throwers, Melissa Price and John McEwen, a shot-put champion Kevin Toth and a women's middle-distance runner, Regina Jacobs, are suspended within the last year after testing positive for THG, the designer steroid.

The Michelle Collins case is particularly detailed. By 2004 she has been accused of using THG, "the Cream" (testosterone and epitestosterone, which serves as a masking agent), trenbolone (a bovine steroid popular because it has a half life in the body of a day or two so is hard to detect in a blood test), norbolethone (An obscure steroid developed in the 1950's and never sold commercially, it is not on the IOC's banned list until it is detected in the urine of the cyclist Tammy Thomas in 2002. She is given a lifetime ban.), EPO and modafinil. To hide her use of these drugs Collins has urine and blood tests done so BALCO can monitor the levels of these illicit drugs in her system. This monitoring is known as pretesting and was used by the East Germans to test athletes before they entered international competitions [40].

On February 1, 2005 WADA announces the discovery of a new designer steroid. The new steroid is called desoxymethyltestosterone or DMT. It is uncovered after an anonymous e-mail tip directs the agency to investigate a substance seized by Canadian customs officials in June 2004. It is a clear oily substance that is modified from a common steroid, methyltestosterone [41]. Canadian sprinter Derek Dueck pleads guilty to attempting to smuggle the steroid into Canada and is fined C\$3,000.

On July 16, 2005 Victor Conte, head of BALCO, pleads guilty in federal court to one count of distributing steroids and one count of money laundering. The original indictment had been for 42 counts. Conte is sentenced to four months in prison and four months of house arrest. Conte's guilty plea does not require him to cooperate with federal authorities or anti-doping officials about drug use by athletes. The end of his criminal case will allow for Marion Jones' \$25 million defamation suit against Conte to begin. Conte told the ABC T.V. program "20/20" last year that he provided Jones a doping regimen for the 2000 Sydney Olympics and that he watched Jones inject herself with hGH [42].

On July 27, 2005 CAS announces that the doping cases involving American sprinters Tim Montgomery and Chryste Gaines are expected by late October. Both runners are appealing proposed lifetime bans based on the BALCO criminal enquiry. This is the first time that anti-doping authorities have tried to ban athletes without having a positive drug test as evidence [43].

On July 29, 2005 in the BALCO case, track coach Remi Korchemny pleads guilty to one misdemeanor count of distributing modafinil, a stimulant. Prosecutors drop dozens of other charges. Korchemny is the track coach of suspended sprinters Kelli White and Dwain Chambers [44].

On September 30, 2005 U.S. federal agents raid the home and laboratory of chemist Patrick Arnold. It is believed that he created one of the steroids at the center of the BALCO case. BALCO founder Victor Conte and vice president James Valente identified Arnold as the source of THG. The federal raid could mean

more indictments in the BALCO case. Conte, Valente and track coach Remi Korchemny all pleaded guilty to distributing steroids to elite athletes and will be sentenced next month. In the supplement industry Arnold is known as the man who popularized androstenedione, or andro [45].

On November 3, 2005 a U.S. grand jury indicted the scientist Patrick Arnold for conspiring with BALCO founder Victor Conte to illegally distribute THG. The charge is for three counts of illegally distributing performance-enhancing drugs designed to avoid detection by sporting leagues, including the U.S. Anti-Doping Agency, Major League Baseball and the National Football League. Federal prosecutors are now taking aim at those who supplied BALCO with its performance enhancing drugs [46]. On November 9, 2005 Arnold pleads not guilty.

On December 12, 2005 in an interview with the BBC, British sprinter Dwain Chambers admitted using the steroid THG from March 2002. This could lead to the IAAF stripping Chambers of his 2002 European 100-meter title and Britain's 400 relay gold from the same meet could also be lost, too. Chambers' British 100 meter record time of 9.87 seconds-set in Paris in Sept. 2002 could also be taken away. Britain's 400 relay silver medal from the 2003 world championships has already been taken away because of Chambers' positive test for THG in August 2003. The IAAF has a rule that any athlete who admits to using drugs can, for eight years after it happened, have his results annulled from every meeting. Chambers said he started taking THG when he relocated to California and began working with coach Remi Korchemny, who introduced him to Victor Conte. Chambers completed his two year ban in November, but can't compete until he passes three drug tests. That's expected to be finished by the end of January [47].

On December 13, 2005 USA sprinters Tim Montgomery and Chryste Gaines received two-year bans from CAS. Both sprinters never tested positive for drugs but were found guilty of non-analytical positives. Both were convicted on evidence in the criminal investigation of the BALCO steroid scandal. Montgomery testified to a federal grand jury in 2003 that in 2001 Victor Conte of BALCO gave him weekly doses of HgH and THG or the "clear". Kelli White also testified against both sprinters. CAS voided all of Montgomery's performances since March 31, 2001. Gaines' were voided from Nov. 30, 2003. Montgomery's 100 meter world record, set in September 2002 in Paris, 9.78 seconds, is erased from the record books. Montgomery also loses his 100-meter silver medal from the 2001 World Championships. He also forfeits his gold medal in the 400-meter relay from 2001. A total of 14 athletes have received sanctions in the BALCO case, including five without positive tests [48].

New Drugs and Undetectable Drugs cont.

On March 20, former German track coach Thomas Springstein was convicted of doping charges and given a 16-month suspended prison sentence. The guilty charges included the doping of young athletes in 2003. Springstein was accused of supplying testosterone to his athletes, including a 16 year old girl. One drug was Repoxygen, designed for gene therapy on patients with anemia. It can boost an athlete's performance by inducing the release of EPO. There is no known test for Repoxygen, which gives the body the gene to stimulate EPO production on its own. Springstein had worked with Grit Breuer and Katrin Krabbe. The two were banned from competition for using the steroid clenbuterol in 1992 [49].

The Collins and Springstein cases are particularly disturbing. Collins' case shows the trust athletes give to their doctors and coaches when it comes to the use of these performance enhancers. The BALCO case is important because it not only punished athletes but also coaches and doctors. However, BALCO was a criminal prosecution. The Springstein case is also a criminal prosecution. WADA needs to look at stronger sanctions for the people who supply and administer these doping drugs to athletes. And in the case of Springstein, coaches who give doping drugs to athletes not yet considered adults, need to be banned from

the sport for good.

Drug Testing and Sanctions

This timeline will show how drug testing and sanctioning of athletes under WADA have drastically improved. While not perfect, when compared to the period leading up to the creation of WADA, drug testing has become uniform and more intrusive. Drug testing machines have been upgraded significantly thanks to research and investment by WADA, and athletes have been caught going back to old drugs as a result. The adjudication process has been formalized Olympic wide. With this system in place, athletes know the consequences for doping are real.

1989

On April 6, the IOC announces that for 1988 more than 1,150 Olympic athletes tested positive for banned substances. The majority of positives were for anabolic steroids.

1996

Before the summer games in Atlanta, it is reported that three \$700,000 high resolution mass spectrometers (HRMS) will be used at Atlanta. These are said to be five to ten times more sensitive than recent models. To thwart the machines, athletes come up with many ways to avoid detection: contaminate urine with bacteria from the finger, drink fluids containing high concentrations of vinegar, injecting or inhaling adrenaline, taking Alzheimer's drugs because some are stimulants and women bringing condoms containing "clean" urine in their vaginas. Designer drugs are also being created that are so new they have yet to appear in any scientific literature. The latest technology still cannot distinguish between naturally produced hormones like hGH, Insulin Growth Factor-1 (IGF-1 is used to build muscles or increase lean body mass) and EPO and the synthetic ones [50].

1997

In March the International Cycling Union (UCI), cycling's world governing body, begins testing the blood of professional road racers for EPO.

1998 Winter Olympics

The Winter Olympics in Nagano will use carbon-isotope machines designed to detect the presence of artificially-administered testosterone. At Nagano, Mitsubishi Kagaku Bio-Clinical Laboratories pays for the right to administer drug testing at the Winter Olympics. The laboratory is a spin-off of Mitsubishi-Kagaku Foods, a sales division of Mitsubishi Chemical Corporation, a donor to IOC President Samaranch's Olympic Museum in Lausanne. This makes one wonder whether there is a lack of commitment within the IOC for an independent, credible, drug testing system for the Olympic Games [51].

1999

In August, at the World Track & Field Championships at Seville, Spain, Jamaican sprinter Merlene Ottey is notified that she failed a drug test for nandrolone at a meet in Lucern, Switzerland in July. She withdraws from the world championships and faces a possible two year suspension from competition. British sprinters Linford Christie, Mark Richardson and Dougie Walker, and 1996 Atlanta Olympics German 5000 meter runner Dieter Baumann have also failed drug tests for nandrolone in 1999. Nandrolone (also called Deca-Durabolin) is allowed at a limit of 2 mg per ml of urine according to IOC doping guidelines. This limit is thought to be the maximum at which nandrolone occurs naturally in the body. Some samples given by the athletes have come back at levels 100 times higher than this. This is causing speculation that the testing procedure may be flawed or inaccurate. Another theory is that dietary supplements like protein shakes and creatine, when combined with heavy training, are leading to the positive drug tests. It is only a theory but scientists believe there may be a link between heavy training, the dehydration that goes with it, and their effects upon the components of high protein diets. All of the athletes mentioned, including Merlene Ottey, have been cleared by their national athletic organizations. The IAAF, however, overturned the reinstatement of Christie and Walker [52].

2000

The Olympic drug lab tests for EPO with a new combination blood and urine test. The urine test, developed by the French, can detect EPO within three days of use while the blood test, developed by Australia, can detect EPO within 20 days of use. However, for the Olympics, both tests must come back positive in order to disqualify the athlete. There is pre-Olympic testing on 300 blood and 400 urine tests from two weeks before the Olympics. The blood tests are for the synthetic version of EPO. The drug lab, however, can still not test for hGH, insulin growth factor and drugs that are essentially artificial blood (not including synthetic EPO).

2000 Summer Olympics

39 athletes test positive and are expelled or forbidden to compete in the Sydney Olympics. Most of the drug positives are from East European and developing countries. It is thought that these country's athletes lack knowledge about how to avoid detection and cannot afford the high prices required for sophisticated drugs. C.J. Hunter, the American shot-putter, who says he pulled out of the games because of knee surgery, is actually found to have failed four drug tests for nandrolone. Recently there have been around 300 positive tests for nandrolone. Anti-doping scientists blame dietary supplements that fail to label nandrolone "precursors" (which stimulate the body's production of the steroid) [53].

2001

At the World Nordic Skiing Championships in Finland six members of the Finnish team, including women's pursuit gold medalist Virpi Kuitunen, test positive for the banned blood doping drug hydroxyethyl starch (HES). The Finnish team doctors admit they gave it to the athletes. The doctors resign, the men's and women's coaches are fired and the six athletes receive two year bans [54].

2002 Winter Olympics

Every athlete submits a blood sample before the Salt Lake City Games. Those who have a suspiciously high hematocrit (the percentage of oxygen-carrying red blood cells in the blood) give a urine sample. Officials check the sample for EPO. The EPO drug test is officially approved by WADA for these Games because officials believe, if challenged, any positive tests will hold up in court. HES, RSR-13 and HemAssist are other popular drugs. HES increases blood volume, and because more fluid can contain more red blood cells, HES lowers the hematocrit and masks EPO use. HemAssist, a blood substitute for trauma patients, promises more red blood cells. Drug tests are readied for each of these drugs at Salt Lake City. This year, for the first time, athletes must prove they suffer from asthma [55].

Cross country skier Larissa Lazutina of Russia tests positive for darbepoetin, a drug that boosts production of red blood cells that carry oxygen to the muscles. She forfeits her gold medal in the 30 km classical cross country race. She is also barred from the 20 km relay after pre-race testing finds high levels of hemoglobin. Johann Muehlegg of Spain also tests positive for darbepoetin. He loses his 50 km classical cross country gold medal and later retires from the sport. However, he is allowed to keep his 10 km classical and 30 km freestyle gold medals because he doesn't test positive after those races. Olga Danilova of Russia tests positive for darbepoetin in the 30 km classic. However, she gets to keep the gold and silver that she won in earlier races. Natalia Baranova-Masolkina of Russia tests positive for EPO before the Games. She is barred from competition.

2003

In June, in an update on the doping case of Russian cross country skier Larissa Lazutina, the International Skiing Federation (FIS), reacting to a decision of CAS, strips her of two Olympic silver medals and has a third result from the 2002 Winter Olympics annulled. The CAS upheld an FIS decision stating Lazutina is not eligible to compete at Salt Lake City because she is found guilty of a doping offense prior to the Olympics. Lazutina tested positive for darbepoietin in December 2001 at competitions in Cogne, Italy and Ramsau, Austria.

From August 21–23 the U.S. Anti-Doping Agency holds a symposium and discusses how to apply the Gas Chromatography/Combustion/Isotope Ratio Mass Spectrometry (GCC IRMS) machine to doping control. The GCC IRMS uses an analytical technique that allows it to differentiate the origin of a variety of molecules based on their content of a non-radioactive isotope. Some sports federations now believe that the GCC IRMS is the definitive machine for detecting use of testosterone. In the symposium discussions are held on how the laboratory and testing community can determine how and when this technique can best be used.

On December 4, the IOC authorizes retesting of all doping samples taken at the 2002 Salt Lake City Winter Olympics. It also expands drug testing for next year's Athens Olympics. The in competition testing period will start from the opening of the Olympic Village on July 30 to the closing of the Games on August 29. IOC testers are allowed to check athletes for drugs both before and after the games, wherever they may be.

2004 Summer Olympics

Twenty-four athletes are banned for doping violations at the Athens Olympics (not counting positives after the Olympics are over because the IOC freezes urine and blood tests for an additional three months

after the Games to allow for re-testing). 382 pre-Olympic tests are conducted and 2,344 post-Olympic tests are conducted. In addition out of competition testing leading up to Athens started on July 29. All weight lifters are drug tested. Ten test positive for steroids and one is disqualified for avoiding a test. Older steroids, like stanozolol, are available, cheaply, on the internet. Several of the positive steroid tests are for stanozolol. Seven athletes forfeit medals, three of them gold medals. Adrian Annus loses his hammer-throw gold for Hungary. He comes under suspicion when providing his urine sample. Anti-doping officials request another sample, even go to Hungary to get it, but Annus refuses. Robert Fazekas loses his discus gold for Hungary. He is accused of providing a drug testing sample too quickly. When asked to provide a second sample he refuses to give the minimum 25 milliliters required. This leads to his drug test being called positive. Urine switching devices are easily available for purchase on the internet. Officials circulate pictures of a device that enables athletes to hide the urine of others in their rectums. Officials do not openly accuse Annus and Fazekas of using these types of devices, they just say the samples are suspicious [56].

In September WADA confirms for the first time that it tested for hGH at the Athens Olympics. About 10% of all drug tests are for hGH but no positive tests are revealed. However, samples can be frozen and re-tested and the IOC can sanction athletes retroactively for up to eight years [57].

In September, the U.S. Olympic cyclist Tyler Hamilton is accused of using an illegal blood transfusion to enhance his performance at Athens but is allowed to keep his gold medal because his B sample is mishandled by the doping lab in Athens. However, Hamilton also tests positive for the same doping offense at the Spanish Vuelta (also in September) bike race. His B sample also comes back positive. He now faces a possible two year suspension from the ICU, who administered the tests. The USADA does suspend Hamilton for two years and he is appealing the suspension to CAS. Hamilton is the first person to test positive at the Olympics for doping by blood transfusion. Homologous blood doping is the practice of transfusing another person's blood, a low tech way of increasing the red blood cell count, and it is regaining popularity thanks to number of new anti-doping tests being developed. One such test is the urine test for the cloned human hormone EPO developed four years ago. The blood transfusion test is a new one, developed by a group of researchers led by Michael Ashenden, an Australian physiologist who also heads the Science and Industry Against Blood Doping research consortium. Its weakness is that it cannot test for blood that athletes have removed from themselves, stored and reintroduced for competition.

2005

In June Swiss triathlete Brigitte McMahon tests positive for EPO. She is the Sydney 2000 Olympic gold medalist. She is kicked off the national triathlon team.

On July 28, the IAAF says that it will carry out blood testing at its world championships, to be held at Helsinki from August 6–14. The blood tests will look for evidence of blood transfusion, hemoglobin-based oxygen carriers (HBOCS) and other substances. HBOCS has been named by many experts as a possible performance booster [58].

On August 29, the IAAF confirmed two positive drug tests from its world championships at Helsinki. On August 8 Ukrainian hammer thrower Vladyslav Piskunov tests positive for the anabolic steroid drostalone. Announced during the competition, female Indian discus thrower Neelam Jaswant Singh tests positive for the stimulant pemoline. Overall 884 doping tests are carried out on 708 athletes. 416 of the tests are administered before the competition. The IAAF says it is the largest anti-doping program ever carried out at an athletics event [59].

An October 5 article reports that CAS hopes to reach a decision on the case of Tyler Hamilton's

suspension for blood doping by the end of the year or the beginning of 2006. It is the first case based on a test designed to detect the presence of someone else's red blood cells in a sample. [60].

On October 19 Belgian triathlete Rutger Beke sues WADA and two drug labs after his 18 month doping suspension was overturned because of doubts over the accuracy of his EPO test. The drug labs are in Ghent, Belgium and Cologne, Germany. Beke was suspended in March 2005 after a positive EPO test at a competition in Belgium last year. Beke denied taking EPO and won his appeal in August after a Belgian regional disciplinary board agreed the test did not provide sufficient proof of guilt. That ruling has not been appealed [61].

On October 20 CAS rules to restore the bronze medal taken away from Colombian cyclist Maria Luisa Calle. CAS says that she did not take the banned stimulant heptaminol that she tested positive for in Athens. At the time Calle said she took the anti-migraine drug Neo-Saldina. CAS says Neo-Saldina contains isometheptene, a substance which transforms into heptaminol during lab analysis. Isometheptene was not banned for Athens. Calle's bronze came in the women's track points race. Her bronze medal was given to American cyclist Erin Mirabella [62]

On October 27, the IOC executive board ratified a CAS decision to return Colombian cyclist Maria Luisa Calle the bronze medal she won in the women's point race at Athens. CAS ruled the headache medication she took did not contain banned substances. Fourth place finisher Erin Mirabella has been asked to return the bronze medal awarded to her at the time [63].

On November 3, City of Hope researchers report that they have developed a new method of detecting performance enhancing anabolic steroids, including so-called "designer steroids" that may escape current testing methods. All anabolic steroids function by interacting with an internal switch at the cellular level called an "androgen receptor". The new test detects any compound that turns on that receptor, even if the compound is unfamiliar to anti-doping authorities. Previously, testing was based on finding doping through chemistry. Labs search an athlete's blood and urine for chemical compounds known to enhance performance. But designer steroids are made to be invisible to the test that is looking for the particular chemical markers. The new strategy uses biology, not chemistry, to look for genes that have been manipulated for performance enhancement. Some negative aspects of the test include the taking of blood. Some athletes, for cultural reasons, are sensitive to the loss or use of blood from the body. The test so far applies only to anabolic steroids. WADA has spent more than \$21 million since 2001 on research into anti-doping methodologies [64].

On November 21, it was reported that cyclist Tyler Hamilton will have another hearing on Jan. 10 to appeal his blood doping suspension. Hamilton's initial hearing in September was canceled because not all of the evidence could be presented. Hamilton was suspended April 18 by the independent American Arbitration Association. CAS said the Jan. deliberations could last a few weeks [65].

2006

On February 9, the International Ski Federation announced that eight cross country skiers competing in the Torino Winter Olympics tested for excessive hemoglobin levels. Under the federation's rules, athletes with elevated hemoglobin levels are barred from competing for five days after the date of the test. The federation did not say on what day the tests were administered. Hemoglobin is the part of a red blood cell that carries oxygen from the lungs to all cells. Illicit strategies like synthetic hemoglobin and blood transfusions have been used to boost oxygen levels in the muscles. Of the eight skiers two are from the USA and Belarus, and one each from Canada, France, Russia and Germany [66].

On February 11, the number of suspended cross country skiers rose to twelve; also for excessive

hemoglobin levels. The five day suspensions for all of the skiers will cause some of them to miss the 15-kilometer women's pursuit and the 30-kilometer men's pursuit. The skiers will be re-tested on Monday. Dr. Lawrence Rice, a hematologist said that only severe dehydration would cause a substantial spike in hemoglobin levels. Rice also said that the athletes could drink a lot of fluids and bleed themselves before the retest as a way to lower the hemoglobin count. The Monday retests could include urine tests as well as blood tests. Urine more accurately detects synthetic hormones. During the 2003 Nordic world championships, Kaisa Varis of Finland received a 5-day suspension for a high hemoglobin level. Varis and the Finnish Ski Association both said the test results were caused by her use of a room that simulates high altitude. However, in April 2003 Varis received a two year ban after testing positive for EPO [67].

On February 11, Tyler Hamilton's appeal of a two-year suspension for blood doping was rejected by CAS. Hamilton was suspended from April 18, 2005 by the independent American Arbitration Association (ABA). CAS held 12 hours of hearings in Denver last month. Hamilton's case was the first based on a test designed to detect an athlete's use of another person's blood by using a blood transfusion. Called the HBT test it detects the presence of another person's red blood cells in a sample. Terry Madden, CEO of the USADA, said it considered all theoretical explanations for the positive test, including an extortion plot by a fan of another team. However, Mr. Madden is quoted as saying that, "It is sad that Mr. Hamilton resorted to conspiracy theories rather than just accept the consequences of his doping." Hamilton can't race until April 2007, when he will be 36 years old [68].

On February 16, the first athlete was caught for doping at Torino. Russian biathlete Olga Pyleva was stripped of her silver medal in the 15 km event after testing positive for the banned stimulant carphedon from a urine test. The test was on Monday Feb. 13, after the race. She was scratched from Thursday's 7.5 km sprint and kicked out of the Olympics. Dr. Nikolai Durmanov, head of the Russian Anti-Doping Committee, said a doctor who treated her in Siberia for an ankle injury in January gave her an over-the-counter medication that did not list carphedon as one of its ingredients. Under IOC rules athletes testing positive at the Olympics are considered guilty if a banned substance is found in their systems, regardless of the circumstances. Pyleva was tested twice by the World Anti-Doping Agency in January. A total of 1,200 samples are being tested, a 72 percent increase over the number in Salt Lake City, where there were seven doping cases total. A Brazilian bobsledder tested positive for nandrolone in pre-Olympic testing. Armando dos Santos failed his test in early January. Of the dozen cross country skiers suspended for elevated hemoglobin levels, seven have been re-tested and cleared to compete; one failed the re-test, and the other four have yet to be cleared [69].

The creation of WADA has affected the fight against doping in a positive way. There is now an Olympic wide system of evenhanded testing and sanctions throughout Olympic sport. And most importantly, anti-doping agencies are separate from their country's Olympic committees. As many of the above examples have shown, conflicts of interest had developed between the Olympic athletes and the committees. The threat of collusion over the problem of athletic drug abuse for performance enhancement was all too real as the overarching goal of Olympic committees is to win as many Olympic medals as possible.

Conclusion

Wada's sponsorship and financial backing of drug testing has led to increased vigilance toward the fight against doping. Only an organized campaign like this, with the support of the IOC and each country's Olympic committee, can affect the fight against doping in a positive way. As a result, the main culprits in doping are firstly of course athletes, followed by their coaches and the rogue chemists willing to create drugs undetectable by the latest drug testing technology.

Looking forward, the Olympic movement, led by WADA, needs to keep up the pressure on dopers and their supporters. Some ways to ratchet up the intensity include:

WADA makes clear and shows through its actions that drug testing and sanctioning of athletes is uniform. This means that an athlete from the United States faces the same drug testing procedures and sanctions for a positive test as an athlete from a developing country.

WADA must sponsor investment and research into new drug testing techniques that will find drugs that are currently undetectable. This will help level the playing field as most drugs currently undetectable are expensive and thus more available to athletes from rich countries.

WADA must improve its monitoring of out of competition and unannounced testing. Many elite athletes move around the globe to train and are hard to find. This gives them an advantage over athletes from developing countries.

WADA needs to think like an athlete who wants to dope. WADA should enlist athletes who will agree to go undercover and find out about the latest doping substances and the most popular doping drugs. In this way research can be more focused and the chances for early detection of new drugs will go up.

Fairness needs to be encouraged and talked about. Rich countries have built in advantages for their athletes like infrastructure, schools, equipment, training facilities and coaching. This is alleviated somewhat by athletes from developing countries who are invited to train. However, disproportionate numbers of doping positives come from these developing countries. They can only afford cheap drugs that are easily identifiable to current drug testing procedures. A more even training field may lower the number of drug positives from developing countries.

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