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Ignorance, Harm, and the Regulation of Performance-Enhancing Substances

Lisa Milot*

TABLE OF CONTENTS

INTRODUCTION	92
I. REGULATING IGNORANCE	97
<i>A. Legal Regulation of Drugs</i>	97
<i>B. Legal Regulation of Supplements</i>	104
<i>C. Regulation of Performance-Enhancing Substances in Sports</i>	107
<i>D. Ignorance Through Regulation</i>	110
II. IGNORANCE AND HARM	112
<i>A. Evaluation of Current Approach</i>	112
<i>B. Ignorance Increases Athletes' Use of Performance-Enhancing Substances</i>	116
1. Athletes' calculations of costs and benefits are skewed	117
2. Overestimations of rates of use lead to increased use	122
3. Lack of information about unergogenic effects increases risk-taking	124
4. Prohibition itself increases desirability	125
<i>C. Ignorance Increases Harm from Athletes' Use of Performance-Enhancing Substances</i>	128

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1. Ignorance undermines medical authority	128
2. Ignorance prevents legal liability for harm	129
3. Ignorance increases collateral harms	130
III. INFORMATION: WHAT DO WE NEED (AND HOW DO WE GET IT)?	132
A. <i>Information We Need (and Why We Need It)</i>	133
1. Rates of use	133
2. Identity of “performance-enhancing substances” that do not enhance performance	136
3. Examples of enhancement failures	139
4. Proof of harm	140
5. What athletes are actually taking	141
B. <i>Sources of Information</i>	142
CONCLUSION	146

INTRODUCTION¹

It was in the seventies and overcast at midday when the pack of 129 cyclists started Stage 15 of the 1995 Tour de France. The stage was the hardest of the Tour that year: six grueling Pyrenean mountain passes and 128 miles stood between the riders and the day’s finish just southwest of Lourdes. The highlight was expected to be the hellish Col du Tourmalet on whose slopes the riders would ascend nearly a vertical mile, and tens of thousands of spectators lined the road leading up the mountainside days in advance to secure a prime viewing spot.

The peloton rode quickly up and over the first peak—the well-known Col du Portet d’Aspet—in pursuit of an early breakaway. Speeds reached 55 miles per hour on the descent, with quickly turning wheels only inches apart despite the twists and turns carved out of the mountain’s face. The climb was a popular warm-up for the longer and steeper mountains in the range, and it was regularly included in the Tour despite being the scene of

¹ For news coverage of the 1995 Tour on which this description is based, see Tour De France 1995 Stage 15 Fabio Casartelli Rip, YOUTUBE (August 23, 2013), <http://www.youtube.com/watch?v=VJSP-QoZN2s> archived at <http://perma.cc/KPU6-9XVL>; Tour De France 1995 Stage 18 Armstrong Casartelli Tribute, YOUTUBE (August 23, 2013), <http://www.youtube.com/watch?v=TQDL2PnMcyU> archived at <http://perma.cc/9WGA-J2D5>; Samuel Abt, *Cycling: Italian Rider Dies After High-Speed Crash*, N.Y. TIMES, (July 19, 1995), archived at <http://perma.cc/S6WC-DBG9>; Austin Murphy, *A Test of Heart*, 83 SPORTS ILLUSTRATED 36 (July 31, 1995), archived at <http://perma.cc/46Y8-8LHM>.

several high-profile crashes.² Riders usually used it to test their legs, and those of their competitors, before the real racing began a few hours later, but on this day it had started early. For a handful of riders, it would end disastrously on one of the Col's hairpin turns.

The first to fall was Fabio Casartelli. The Italian's body and bike slid sideways, felling nearby cyclists and only stopping when his unhelmeted head hit one of the concrete pylons that lined the turn. The barricade intended to prevent cars from plummeting into the ravine below proved deadly to Casartelli. Despite an emergency airlift, he died before the stage was even finished. French rider Dante Rezze was more fortunate: He slid into a gap between two pylons and off the face of the mountain. While team personnel managed to hoist Rezze out of the ravine after half an hour, his injuries that day ended his race. A third rider lay just down the road, his left leg bent at an excruciating angle. The peloton sped away from the fallen riders, some of whom lay curled and motionless, others quickly jumping up from the wreckage, shaking out their arms and legs and brushing away debris before resuming the high speed descent.

Three days later, Casartelli's twenty-three-year-old teammate Lance Armstrong won his second-ever stage of the Tour de France. Race coverage shows the young American—on his way to finishing 36th in his first completed Tour—pointing repeatedly to the sky, both arms raised in tribute to his fallen friend as he crossed the finish line, his head unself-consciously bare.

In the years following Armstrong, of course, became the best-known and most successful American cyclist ever.³ His near death from cancer in 1996, followed by his ascent to the top of the Tour podium on the Champs d'Elysees in 1999 and again in each of the next six years, made for a comeback story like no other. He had returned from the precipice of death

² The most memorable fall prior to 1995, perhaps, was that of perennial Tour runner-up Raymond Poulidor during Stage 13 of the 1973 Tour de France. Poulidor crashed into an adjacent ravine, injuring his head and requiring an airlift off the mountain. See Bill McGann & Carol McGann, *THE STORY OF THE TOUR DE FRANCE: 1965-2007* 79 (2008); CORBIS IMAGES, *Raymond Poulidor in 1973 Tour de France*, <http://www.corbisimages.com/stock-photo/rights-managed/AJA001204/raymond-poulidor-in-1973-tour-de-france> (last visited Aug. 23, 2013), *archived at* <http://perma.cc/C8JH-VU8G>.

³ For an overview of Armstrong's career at its peak, see generally Austin Murphy, *A Grand Finale*, *SPORTS ILLUSTRATED*, Aug. 1, 2005; LANCE ARMSTRONG WITH SALLY JENKINS, *IT'S NOT ABOUT THE BIKE: MY JOURNEY BACK TO LIFE* (Putnam 2000).

stronger, faster, and more determined. Recently, he admitted he had also returned pharmacologically enhanced.⁴

Armstrong's admission was the culmination of years of speculation and an investigation by cycling's governing body. In its 2012 "Reasoned Decision" announcing its findings and the sanctions it would administer, the United States Anti-Doping Agency ("USADA") detailed Armstrong's use of banned drugs.⁵ Nearly 1,000 pages long, the report includes lurid descriptions of blood stored in hidden refrigerators,⁶ faked engine trouble to provide cover and time for transfusions between race stages,⁷ injections of variously colored unidentified substances into riders' bodies,⁸ and belatedly manufactured documentation to excuse a positive drug test.⁹

The report details Armstrong's eagerness to serve as a human guinea pig, and his expectation that his teammates would do the same, ingesting and injecting previously untested performance-enhancing cocktails.¹⁰ Team doctors and coaches closely monitored Armstrong's hematocrit and lactate levels in order to precisely adjust his drug protocol, experimenting with substances, combinations, and dosages to find the optimal balance between enhancement and detection.¹¹ The anticipated benefits—increased efficiency in carrying and processing oxygen, decreased recovery times, and, ultimately, victory—took precedence over any possible side effects or long-term harm from the drugs.

Both Casartelli's death and Armstrong's self-experiments bring into high relief some of the more extreme risk of harm to which elite athletes voluntarily expose themselves. Yet on a more mundane level, competitive sports inevitably involve the risk of bodily harm. Training is itself a process

⁴ *Oprah and Lance Armstrong: The Worldwide Exclusive* (OWN television broadcast Jan. 17-18, 2013), archived at <http://perma.cc/RW5N-9ZP8> (hereinafter "*Oprah and Lance Armstrong*"). An abridged transcript of the interview is available at *Lance Armstrong's Interview with Oprah Winfrey: the transcript*, TELEGRAPH (Jan. 18, 2013, 2:34 P.M.), www.telegraph.co.uk/sport/othersports/cycling/lancearmstrong/9810801/Lance-Armstrong-interview-with-Oprah-Winfrey-the-transcript.html, archived at <http://perma.cc/D66F-AFY3>.

⁵ *USADA v. Armstrong, Reasoned Decision of the United States Anti-Doping Agency on Disqualification and Ineligibility* (Oct. 10, 2012) (hereinafter "*ARMSTRONG REASONED DECISION*").

⁶ *Id.* at 61.

⁷ *Id.* at 70-71.

⁸ *Id.* at 117 & n. 639.

⁹ *Id.* at 32.

¹⁰ See *id.* at 6 & 59-60; see generally *id.* (describing Armstrong's use, and encouragement and enforcement of his teammates' use, of EPO for untested and unapproved enhancement purposes).

¹¹ *Id.* at 100.

of traumatizing muscles—tearing them down in the hope that the body rebuilds them stronger. In some sports, like boxing, causing harm to a competitor is the basis of success. And continuing despite devastating injury is the hallmark of a modern sports hero—think Kerri Strug vaulting to golden super-stardom on a badly damaged ankle before collapsing to the mat in agony during the 1996 Olympics.¹² Regardless of the sport, the risk of grave injury is ever-present and accepted on the elite level. Not all such risks, though, are regulated in the same way.

Some risks are at most minimally regulated. The Col de Portet d'Aspet, with its hazardous cement pylons and hairpin turns, has remained a popular cycling trial and riders in more than half of the Tours de France since Casartelli's death have taken on its challenges. Moreover, while helmets have been required in most instances in professional bicycle racing by the sport's governing bodies since 2003,¹³ outside of that context their use is discretionary in the United States.¹⁴ The immediate risk of bodily harm—and even death—while training or competing is just one of the trials for the athletes to overcome, and is accepted by our laws, our athletes, the sport's governing bodies, and the American public.

In contrast, the perceived risk from performance-enhancing substances is subject to intense regulation; that is, federal and state laws prohibit the sort of self-experimentation that Armstrong undertook. While popular discussion has focused on his use of performance-enhancing substances as a form of cheating, the laws governing this area are, perhaps surprisingly, unconcerned with morality or fairness in the competition itself.¹⁵ Instead,

¹² George Vecsey, *Sports of the Times: Strug Took Her Chances For the Gold*, N.Y. TIMES, July 24, 1996, archived at <http://perma.cc/49TQ-9SGX>. Similarly, sports sociologist Jay Coakley has noted that “a player’s willingness to compete in pain while subjecting one’s body to danger on the field is the mark of a true athlete.” Jay Coakley, *SPORT IN SOCIETY: ISSUES AND CONTROVERSIES* 164 (2009).

¹³ Press Release, Union Cycliste Internationale, *Mandatory Wear of Helmets for the Elite Category* (May 5, 2003) (on file with author), http://oldsite.uci.ch/english/news/news_2002/20030502i.pdf, archived at <http://perma.cc/J7FU-38A2>.

¹⁴ GOVERNOR'S HIGHWAY SAFETY ASSOCIATION, *Helmet Laws* (November 2013), http://www.ghsa.org/html/stateinfo/laws/helmet_laws.html, archived at <http://perma.cc/9BG-WUM8>.

¹⁵ Federal investigations into Armstrong focused not on whether he cheated, but on whether he defrauded the government, trafficked drugs, laundered money, intimidated witnesses, and engaged in a conspiracy with respect to these possible crimes. See Ian Austen, *Inquiry on Lance Armstrong Ends With No Charges*, N.Y. TIMES, Feb. 4, 2012, at D1, archived at <http://perma.cc/F7XR-RP9G>; see also Press Release, Dept. of Justice, *U.S. Attorney Closes Investigation of Professional Cycling Team*, Rel. No. 12-024 (Feb. 3, 2012)(on file with author), available at <http://perma.cc/9U4D-375G>, (announcing closing of federal criminal conduct investigations into

the legal restrictions on doping are justified as a way to prevent an unacceptable risk of harm from the use of unsafe substances.¹⁶ Our legal perception of, and attitudes towards, this potential for harm—harm to the athletes like Armstrong who choose to use performance-enhancements, to others who believe they must use them to “level the playing field,” and to the “spirit of competition”—means the use of performance-enhancing substances is prohibited, monitored, investigated, and punished in a way other potentially harmful actions are not.

To elite athletes, though, these risks are more similar than not: they are both just part of the game, and part of the job. These contrasting approaches evidence a disconnect between how the law, sporting organizations, and fans approach performance-enhancing substances, and how elite athletes do. As a result of this disjuncture, athletes’ compliance with anti-doping regulations and laws in at least some sports remains low,¹⁷ and any risks associated with the use of prohibited substances are, like high speeds, hairpin turns, and concrete pylons, simply part of an elite athlete’s day’s work. We are no closer to eliminating the use of performance-enhancing substances in sport than we were half a century ago when such efforts began.

This Article analyzes this gap between how legal and sporting authorities, on the one hand, and elite athletes, on the other, approach, understand, and react to the risk of harm from the use of performance-enhancing substances. Specifically, Part I explains the various tangled strands of the United States’ legal and quasi-legal regulation of these substances. It also exposes the staggering ignorance that this approach created and perpetuates with respect to even the most commonly used substances. The successes and failures of this regime are then examined in Part II, which argues that our ignorance concerning the actual effects—both helpful and harmful—of performance-enhancing substances ultimately *increases* demand for these substances. Part III turns to behavioral research to identify specific information we need to successfully align the interests of athletes, sporting officials, legislators, and fans in reducing the harm from doping. In addition, it outlines some sources from which this information may be gathered effectively and ethically with minimal modifications to existing laws and practices. The

Armstrong and his team). The Department of Justice also intervened in a lawsuit filed by Armstrong’s former teammate Floyd Landis that alleges civil fraud violations by Armstrong and his associates. Complaint, United States *ex rel.* v. Tailwind Sports Corp., No. 10-cv-0976-RLW (D.D.C. Apr. 23, 2013).

¹⁶ Part I, *infra*, discusses the American regulation and prohibition of performance-enhancing substances.

¹⁷ Part II, *infra*, details and critiques our lack of success in preventing the use of performance-enhancing substances.

Article concludes by emphasizing the need for an approach to regulating the use of performance-enhancing substances that is consistent with the values and practices of elite sport, while reducing the risk of unnecessary harm.

I. REGULATING IGNORANCE

In the United States, performance-enhancing substances are not subject to a single regulatory regime. Instead, a substance's classification as a "drug" or as a "supplement" determines its legal treatment. This legal framework, then, is formally distinct from the anti-doping efforts of sporting organizations, although at critical times these efforts overlap.

A. Legal Regulation of Drugs

At their most basic level, many performance-enhancing substances are simply drugs: formulations "intended for use in the diagnosis, cure, mitigation, treatment, or prevention of disease in man . . . [or to] affect the structure or function of the body of man."¹⁸ As such, the Food and Drug Administration ("FDA") is the federal agency tasked with overseeing their premarket testing.¹⁹

Federal regulations for human-subjects research limit testing of drugs to instances in which the anticipated benefits of the research to the subjects, together with the more general importance of the knowledge expected to result, outweigh any risk to the subjects from the research.²⁰ This so-called "Common Rule" applies to all research subject to federal regulation and involving human beings.²¹ Fifteen federal departments and agencies have adopted it, including the Department of Health and Human Services, which oversees the FDA.²² Under associated regulations, an Institutional Review Board ("IRB") must approve any human-subjects research in advance after

¹⁸ 21 U.S.C. § 321(g)(1) (2009).

¹⁹ FOOD AND DRUG ADMINISTRATION, *What is the Approval Process for a New Prescription Drug?*, www.fda.gov/AboutFDA/transparency/basics/ucm194949.htm, archived at <http://perma.cc/EY3U-6VZC> (last visited November 5, 2013).

²⁰ 45 C.F.R. § 46.111(a)(2) (2012).

²¹ 45 C.F.R. § 46.101(a) (2012). Research that is at most only minimally invasive is exempted. For a list of these exceptions, see 45 C.F.R. § 46.101(b) (2012).

²² DEPARTMENT OF HEALTH AND HUMAN SERVICES, *Federal Policy for the Protection of Human Subjects ('Common Rule')*, <http://www.hhs.gov/ohrp/humansubjects/commonrule/index.html>, archived at <http://perma.cc/DR2N-KGMT> (last visited Aug. 23, 2013).

assessing the risks and benefits of the research.²³ This approach was formulated in part to ensure that the abuses of past studies were not repeated.²⁴

The legal question in drug approvals is whether a new drug is safe and efficacious for its intended purpose: Given the initial disease or injury the drug is intended to treat, are the side effects and other potential risks worth it? Does it *help* more than it *hurts*? This is an explicitly therapeutic focus, in which drugs are used to treat a particular medical ailment and return a patient's body to normal functioning.²⁵

In contrast to this approach, the use of drugs for performance-enhancement is an effort to improve human functioning and performance *beyond* a normal state or merely good health.²⁶ Because no initial disease or injury is present when enhancement rather than treatment is the goal, any risk or side effect—an ever-present reality with drugs²⁷—is enough to doom any proposed study on human subjects.²⁸ After all, the starting point for enhance-

²³ 45 C.F.R. § 46.111 (2012).

²⁴ For example, in the infamous Tuskegee syphilis study, the United States Public Health Service tracked the untreated progression of syphilis in an African-American community for forty years under the auspices of providing free health care. During the course of the study, twenty men died from syphilis, more died from syphilis-related complications, and many more passed the disease on to their partners and children. For an overview of the Tuskegee study, see generally James H. Jones, *BAD BLOOD: THE TUSKEGEE SYPHILIS EXPERIMENT* (1981). For the ways in which the study impacted future human-subjects research, see CENTERS FOR DISEASE CONTROL AND PREVENTION, *How Tuskegee Changed Research Practices*, <http://www.cdc.gov/tuskegee/after.htm>, archived at <http://perma.cc/XT6U-F9LA> (last visited Nov. 6, 2013).

²⁵ Gary A. Green, *The Role of Physicians, Scientists, Trainers, Coaches, and Other Nonathletes in Athletes' Drug Use*, in *PERFORMANCE-ENHANCING TECHNOLOGIES IN SPORTS: ETHICAL, CONCEPTUAL, AND SCIENTIFIC ISSUES* 82 (Thomas H. Murray, et al., eds. 2009) (hereinafter, "PERFORMANCE-ENHANCING TECHNOLOGIES").

²⁶ For an overview of approaches to understanding enhancements, see Eric T. Juengst, *What Does Enhancement Mean?*, in *ENHANCING HUMAN TRAITS: ETHICAL AND SOCIAL IMPLICATIONS* 29 (Erik Parens, ed. 2000).

²⁷ See, e.g., Anjan Chatterjee, *Cosmetic Neurology: The Controversy Over Enhancing Movement, Mentation, and Mood*, 63 *NEUROLOGY* 968, 970 (2004) ("Virtually all medications have potential side effects that range from minor inconveniences to severe disability or death."); cf., Anita Bernstein & Joseph Bernstein, *An Information Prescription for Drug Regulation*, 54 *BUFF. L. REV.* 569, 570 (2006) (noting that, in the context of FDA approval, "[s]afe" does not mean "incapable of doing harm"; all drugs do harm.).

²⁸ See generally Maxwell Mehlman & Jessica Berg, *Human Subjects Protections in Biomedical Enhancement Research: Assessing Risk and Benefit and Obtaining Informed Consent*, 36 *J. LAW, MEDICINE & ETHICS* 546 (2008) (arguing that, contrary to current assumptions and practices, enhancement research requires few protections for human subjects beyond those accepted for therapeutic research).

ment is normal health, not illness.²⁹ Thus, while an IRB may deem a drug that treats anemia but increases a user's risk of stroke beneficial enough given its therapeutic benefits to test as a treatment for anemia, the same risk of stroke would be unacceptable were a manufacturer instead to propose testing the drug to increase the blood's oxygen-carrying capacity to improve an athlete's endurance.³⁰ Whether the availability of a drug constitutes cheating or potentially provides an unfair advantage to an athlete is not part of the consideration in the FDA's approval process.³¹ Just as American law does not concern itself with the composition of baseball bats,³² whether a football coach spies on opponents' signals,³³ or how much of the course a marathoner actually runs,³⁴ only where enhancement involves a legal offense—not simply cheating—does the law involve itself.³⁵

²⁹ *Id.* at 547.

³⁰ Synthetic erythropoietin ("EPO"), one of the drugs USADA repeatedly cited in its case against Armstrong, offers this trade-off. See Malcolm Gladwell, *Performance-Enhancing Drugs Should Be Regulated Not Prohibited*, in PERFORMANCE-ENHANCING DRUGS 56–58 (James Haley, ed., Greenhaven Press 2003).

³¹ Others have also noted this fact. See, e.g., Maxwell J. Mehlman, *How Will We Regulate Genetic Enhancement*, 34 WAKE FOREST L. REV. 671, 701 (1999) ("[T]he scope of FDA review is statutorily limited to safety and efficacy. It currently does not have any statutory authority to consider . . . social problems of fairness or cheating.").

³² Unlike the law, sporting regulations are very concerned with such things. For example, Major League Baseball suspended Chicago Cubs star player Sammy Sosa for eight games in 2003 after his bat shattered in a game, revealing pieces of cork. See *Cork Screwed*, CNN SPORTS ILLUSTRATED, (June 7, 2003), http://sportsillustrated.cnn.com/baseball/news/2003/06/06/sosa_suspension_ap/, archived at <http://perma.cc/RRP4-JJ55>

³³ In 2007, the National Football League fined Bill Belichick and the New England Patriots a combined total of \$750,000 and caused the team to forfeit its 2008 first-round draft selection for videotaping the New York Jets' defensive coaches' signals. See *NFL fines Belichick, strips Patriots of draft pick*, NFL.COM, (Sept. 13, 2007) <http://www.nfl.com/news/story/09000d5d80251b7e/article/nfl-fines-belichick-strips-patriots-of-draft-pick>, archived at <http://perma.cc/G6MQ-SBLR>.

³⁴ Race officials originally declared Rosie Ruiz the winner of the 1980 Boston Marathon, but later disqualified her after it came to light that she had entered the race only in the last mile. Moreover, Ruiz had qualified for the marathon based on her performance in the 1979 New York Marathon, which was later discovered to be another instance of cheating: Ruiz had ridden the subway for part of the distance. See *This Day in History*, HISTORY.COM, <http://www.history.com/this-day-in-history/rosie-ruiz-fakes-boston-marathon-win>, archived at <http://perma.cc/8S8W-QPGC> (last visited Aug. 23, 2013).

³⁵ For example, prosecutors charged Barry Bonds and Roger Clemens with obstruction of justice and perjury in connection with their testimony about their use of prohibited performance-enhancing drugs, but not for the use of the drugs them-

As a result, neither the government nor manufacturers conduct tests to determine whether a new drug is effective to enhance performance. Instead, doctors, coaches, and athletes formulate enhancement protocols by extrapolating from how drugs act in the tested, therapeutic context. For example, researchers developed human growth hormone (“HGH”) to treat growth disorders in children and hormonal deficiencies that lead to a loss of muscle mass and decreased energy in adults.³⁶ However athletes began using it in the hope it would enhance their athletic performance, guessing that if HGH increased muscle mass and decreased fatigue in individuals with naturally low levels of the hormone, it should have the same effect on them. More recently, the multi-billion dollar anti-aging industry has marketed it as a fountain of youth based on similar logic.³⁷

No testing supports these uses; instead, they rest on an assumption that HGH will produce the same results when taken by an otherwise healthy individual as it does when taken by someone who naturally underproduces it.³⁸ Similarly, researchers derive the assumed negative effects of HGH when used for performance enhancement by extrapolating from known effects on individuals whose bodies naturally overproduce the hormone.³⁹ It may well be, though, that it is the *underproduction* of HGH in the

selves. *United States v. Bonds*, 580 F. Supp. 2d 925 (N.D. Cal. 2008) (dismissing perjury charge from indictment on Bonds’s motion, but denying motion to dismiss obstruction of justice charge); *United States v. Clemens*, No. 10-cr-00223-RBW, 2010 WL 3260179 (D.D.C. Aug. 19, 2010) (indictment). *See also* note 15, *supra* (describing Armstrong criminal investigations). On a related point, see Matt Hlinak, *Cheating in Professional Sports and the Criminal Justice System*, 9 WILLAMETTE SPORTS L.J. 19 (2012) (questioning whether criminal law is correct venue for policing sports cheating).

³⁶ *See generally* Susan Cohen & Christine Cosgrove, *NORMAL AT ANY COST* (Penguin Group 2009) (examining the development and use of HGH).

³⁷ In some instances these uses overlap, as seen with the “anti-aging clinic” scandal in Major League Baseball. *See* Tim Elfrink, *A Miami Clinic Supplies Drugs to Sports’ Biggest Names*, MIAMI NEW TIMES, (Jan. 31, 2013) <http://www.miaminewtimes.com/2013-01-31/news/a-rod-and-doping-a-miami-clinic-supplies-drugs-to-sports-biggest-names/full/> (last visited Aug. 23, 2013) (exposing Florida anti-aging clinic Biogenesis’s provision of HGH, testosterone, and anabolic steroids to Major League Baseball players).

³⁸ Ioulietta Erotokritou-Mulligan, et al., *Growth Hormone Doping: A Review*, OPEN ACCESS J. SPORTS MED. 2011:2 99–102; *see also* Charles E. Yesalis & Michael S. Bahrke, *Issues, Concerns, and the Future of Performance Enhancing Substances in Sport and Exercise*, in PERFORMANCE-ENHANCING SUBSTANCES IN SPORT AND EXERCISE 351, 352 (Michael S. Bahrke & Charles E. Yesalis, eds.).

³⁹ *See, e.g.*, Brian P. Brennan, et al., *Human Growth Hormone Abuse in Male Weightlifters*, 20 AM. J. ON ADDICTIONS 9, 9 (2010) (“There is substantial evidence that long-term supraphysiologic levels of HGH may cause adverse effects—as suggested

first instance that makes its supplementation beneficial in the therapeutic context.⁴⁰ Simply put, it might be that only people who naturally produce low levels of HGH respond positively to its artificial introduction. In individuals who naturally produce normal levels, the excess hormone may be simply a waste product, just as excess vitamin C is flushed unused from the body.⁴¹ We just don't know.

If prescribed by a doctor, enhancement and anti-aging uses of HGH would be "off-label": prescribed for a use other than those for which the drug was tested and approved. In most instances, physicians are free to write off-label prescriptions, limited only by medical malpractice standards.⁴² The use of drugs for performance enhancement is always an off-label use since there is no testing of the drugs for this purpose, and thus no FDA approval. Instead, enhancement is an imprecise extension of a therapeutic use of the drug.⁴³

For many drugs, off-label prescriptions dwarf those for approved purposes. For example, approximately 90% of the prescriptions written for the drug modafinil are off-label.⁴⁴ An anti-narcolepsy drug also approved for

by studies of acromegaly, a naturally occurring disorder characterized by prolonged supraphysiologic levels of HGH."); *Report of the Council on Scientific Affairs: Steroids in Amateur and Professional Sports—The Medical and Social Costs of Steroid Abuse: Hearings Before the H. of Representatives Comm. on the Judiciary*, 101st Cong. 81 (April 3 & May 9, 1989) (hereinafter "1989 STEROIDS HEARINGS") (predicting adverse effects of HGH use on athletes by reference to known effects of natural hyperproduction of the hormone).

⁴⁰ See Brennan et al., *supra* note 39, at 12 ("[T]here is little evidence that supraphysiologic HGH produces anabolic effects in non-HGH-deficient individuals—although it may have such effects when used in conjunction with [anabolic steroids] . . .").

⁴¹ Katherine Zeratsky, *Too much vitamin C: Harmful?*, THE MAYO CLINIC (Mar. 20, 2012), <http://www.mayoclinic.com/health/vitamin-c/AN01801>.

⁴² See Philip M. Rosoff & Doriane Lambelet Coleman, *The Case for Legal Regulation of Physicians' Off-Label Prescribing*, 86 NOTRE DAME L. REV. 649, 660–76 (2011) (providing an overview of existing regulations—and the virtual lack thereof—concerning physicians' off-label prescribing); James T. O'Reilly, *FDA and Off-Label Drug Promotion*, 1 FOOD & DRUG ADMIN. 15:45 (2011) (explaining that, once the FDA approves marketing and sale of a new drug, informal and nonstatutory provisions allow individual physicians freedom to use the drug in unapproved ways).

⁴³ David C. Radley, et al., *Off-Label Prescribing Among Office-Based Physicians*, 166 ARCHIVES OF INTERN. MED. 1021 (2006) (finding 73% of off-label prescriptions lacked scientific support for the use).

⁴⁴ Renee A. Penalozza, et al., *Trends in On-Label and Off-Label Modafinil Use in a Nationally Representative Sample*, 173 JAMA INTERN. MED. 704, 704 (2013). Modafinil is sold both as a generic drug and as "Provigil" in the United States

obstructive sleep apnea and certain other sleeping problems, modafinil is also a popular cognitive enhancer for students cramming for exams, surgeons seeking to stay alert for one more procedure, and computer programmers staying up all night on coding binges.⁴⁵ These enhancement purposes are off-label, yet pervasive and legal.

It is illegal, however, to prescribe or use certain drugs in off-label ways.⁴⁶ The Controlled Substances Act (“CSA”) regulates the manufacture, importation, possession, use, and distribution of certain “controlled substances.” The CSA divides these substances into five categories or “schedules” based on their characteristics. Schedule I substances are considered unsafe for any use.⁴⁷ They have no currently-accepted medical uses and a high potential for abuse; physicians may not prescribe them at all.⁴⁸ Inclusion on Schedules II-V reflects the judgment that, while its off-label use is not legitimate, the substance does have proven medical use.⁴⁹

Almost all controlled substances are popular for recreational use and are addictive, and most are narcotics, depressants, stimulants, or psychotropic drugs.⁵⁰ However, in a flurry of outrage in 1990 after their widespread use in sports was revealed, Congress included anabolic steroids under the CSA even though they did not fit this profile.⁵¹ As such, their off-label use is prohibited, and their distribution, use, or possession without a prescription for an approved purpose is a criminal offense.⁵² The goal is deterring use of these drugs outside of a very narrowly conscribed medical context.

(www.provigil.com, *archived at* <http://perma.cc/Z9XL-R9C8>). While physicians may write off-label prescriptions for it, the World Anti-Doping Agency (“WADA”) prohibits its use by athletes. WADA, *The 2013 Prohibited List* S6(a), http://www.wada-ama.org/Documents/World_Anti-Doping_Program/WADP-Prohibited-list/2013/WADA-Prohibited-List-2013-EN.pdf, *archived at* <http://perma.cc/K5FG-L7ZB> (Sept. 10, 2012) (hereinafter “WADA Prohibited List”).

⁴⁵ Penaloza, *supra* note 44, at 704.

⁴⁶ 21 U.S.C. § 829 (2009) (setting forth requirements for prescribing controlled substances); 21 C.F.R. § 1306.04(a) (2013) (“A prescription for a controlled substance . . . must be issued for a legitimate medical purpose by an individual practitioner acting in the usual course of his professional practice.”).

⁴⁷ 21 U.S.C. § 812(1)(B) (2009).

⁴⁸ *Id.* Heroin, peyote, and LSD, for example, are Schedule I substances. *Id.*

⁴⁹ 21 C.F.R. § 1306.04(a) (2009).

⁵⁰ See 21 U.S.C. §§ 801–904 (2009); *Legislation to Amend the Controlled Substances Act (Anabolic Steroids): Hearing on H.R. 3216 Before the Subcomm. on Crime of the H. of Representatives Comm. on the Judiciary*, 100th Cong. 2d Sess. 60 (1988) (statement of Gene Haislip) (hereinafter “1988 STEROID HEARING”).

⁵¹ 21 U.S.C. § 812 Schedule III(e) (2012).

⁵² 21 U.S.C. §§ 841–44 (2010); 21 C.F.R. § 1306.04(a) (2013).

In prohibiting the off-label use of anabolic steroids, Congress primarily focused its inquiries on the drugs' potential for harm when used for performance-enhancement, asking:

What risks are American athletes running if they take these drugs? Just how big a problem are these drugs becoming? What is the nature of the abuse of these drugs and how widespread has it become? What are the current laws available to prevent this abuse and what should we be doing to better protect athletes, young and old, from these particular drugs?⁵³

In answer, numerous agency and medical witnesses repeatedly testified about the lack of information on these points, and questioned whether strategies other than prohibition might curtail the use of steroids for enhancement purposes.⁵⁴ One witness succinctly summarized the state of research into the harmful effects of steroids when he answered his own question, "What are the long-term health effects in otherwise healthy people? We do not know. It is pure conjecture what is going to happen in the long-run. That has not been studied."⁵⁵

Representatives from the American Medical Association ("AMA"), Drug Enforcement Agency ("DEA"), FDA, and Department of Justice ("DOJ") unequivocally opposed including steroids under the CSA. These agencies were unified in expressing concern over the lack of information concerning the risk of harm from the nontherapeutic use of steroids.⁵⁶ Specifically, the DOJ urged Congress to await the results of an already-commissioned task force study into the use and abuse of steroids before deciding whether to schedule them⁵⁷ and the AMA stressed the folly of limiting off-label medical uses for the drugs,⁵⁸ arguing that existing data failed to demonstrate that steroids were either physically or psychologically addictive.

⁵³ Statement of William J. Hughes (Chairman of the Subcommittee on Crime), 1988 STEROID HEARING, *supra* note 50, at 3.

⁵⁴ Statement of Dr. David L. Bever, 1988 STEROID HEARING, *supra* note 50, at 54–55; *Anabolic Steroid Restriction Act of 1989: Hearing on H.R. 995 Before the Subcomm. on Crime of the H. of Representatives Comm. on the Judiciary*, 101st Cong., 1st Sess. 47 (1989) (statement of Dr. Charles E. Yesalis III) (hereinafter "MARCH 1989 STEROID HEARING"); Statement of Dr. David E. Katz, 1989 STEROIDS HEARINGS, *supra* note 39, at 56.

⁵⁵ Testimony of Dr. Charles E. Yesalis III, 1988 STEROID HEARING, *supra* note 50, at 42.

⁵⁶ Statement of the AMA, 1988 STEROID HEARING, *supra* note 50, at 91–92.

⁵⁷ *Anabolic Steroids Control Act of 1990: Hearings on H.R. 4658 Before the Subcomm. on Crime of the H. of Representatives Comm. on the Judiciary*, 101st Cong., 2nd Sess. 37 (1990) (statement of Leslie Southwick (DOJ)).

⁵⁸ Statement of the AMA, 1988 STEROID HEARING, *supra* note 50, at 94.

tive.⁵⁹ The DEA pointedly expressed concern with taking legislative action under these circumstances, stating: “There is a great deal about the problem that we don’t know, a great deal about the steroids themselves in terms of their impacts, a great deal about this casual traffic and what I would refer to as abuse of steroids—that is unknown and that we should try to discover. . . .”⁶⁰ Disregarding this opposition, Congress amended the CSA to include anabolic steroids.⁶¹ In parallel legislation, Congress also prohibited the off-label use of HGH.⁶² As a result of these prohibitions, our knowledge about the effects of anabolic steroids and HGH on healthy bodies has barely advanced in a quarter of a century.

B. Legal Regulation of Supplements

While we know little about performance-enhancing drugs like steroids and HGH, we know even less about supplements. The Food, Drug & Cosmetic Act⁶³ defines supplements as substances intended for human ingestion that contain vitamins, minerals, herbs or other botanical products, amino acids, enzymes, or other substances found in the human diet,⁶⁴ so long as they do not have a proven therapeutic use as a drug.⁶⁵

In contrast to drugs, supplements receive very little oversight from anyone. From a regulatory perspective, supplements are merely food.⁶⁶ Like other foods, supplements are free from the regulatory scheme that applies to drugs, including the FDA’s testing requirements.⁶⁷ Instead, they are subject to the Dietary Supplement Health & Education Act (“DSHEA”), under

⁵⁹ Statement of Dr. Edward L. Langston, 1989 STEROIDS HEARINGS, *supra* note 39, at 69; Statement of the AMA, 1988 STEROID HEARING, *supra* note 50, at 94.

⁶⁰ Testimony of Gene Haislip, 1988 STEROID HEARING, *supra* note 50, at 60.

⁶¹ 21 U.S.C. § 812 Schedule III(e) (2012) (listing anabolic steroids as a controlled substance); *id.* at § 802(41) (defining anabolic steroids); *see also* Maxwell J. Mehlman, et al., *Doping in Sports and the Use of State Power*, 50 ST. LOUIS U. L.J. 15 & Appendix A (2005) (discussing the CSA’s regulation of steroids and listing the states that include anabolic steroids in their controlled substances acts).

⁶² 21 U.S.C. § 333(e)(1) (2012).

⁶³ 21 U.S.C. § 301, et seq.

⁶⁴ 21 U.S.C. § 321(ff) (2009).

⁶⁵ *FDA Basics: Is a dietary supplement a food or a drug?* FOOD & DRUG ADMIN. (Dec. 30, 2009), <http://www.fda.gov/AboutFDA/Transparency/Basics/ucm194355.htm>, archived at <http://perma.cc/686P-VP29> (“If a dietary supplement meets the definition of a drug, it is regulated as a drug.”).

⁶⁶ 21 U.S.C. § 321(ff) (2009).

⁶⁷ Lars Noah & Barbara A. Noah, *A Drug by Any Other Name . . .?: Paradoxes in Dietary Supplement Risk Regulation*, 17 STAN. L. & POL’Y REV. 165, 168–69 (2006).

which manufacturers may market them absent an affirmative showing by the FDA that they are adulterated.⁶⁸

No pre-market testing or FDA approval of supplements is required under DSHEA; unlike drugs, the safety of supplements is assumed and efficacy toward any end is not required.⁶⁹ Even where the product contains a “new dietary ingredient”, the manufacturer need only notify the FDA of its basis for believing the ingredient to be reasonably safe.⁷⁰ The FDA then bears the burden of proving otherwise.⁷¹ In fact, the law does not require a manufacturer even to report injuries or illnesses caused by its product unless they are “serious.”⁷² As a result, manufacturers do little themselves to determine their products’ side effects, problems, or benefits⁷³—or even to confirm that their products’ labeling matches the ingredients.⁷⁴ This lack of regulation of supplements perpetuates our ignorance about their effects.

Some of the better-known performance-enhancing “drugs” are actually supplements, unproven to achieve any end but marketed as simulating the effects of harder-to-get, more expensive, or prohibited drugs. In 1998, for example, as Mark McGwire and Sammy Sosa were in the midst of the home

⁶⁸ Dietary Health & Supplement Act of 1994, Pub. L. No. 103-417, 108 Stat. 4325 (codified in scattered sections of 21 U.S.C.). For an in-depth discussion of dietary supplement regulation, see generally *supra* note 67.

⁶⁹ See Thomas L. Schwenck & Chad D. Costley, *When Food Becomes a Drug: Nonanabolic Nutritional Supplement Use in Athletes*, 30 AM. J. OF SPORTS MED. 907, 915 (2002) (“Many supplements are marketed and promoted based on various theoretical benefits, often derived from limited animal studies, without any basis for recommending their human use for specific, proven ergogenic benefits.”).

⁷⁰ Andrew L.T. Green, Note, *Spreading the Blame: Examining the Relationship Between DSHEA and the Baseball Steroid Scandal*, 90 B.U. L. REV. 399, 410 (2010).

⁷¹ *Id.*

⁷² Noah & Noah, *supra* note 67. Serious adverse events include death, life-threatening injury, inpatient hospitalization, persistent or significant disability or incapacity, and congenital anomaly or birth defect, as well as medical or surgical intervention reasonably needed to prevent one of these events. Dietary Supplement and Nonprescription Drug Consumer Protection Act, Pub. L. No.109-462, 21 U.S.C. §379aa-1(a)(2).

⁷³ John M. Tokish, et al., *Ergogenic Aids: A Review of Basic Science, Performance, Side Effects, and Status in Sports*, 32 AM. J. SPORTS MED. 1543, 1551 (2004); see also Ron J. Maughan, et al., *Dietary Supplements*, 22 J. SPORTS SCI. 95, 97 (2004) (“For most of these supplements, there are few supporting data—indeed, few experimental data at all.”).

⁷⁴ See Hans Geyer, et al., *A-Z of Nutritional Supplements: Dietary Supplements, Sports Nutrition Foods and Ergogenic Aids for Health and Performance—Part 22*, 45 BRITISH J. SPORTS MED. 752 (2011); Maxie Kohler, et al., *Confiscated Black Market Products and Nutritional Supplements with Non-Approved Ingredients Analyzed in the Cologne Doping Control Laboratory 2009*, 2 DRUG TESTING & ANALYSIS 533 (2010).

run race McGwire would ultimately win, an Associated Press reporter noted the name on a brown bottle sitting in McGwire's locker.⁷⁵ When asked, a cardiologist told the reporter that the substance marked on the bottle—"Androstenedione"—was a testosterone precursor commonly known as "andro". A supplement taken by some athletes in the belief it would stimulate their bodies' production of testosterone, andro's proponents believed that it acted as a then-legal steroid.⁷⁶

Does it work? Who knows? As with other supplements, andro's manufacturers performed no research into its efficacy before marketing it.⁷⁷ The minimal research that exists suggests the substance may well be just a placebo: A 2003 review summarizing four published sports medicine studies into the effects of andro supplementation concluded the substance showed "questionable ergogenic effects."⁷⁸ A 2004 overview of research concluded, "the marketing of this supplement's effectiveness far exceeds its science No study has shown a significant ergogenic effect of any kind with andro supplementation."⁷⁹ Despite the lack of evidence that andro does much of anything, the International Olympic Committee ("IOC") prohibited its use as of 1997⁸⁰ and the World Anti-Doping Agency ("WADA") followed suit in 2004.⁸¹ Falling in line, Congress amended the CSA shortly thereafter to

⁷⁵ See *Special Report: Who Knew*, ESPN THE MAGAZINE, <http://sports.espn.go.com/espn/eticket/story?page=steroids&num=8>, archived at <http://perma.cc/MPL7-5HEZ> (last visited Oct. 8, 2013).

⁷⁶ *Id.*

⁷⁷ Or if it was, it was not required and the results have not been published. *Legal in Baseball*, CNN SPORTS ILLUSTRATED, Aug. 22, 1998, http://sportsillustrated.cnn.com/baseball/mlb/news/1998/08/22/mcgwire_supplement/, archived at <http://perma.cc/V97N-38YJ>.

⁷⁸ Eric G. Boyce, *Use and Effectiveness of Performance-Enhancing Substances*, 16(1) J. OF PHARMACY PRACTICE 28 (2003). See also Greg E. Bradley-Popovich & Christopher R. Mohr, *Androstenedione and Androstenediol in Sport: A Brief Review of Safety and Efficacy*, 15 J. SPORTS CHIROPRACTIC & REHABILITATION 20 (2001) (finding mixed, and at most minimal, effects on muscle strength from andro supplementation); Maughan, et al., *supra* note 73, at 109 ("There is no evidence that androstenedione and similar prohormones are anabolic agents").

⁷⁹ Tokish, et al., *supra* note 73, at 1550.

⁸⁰ Kirk Johnson, *As Drugs in Sports Proliferate, So Do Ethical Questions* N. Y. TIMES (1998), archived at <http://perma.cc/7TAN-8CC3>.

⁸¹ See *The 2004 Prohibited List*, WORLD ANTI-DOPING AGENCY, 2004, http://www.wada-ama.org/Documents/World_Anti-Doping_Program/WADP-Prohibited-list/WADA_Prohibited_List_2004_EN.pdf, archived at <http://perma.cc/X4QN-T8UB> (prohibiting androstadeinone as of Jan. 1, 2004).

add andro and similar substances as Schedule III controlled substances⁸² and the FDA banned its sale entirely.⁸³

C. Regulation of Performance-Enhancing Substances in Sports

In contrast to this dual legal framework, no differentiation between the regulation of drugs and of supplements exists for purposes of sports governance of the use of performance-enhancing substances. Instead, both are evaluated under identical criteria.

The primary document governing the use of performance-enhancing substances in Olympic sports is the WADA “Prohibited List.”⁸⁴ The list includes substances that meet at least two of the following criteria: (1) enhancing, or having the potential to enhance, performance; (2) posing an actual or potential health risk to athletes using them; and (3) being contrary to the spirit of sport.⁸⁵ In short, those that “work” and those that harm. However, in many cases no solid evidence exists that a prohibited substance offers any enhancement or causes any harm: Instead, presumptions stand in for data.⁸⁶

Once WADA includes a substance on the Prohibited List, athletes can no longer take it without risking a positive drug finding and suspension from competition. A “positive” finding can result from a laboratory test that shows the presence of a prohibited substance in the athlete’s body or from a “non-analytical positive”, based on circumstantial evidence of prohibited drug use such as witness testimony,⁸⁷ “whereabouts” violations,⁸⁸ or

⁸² Anabolic Steroid Control Act of 2004, Pub. L. 108–358, 118 Stat. 1661 (Oct. 22, 2004).

⁸³ See News Release, FDA, HHS Launches Crackdown on Products Containing Andro: FDA Warns Manufacturers to Stop Distributing Such Products (Mar. 11, 2004), <http://www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/2004/ucm108262.htm>, archived at <http://perma.cc/NL2G-S4AF>.

⁸⁴ WADA Prohibited List, *supra* note 81. United States professional sports leagues also have their own governing frameworks, but the specifics of each are beyond the scope of this Article.

⁸⁵ World Anti-Doping Agency, WORLD ANTI-DOPING CODE Art. 4.3.1 & comment to Art. 4.3.2 (2009), http://www.wada-ama.org/Documents/World_Anti-Doping_Program/WADP-The-Code/WADA_Anti-Doping_CODE_2009_EN.pdf, archived at <http://perma.cc/4VLT-W98C> (hereinafter “WORLD ANTI-DOPING CODE”). In addition, the Prohibited List includes substances that mask the use of other prohibited substances. *Id.*

⁸⁶ See Green, *supra* note 25, at 87; Srikumaran Melethil, *Making the WADA Prohibited List: Show Me the Data*, 50 ST. LOUIS U. L.J. 75, 77 (2005).

⁸⁷ Armstrong, Michelle Collins, Chryste Gaines, and Tim Montgomery were each found to have violated anti-doping rules largely based on testimony from team-

suspicious biological passport information.⁸⁹ While an athlete may receive a “therapeutic use exemption” to excuse the use of a prohibited substance if he has a recognized medical need for the substance,⁹⁰ athletes are strictly liable for all substances in their bodies.⁹¹ Under this approach, either an athlete has used an impermissible substance without advance permission, and has thus engaged in performance enhancement, or he has not. Neither the athlete’s intent nor his knowledge of what he ingested or a substance’s status as prohibited, nor the actual therapeutic or enhancement effect on his body, is relevant in declaring a positive finding.

In the United States, USADA enforces athletes’ use of substances on the Prohibited List. Created in 2000 by Congress and receiving approximately two-thirds of its funding from the United States government,⁹² USADA is a quasi-governmental organization. Its responsibilities include fulfilling American obligations under the International Convention Against

mates and team personnel. ARMSTRONG REASONED DECISION, *supra* note 5; USADA v. Collins, AAA 30 190 00658 04 (Oct. 12, 2004); USADA v. Gaines, CAS 2004/O/649 (Dec. 13, 2005); USADA v. Montgomery, CAS 2004/O/645 (Dec. 13, 2005).

⁸⁸ WADA requires elite athletes to file their anticipated location for every day of the following three month period at the start of each calendar quarter, including the exact location they will be during a 60-minute window on each day. If an athlete fails to file the information accurately or to update it as needed, or misses three unannounced tests in any 18-month period, he has committed a “whereabouts” doping violation. See WADA-AMA, *Doping Control*, ATHLETE GUIDE (5th ed.) (2009), http://www.wada-ama.org/Documents/Anti-Doping_Community/Athlete_Guide_2008_EN.pdf, archived at <http://perma.cc/9T7Q-U64A>.

⁸⁹ An athlete’s “biological passport” is a record of his biological parameters, established by blood and urine testing, over time. The information is used both to target athletes with suspicious profiles for additional drug testing and as indirect evidence of doping. See WADA-AMA, *Questions & Answers on the Athlete Biological Passport*, <http://www.wada-ama.org/en/Science-Medicine/Athlete-Biological-Passport/Q—A-on-the-Athlete-Biological-Passport/> (last updated November 2011), archived at <http://perma.cc/Q6YW-4LNM>.

⁹⁰ WORLD ANTI-DOPING CODE, *supra* note 85, at Art. 4.4; see also WADA-AMA, *Questions & Answers on Therapeutic Use Exemptions*, <http://www.wada-ama.org/en/Science-Medicine/TUE/QA-on-Therapeutic-Use-Exemptions/>, archived at <http://perma.cc/YDK7-EDYQ> (last updated Nov. 2012) (providing detailed information on when such exemptions are granted). If an exemption is granted, the athlete’s doping test will be categorized as “adverse analytical finding”, but not “positive”. See *infra* notes 111–16 and accompanying text for further discussion of this distinction.

⁹¹ WORLD ANTI-DOPING CODE, *supra* note 85, at Art. 2.1.1.

⁹² U.S. Anti-Doping Agency Audit Report (May 5, 2011), <http://www.usada.org/audit-report>, archived at <http://perma.cc/9K92-JHXL>.

Doping in Sport, which obligates signatories to combat the use of banned performance-enhancing substances.⁹³

While the Prohibited List is a sporting—not a legal—document, efforts to combat banned substances have at times led to government enforcement of its prohibitions. For example, federal agents subpoenaed and seized emails and other incriminating documents belonging to the Bay Area Laboratory Co-Operative (“BALCO”) in connection with a federal criminal investigation into the company’s creation and distribution of so-called “designer steroids” to elite athletes.⁹⁴ Federal officials interviewed athletes and team personnel about performance-enhancing drug use, and threatened them with perjury and obstruction of justice charges if they were not truthful and forthcoming.⁹⁵ The agents then provided transcripts of the interviews and the written evidence they had accumulated to USADA for use in its non-analytical positive drug cases against sprinters Tim Montgomery,⁹⁶ Marion Jones,⁹⁷ Michelle Collins,⁹⁸ Alvin Harrison,⁹⁹ Kelli White,¹⁰⁰ and

⁹³ UNESCO International Convention against Doping in Sport, Feb. 1, 2007, 2419 U.N.T.S. 201; see also Treasury and General Appropriations Act, Pub. L. No. 107-67, 115 Stat. 514, 593 (2003) (designating USADA as United States’ anti-doping agency for Olympic and international sports competition).

⁹⁴ Eleven people were sentenced in connection to the investigation. For a summary of the BALCO investigation and resulting convictions, see Paul Elias, *Bonds sentencing brings BALCO saga near a close*, UT SAN DIEGO (Dec. 14, 2011) <http://www.utsandiego.com/news/2011/dec/14/bonds-sentencing-brings-balco-saga-near-a-close/all/>, archived at <http://perma.cc/C2EK-Z6AU>.

⁹⁵ Baseball player Barry Bonds and sprinter Marion Jones were convicted and sentenced for their statements during the BALCO hearings, and the government threatened New York Yankees’ athletic trainer Brian McNamee with prosecution for perjury concerning statements he made about his role in delivering performance-enhancing drugs to athletes. See *United States v. Bonds*, No. 3:07-cr-73251, 2011 (N.D. Cal. Dec. 6, 2011) (sentencing memorandum: obstruction of justice); *United States v. Jones*, No. S6 05-cr-01067-KMK (S.D. N.Y. Oct. 5, 2007) (sentencing memorandum: false statements); *McNamee v. Clemens*, 762 F.Supp. 2d 584, 589 (E.D.N.Y. 2011).

⁹⁶ *USADA v. Montgomery*, CAS 2004/0/645 4-5 (Dec. 13, 2005).

⁹⁷ See Anderson, et al., v. International Olympic Committee, CAS 2008/A/1545 2 (July 16, 2010) (referring to the description of the BALCO scandal found in *USADA v. Montgomery* and *USADA v. Gaines* with respect to Marion Jones).

⁹⁸ *USADA v. Collins*, AAA 30 190 00658 04 (2004).

⁹⁹ Press Release, USADA, U.S. Track and Field Athlete Harrison Receives Four-Year Suspension for Participation in BALCO Drug Conspiracy (Oct. 19, 2004) (on file with author), archived at <http://perma.cc/9XZL-PM8Z>.

¹⁰⁰ Press Release, USADA, U.S. Track and Field Athlete Accepts Two-Year Suspension from USADA (May 19, 2004) (on file with author), archived at <http://perma.cc/G5FE-Z5F2>.

Chryste Gaines.¹⁰¹ In addition, the United States Senate provided USADA with materials prepared during the grand jury investigation into BALCO, and IRS agent Jeff Novitsky testified against Montgomery regarding evidence Novitsky accumulated in the course of the federal investigation.¹⁰² Similarly, Travis Tygart, USADA's current CEO, participated in witness interviews during the federal criminal case against Lance Armstrong then spearheaded the USADA proceeding against him.¹⁰³ Moreover, riders who provided statements in connection with the criminal case against Armstrong were potentially open to perjury charges if they provided contrary testimony in the USADA case against him.¹⁰⁴ Thus explicitly sporting rules are backed at times by the force of the United States government.

D. Ignorance Through Regulation

The overlap of these legal and sporting regimes means little is actually known about the substances commonly thought to enhance performance. And even less is known about them as they are used by athletes: The possibility that an athlete can be declared positive for doping, be publicly humiliated, and lose years of results based largely on witness testimony means athletes are loath to disclose any information about their use of these substances. Even where disclosure would be in an athlete's medical best interests, he has strong incentive to stay silent: USADA's use of statements Armstrong made to his doctors during his treatment for testicular cancer concerning his use of prohibited drugs¹⁰⁵ is a powerful message to all American athletes to remain silent and isolated in their use of banned substances.¹⁰⁶ Thus, in at least some instances, athletes rely on rumors,

¹⁰¹ USADA v. Gaines, CAS 2004/O/649 (Dec. 13, 2005).

¹⁰² USADA v. Montgomery, CAS 2004/O/645 at 2, 14, 16–17 (Dec. 13, 2005).

¹⁰³ Letter from Robert D. Luskin, counsel to Lance Armstrong, to William Bock, III, General Counsel of USADA, (June 8, 2012), (on file with author) *archived at* <http://perma.cc/PT9-ZXF5>. See also *Armstrong v. Tygart*, No. 1:12-CV-00606, 2012 WL 26887744 (W.D. Tex. July 9, 2012) (citing concerted action by USADA, DOJ, FBI, “and other federal law enforcement agencies” in investigating Armstrong); *ARMSTRONG REASONED DECISION*, *supra* note 5, at 11 (acknowledging that USADA coordinated witness interviews with federal investigation).

¹⁰⁴ However, while USADA sought evidence collected by law enforcement agencies against Armstrong, the request was denied. *ARMSTRONG REASONED DECISION*, *supra* note 5, at 3.

¹⁰⁵ *Id.*

¹⁰⁶ In addition, Armstrong's professional relationship and communications with Dr. Michele Ferrari were a cornerstone of USADA's case. See *id.* at 45–53, 67–74, 77–86, & 90–106.

anecdotes, and guesses instead of medical or other professional advice in their use of performance-enhancements.¹⁰⁷ And we remain ignorant as to the actual scale, scope, nature, and effect of the use of performance-enhancing substances.

Almost twenty-five years after Congressional hearings focused on the dearth of actual information about anabolic steroids as performance-enhancers, we still lack definitive data on this point.¹⁰⁸ Instead, our understanding of how these and other such substances act in a healthy human body is primarily based on anecdotal reports of their unconfirmed, uncontrolled, unmonitored, and unmeasured use.¹⁰⁹ This lack of data does not, of course, mean that any of these substances are safe or recommended for non-therapeutic use. Nor does it mean they are not performance-enhancing. Rather, it simply points to a critical gap in current knowledge, a gap that is a direct result of the existing legal and quasi-legal regimes.¹¹⁰ In its anxiety

¹⁰⁷ See, e.g., Aaron C.T. Smith & Bob Stewart, *Drug Policy in Sport*, 27 DRUG & ALCOHOL REV. 123, 146 (2008) (“[T]he policy of banning drugs has made it more difficult for athletes to obtain medical advice that might reduce the health damage of the drugs they are using.”).

¹⁰⁸ See, e.g., Berno Buechel, et al., *Nobody's Innocent—The Role of Customers in the Doping Dilemma 2* (Working Papers, 2013), archived at <http://perma.cc/F7L-ASQM> (“Empirical studies about doping are rare because it is very hard to collect data of a high quality.”); Bengt Kayser & Aaron C.T. Smith, *Globalisation of Anti-Doping: The Reverse Side of the Medal*, 337 BMJ 85, 87 (2008) (“Anti-doping policy has been forged without the benefit of robust data concerning the long term health effects of the most prevalent performance-enhancing drugs.”); Michael Shermer, *The Doping Dilemma: Game Theory Helps to Explain the Pervasive Abuse of Drugs in Cycling, Baseball and Other Sports*, 298 SCIENTIFIC AMERICAN 82 (2008) (“Scientific studies on the effects of performance-enhancing drugs are few in number and are usually conducted on nonathletes or recreational ones . . .”). But see Boyce, *supra* note 78, at 22 (summarizing the research that does exist).

¹⁰⁹ See, e.g., *Eradicating Steroid Use Part IV: Hearing Before the H. Comm. on Gov't Reform*, 109th Cong., 60 (2005) (statement of Dr. Todd Schlifstein) (“Data on the benefits of [steroids] is based on little scientific dat[a] and mostly self reports.”); Mehlman, *supra* note 31, at 30 (noting that most data on steroid use by athletes consists of unconfirmed and unmeasured anecdotal reports and observational studies); Statement of Dr. Yesalis, 1989 STEROID HEARINGS, *supra* note 39, at 55 (characterizing research into steroids as “anecdotes, isolated case histories or ill-conceived research”).

¹¹⁰ Cf., Tokish, et al., *supra* note 73, at 1546 (“Because [HGH] is illegal except under the prescription of a physician, well-controlled studies are lacking and its impact is largely unknown, although the rumors of its use abound throughout the sports world.”). Similarly, Julian Savulescu has noted, “[t]here is very little rigorous, objective evidence because the athletes are doing something that is taboo, illegal, and sometimes highly dangerous.” Julian Savulescu, et al., *Why We Should*

to show it was doing *something* about drugs in sport, Congress ensured we would remain ignorant about whether, how, and at what cost these substances enhance human performance.

II. IGNORANCE AND HARM

Despite the lack of information about performance-enhancing substances, the existing legal framework could still be effective: If the laws curtail use of the substances they prohibit without encouraging riskier behavior, then they avert potential harm. This is an area where *over*-deterrence simply means any corresponding benefits to use are missed, while *under*-deterrence means harm is potentially caused. How is it going? Are the prohibitions preventing the use of potentially harmful performance-enhancing substances?

A. Evaluation of Current Approach

Few athletes are disqualified or suspended from competition based on positive doping tests. For example, of nearly 9,000 pre- and post-competition doping tests performed in connection with the 2012 London Summer Olympic Games, only 52 showed the presence of a prohibited drug.¹¹¹ Of these, only *nine* tests—two from a single athlete—resulted in disqualifications or exclusions from competition;¹¹² the remainder were permitted therapeutic uses of the prohibited substances.¹¹³

Allow Performance Enhancing Drugs in Sport, 38 BRIT. J. SPORTS MED. 666, 666 (2004).

¹¹¹ 2012 *Anti-Doping Testing Figures Report* 9, WADA-AMA, <http://www.wada-ama.org/Documents/Resources/Testing-Figures/WADA-2012-Anti-Doping-Testing-Figures-Report-EN.pdf>, archived at <http://perma.cc/6Q3S-2FX7> (hereinafter 2012 *Anti-Doping Report*) (providing data for Harlow, UK Olympic anti-doping laboratory).

¹¹² See <http://www.olympic.org/content/news/search-page/?news=true&press=true&practical=true&frommonth=july&fromyear=2012&tomonth=september&toyear=2012&topic=all&search=doping>, archived at <http://perma.cc/F8CJ-5K6X> (last visited Aug. 23, 2013) (listing disqualification of Nadzeya Ostapchuk, Ghfran Almouhamad, and Nicholas Delpopolo based on post-competition testing, and exclusions from competition for Diego Palomeque Echavarria, Alex Schwazer, Victoria Baranova, Hysen Pulaku, and Luiza Galiulina based on pre-competition testing; Ostapchuk's pre-competition test was also positive).

¹¹³ See 2012 *Anti-Doping Report*, *supra* note 111, at 8 (differentiating between tests showing an "adverse analytical finding"—meaning the presence of a prohibited substance—and those resulting in sanctions); *supra* note 90 and accompanying text (explaining therapeutic use exemptions).

This very low rate of positive tests, representing only one-tenth of one percent of all samples tested, is not anomalous. Of nearly 5,000 tests performed at the 2008 Beijing Summer Olympics, only seven resulted in a contemporaneous finding of doping,¹¹⁴ and officials recorded only one doping case out of over 2,000 tests at the 2010 Vancouver Winter Olympics.¹¹⁵ More generally in 2012, WADA-accredited laboratories worldwide conducted approximately 270,000 doping tests, of which only 3,190 revealed the use of prohibited substances.¹¹⁶ Assuming the same percentage of these tests represented therapeutic use exemptions as at the 2012 Summer Olympics,¹¹⁷ only 552 tests out of the 270,000 would have revealed evidence of doping.

To the extent the actual rate of prohibited substance use is, in fact, less than 1%, the current system is working quite well. If this is the case, then few athletes are doping and many of those who do dope are caught. Moreover, as testing becomes increasingly sophisticated, the rate of undetected doping can be expected to fall even further. For example, when more sensitive carbon-isotope testing is used, prohibited substances are detected at a significantly higher rate in certain sports than under traditional testing.¹¹⁸ In the case of Thai weightlifters, for example, 96.2% of tested samples showed the presence of prohibited substances, and 5.75% of the tests on track-and-field athletes did the same.¹¹⁹ Thus advances in testing technology are increasing the likelihood of detection and disqualification.

However, suspensions based on more sophisticated testing of samples years later and non-analytical findings make it clear that actual rates of use are, in fact, much higher than the modest number of positive tests implies. While WADA initially tests samples immediately after procurement, it

¹¹⁴ *Factsheet: The Fight Against Doping and Promotion of Athletes' Health*, Int'l Olympic Committee 2 (Jan. 2013), http://www.olympic.org/Documents/Reference_documents/Factsheets/Fight_against_doping.pdf, archived at <http://perma.cc/3QYD-KDLP> (hereinafter, "*Olympic Factsheet*").

¹¹⁵ *Id.*

¹¹⁶ *2012 Anti-Doping Report*, *supra* note 111, at 8. This is a rate of 1.2%, which is the same as it was in 2011. This rate has stayed fairly constant since at least 2008. See *id.* See also Alan Abrahamson, *106 Tests in All of 2012*, 3 *Wire Sports* (July 31, 2013), <http://www.3wiresports.com/?p=3855>, archived at <http://perma.cc/8F6A-JEPB> (interpreting and summarizing this report).

¹¹⁷ See *supra* notes 111–13 and accompanying text. At the London Olympics, only 9/52, or 17.3%, of the tests that showed the presence of a banned substance resulted in action against the athlete. See *2012 Anti-Doping Report*, *supra* note 111, at 9; *supra* note 112.

¹¹⁸ See Abrahamson, *supra* note 116.

¹¹⁹ *2012 Anti-Doping Report*, *supra* note 111, at 41–46.

reserves the right to retest them at a later date as well¹²⁰ and has an eight-year statute of limitations for related suspensions.¹²¹ In the international arena, recent retests of frozen samples have resulted in retroactive disqualifications for six athletes from the 2005 World Track & Field Championships¹²² and four from the 2004 Athens Summer Olympics.¹²³ These positives represent use of substances banned at the time of competition but for which tests were not contemporaneously available. The rate of retroactive disqualifications can provide some guide to the rate of doping that is undiscovered at the actual time of use, but still misses use that is not detectable under even current tests.¹²⁴

Even this retesting, though, falls short of capturing at least some significant use. In 2013, Major League Baseball suspended Ryan Braun,¹²⁵ Alex Rodriguez,¹²⁶ and twelve other players¹²⁷ for the use of prohibited substances based on documentary evidence and witness testimony, not positive drug tests.¹²⁸ This scandal was presaged by a decade by that of BALCO, in

¹²⁰ WORLD ANTI-DOPING CODE, *supra* note 85, at Art. 6.5.

¹²¹ *Id.* at Art. 17.

¹²² See *Sample retests reveal 6 track & field athletes doped at '05 worlds*, SPORTS ILLUSTRATED, <http://sportsillustrated.cnn.com/more/news/20130308/iaaf-world-championships-drug-retests.ap/>, archived at <http://perma.cc/EMA9-NYN7> (Mar. 8, 2013) (reporting retests of frozen samples within the eight-year statute of limitations).

¹²³ See *IOC strips 4 medals from 2004 Games*, ESPN, http://espn.go.com/olympics/story/_id/8714605/ioc-strips-4-medals-2004-athens-olympics-postpones-decision-lance-armstrong, <http://perma.cc/6AF8-23XM> (Dec. 5, 2012).

¹²⁴ One anecdotal report places use as high as 95%. Andrea Petroczi, et al., *Comfort in Big Numbers: Does Over-Estimation of Doping Prevalence in Others Indicate Self-Involvement*, 3 J. OCCUPATIONAL MED. & TOXICOLOGY 19, 20 (2008); see also Carnegie Research Institute, *International Literature Review: Attitudes, Behaviors, Knowledge and Education—Drugs in Sport: Past, Present and Future*, WADA 19-20 (2007) (reporting athletes' estimates of banned substance use by others at 6%-72%).

¹²⁵ Press Release, Major League Baseball, Milwaukee's Ryan Braun suspended (July 22, 2013), available at http://mlb.mlb.com/news/article.jsp?ymd=20130722&content_id=54364310.

¹²⁶ Press Release, Major League Baseball, Yankees' Rodriguez disciplined (Aug. 5, 2013), available at http://mlb.mlb.com/news/article.jsp?ymd=20130805&content_id=55963494.

¹²⁷ Press Release, Major League Baseball, Discipline issued in Biogenesis investigation (Aug. 5, 2013), available at http://mlb.mlb.com/news/article.jsp?ymd=20130805&content_id=55962130 (listing Antonio Bastardo, Everth Cabrera, Francisco Cervelli, Nelson Cruz, Fautino De Los Santos, Sergio Escalona, Fernando Martinez, Jesus Montero, Jordan Norberto, Jhonny Peralta, Cesar Puello, and Jordany Valdespin).

¹²⁸ Brian Costa, *Drug Suspension Hits A-Rod, 12 Others*, WALL ST. J., Aug. 5, 2013, at A3, archived at <http://perma.cc/R9AQ-YB7W>. In fact, only three players

which comprehensive performance-enhancement over a period of years went undiscovered under USADA's regular testing regimen.¹²⁹ Moreover, Lance Armstrong famously, repeatedly, and correctly¹³⁰ pointed out that he never failed the hundreds of drug tests (including retests¹³¹) he took,¹³² prior to confessing his use in 2012.¹³³ Instead, Armstrong's suspension for his use of prohibited performance-enhancing substances, and those of his former teammates who confessed their own use in providing evidence against him,¹³⁴ resulted from circumstantial and testimonial evidence.

linked to Biogenesis tested positive for banned substances: Melky Cabrera, Bartolo Colon, and Yasmani Grandal. James Wagner, *Gio Gonzalez won't be suspended in Biogenesis investigation*, WASH. POST, Aug. 5, 2013, archived at <http://perma.cc/T9JB-VTHC>. While one of Braun's urine samples did show the presence of testosterone in 2011, he was successful in appealing the associated suspension. The 65-game suspension he accepted in June 2013 relied on a nonanalytical positive, not a positive drug test. Steve Eder, *For Rodriguez, Suspended Animation: 12 Other Players Agree Not to Fight M.L.B. Punishment*, N.Y. TIMES, Aug. 6, 2013, at B8, archived at <http://perma.cc/GB2N-NVHR>.

¹²⁹ For further discussion of BALCO, see *supra* notes 94–102, and accompanying text.

¹³⁰ Armstrong did have an adverse analytical finding with respect to cortisone, but it was excused (and thus not a positive test) under a therapeutic use exception. See ARMSTRONG REASONED DECISION, *supra* note 5, at 31–33; *supra* note 90 (concerning therapeutic use exceptions); *supra* notes 111–113 and accompanying text (explaining distinction between adverse analytical findings and positive tests).

¹³¹ While six frozen samples from the 1999 Tour de France allegedly belonging to Armstrong tested positive for EPO upon retesting years later, they were never formally identified as his and were not considered positive tests because no second sample was available to confirm the preliminary findings. *L'Equipe story accuses Armstrong of 1999 EPO use*, TOUR DE FRANCE BLOG (Aug. 23, 2005), http://www.tdf-blog.com/2005/08/lequipe_story_a.html, archived at <http://perma.cc/Q5K5-RZ3D>.

¹³² See, e.g., Lance Armstrong, TWITTER (May 19, 2011 4:37 P.M.), <https://twitter.com/lancearmstrong/status/71358750434402306>, archived at <http://perma.cc/Q6UB-VTG8> (“20+ year career, 500 drug controls worldwide, in and out of competition. Never a failed test. I rest my case.”). In connection with his suit against USADA, Armstrong initially asserted that he had “passed every drug test ever administered to him in his career—a total of 500 to 600 tests,” Jury Demand, *Armstrong v. USADA*, Civ. Action No. 1:12-CV-00606, at 3 (W.D. Tex.) (July 9, 2012). The next day, though, he withdrew this assertion. See Jury Demand, *Armstrong v. USADA*, Civ. Action No. 1:12-CV-00606 (W.D. Tex.) (July 10, 2012) (omitting the assertion).

¹³³ *Oprah and Lance Armstrong*, *supra* note 4.

¹³⁴ USADA suspended Michael Barry, Tom Danielson, George Hincapie, Levi Leipheimer, Christian Vande Velde, and David Zabriskie for six months and erased numerous results for each athlete based on their confessions during the course of the Armstrong investigation. See *Six former Armstrong USPS teammates receive bans from USADA*, CYCLING NEWS, <http://www.cyclingnews.com/news/six-former-arm>

Moreover, even WADA's own research suggests that the use of prohibited substances is commonplace in at least the world of elite track and field competitors.¹³⁵ The as-yet-unpublished study,¹³⁶ comprised of an anonymous survey completed by more than 2,000 athletes, revealed that 29% of the competitors at the 2011 World Championships and 45% at the 2011 Pan-Arab Games were willing to admit to doping during the prior year.¹³⁷ Due to predictable self-reporting issues, the researchers concluded that the actual rate of doping most likely exceeded these figures.¹³⁸ In combination with the results of testing, retesting, and testimonials concerning use, this research shows that enhancement—attempted or actual—is pervasive on the elite level of at least some high-level sports.

*B. Ignorance Increases Athletes' Use of Performance-Enhancing Substances*¹³⁹

Not only is the current approach to the regulation of performance-enhancing substances ineffective in preventing use of these substances in at least some sports, ignorance concerning purported performance-enhancing substances *increases* athletes' attempts at enhancement for four reasons. First, athletes misjudge the objective benefits and costs they can expect to experience from their use of performance-enhancing substances in systematic and predictable ways. Second, athletes overestimate rates of use by their compet-

strong-usps-teammates-receive-bans-from-usada, archived at <http://perma.cc/3RJY-V453> (last updated Oct. 10, 2012).

¹³⁵ See Tim Rohan, *Study Revealing Doping in Track Strikes Hurdle*, N.Y. TIMES, Aug. 23, 2013, at A1, archived at <http://perma.cc/C2MG-22UW> (revealing the existence of the study and summarizing its findings).

¹³⁶ While WADA initially encouraged publication of the study, in March 2013 it directed the researchers to delay publishing the results. *Id.*

¹³⁷ *Id.* To protect athletes' anonymity, researchers asked participants to think of a birthday. If it occurred during the months of January through June, the participant simply indicated so. If it occurred in the latter half of the year, participants were asked to answer "yes" or "no" to the question: "Have you knowingly violated anti-doping regulations by using a prohibited substance or method in the past 12 months?" Only the individual athlete knew which question he was answering, and the researchers then used statistical analysis to estimate the overall rate of admitted doping by the athletes at the event. *Id.*

¹³⁸ Rohan, *supra* note 135.

¹³⁹ Game theory analyses of doping similarly conclude that the current regulatory approach increases athletes' use of performance-enhancing substances but for other reasons. See, e.g., Gunnar Breivik, *Doping Games: A Game Theoretical Exploration of Doping*, 27 INT'L REV. SOC. SPORT 235, 237 (1992) (finding that athletes experience a "prisoner's dilemma" with respect to doping); Buechel, et al., *supra* note 108 (focusing on role of "customers" such as media and fans in increasing doping by athletes).

itors and adjust their own use upwards correspondingly. Third, athletes take substances they believe have ergogenic benefits but which in fact do not enhance performance. Finally, prohibition itself increases the desirability of the prohibited substances.

1. Athletes' calculations of costs and benefits are skewed

Analyses of athletes' use of performance-enhancing substances assume athletes engage in a rational decision-making process when evaluating whether to dope.¹⁴⁰ Under this approach, athletes are assumed to weigh the benefits of use, such as faster times clocked, greater weights lifted, and an improved chance of victory, against the costs, including unwanted side effects and long-term damage to health, difficulty in procuring the substances, the probability of detection, and the expected punishment for detection. In their efforts to decrease doping and the harm from doping, legislators, commentators, and sporting organizations focus on manipulating the cost side of the equation. In some proposals, the costs are increased in the belief that rational athletes will then choose not to dope.¹⁴¹ These include improving the quantity and sophistication of tests;¹⁴² making prohibited substances harder to obtain with harsher penalties for their sale, possession, or use;¹⁴³

¹⁴⁰ See, e.g., Richard A. Posner, *In Defense of Prometheus: Some Ethical, Economic, and Regulatory Issues of Sports Doping*, 57 DUKE L.J. 1725, 1736 (2008) (“[L]et B be the benefit from violating a rule, P (smaller than 1) the probability that the violation will be detected and punished, and S the sanction for the violation; then PS is the expected cost of the sanction to the violator, and it must exceed B (PS>B) to deter the violation.”); Peter Strelan & Robert J. Boeckmann, *Why Drug Testing in Elite Sport Does Not Work: Perceptual Deterrence Theory and the Role of Personal Moral Beliefs*, 36 J. APPLIED SOC. PSYCHOL. 2909 (2006) (refining a rational choice model of decision-making concerning doping); see also Joshua Whitman, *Winning at All Costs: Using Law and Economics to Determine the Proper Role of Government in Regulating the Use of Performance-Enhancing Drugs in Professional Sports*, 2008 U. ILL. L. REV. 459 (employing rational choice model).

¹⁴¹ Judge Posner, though, has noted that unless they are completely effective, testing and other anti-doping efforts may result in *increased* doping; since the measures deter some athletes, the expected benefits to use for undeterred athletes—the difference between their performance and that of their clean competitors—*increase*. Posner, *supra* note 140, at 1737.

¹⁴² See, e.g., Shermer, *supra* note 108 (proposing increased and better testing). *But see* Jay Coakley, *supra* note 12, at 182 (2009) (calculating the cost of effective testing for United States athletes at billions of dollars annually).

¹⁴³ See, e.g., *Drug Penalties to Stiffen*, N.Y. TIMES, Aug. 8, 2013, at B12, *archived at* <http://perma.cc/CMU4-KFYD> (reporting IAAF's increase in suspensions from two years to four for serious doping offenses); Shermer, *supra* note 108 (proposing increased penalties for positive tests, including suspensions of entire teams for a

and providing explicit governmental oversight of anti-doping to better ensure compliance.¹⁴⁴ Alternatively, some commentators have proposed adjusting the cost side of the equation by eliminating the current prohibitions on the athletic use of substances¹⁴⁵ or increasing the oversight of athletes' use of substances to reduce any resulting harm.¹⁴⁶ In each case, though, the proposals assume the benefits, side effects, and long-term effects of the substances themselves are well-known constants.

Even if this assumption were correct, simply manipulating the costs associated with enhancement may well prove unsuccessful in deterring the use of banned substances because individuals' decision-making often departs from rational-choice models due to the intervention of cognitive biases.¹⁴⁷ Primary among these is an optimism bias: Individuals typically believe they are more likely to experience positive results and less likely to experience negative results, both compared to the actual likelihood of experiencing those results generally¹⁴⁸ and as compared to other members of their peer

single member's violation of doping rules). This appeared to be Congress's focus when it classified anabolic steroids and andro as controlled substances. *See supra* notes 50–62 (discussing the addition of these substances to the CSA).

¹⁴⁴ *See* Shayna M. Sigman, *Are We All Dopes? A Behavioral Law and Economics Approach to Legal Regulation of Doping in Sports*, 19 MARQ. SPORTS L. REV. 125 (2008).

¹⁴⁵ *See* Bengt Kayser, et al., *Current Anti-Doping Policy: A Critical Appraisal*, 8 BMC MED. ETHICS 2 (2007); Bengt Kayser & Barbara Broers, *The Olympics and Harm Reduction*, 9 HARM REDUCTION J. 33 (2012); Savulescu, et al., *supra* note 110; William Spencer Topham, *Muscle Melee: Redefining Anabolic Steroid Policy in a Post-"Great Recession" Economy*, 7 WILLAMETTE SPORTS L.J. 44, 49 (2010). *But see* Thomas S. Petersen & Johannes K. Kristensen, *Should Athletes Be Allowed to Use All Kinds of Performance-Enhancing Drugs?—A Critical Note on Claudio M. Tamburrini*, 26 J. PHILOSOPHY OF SPORT 88 (2009) (arguing against lifting the ban on performance-enhancing drugs in sport).

¹⁴⁶ *See, e.g.*, Ken Kirkwood, *Considering Harm Reduction as the Future of Doping Control Policy in International Sport*, 61 QUEST 180 (2009) (suggesting increased medical supervision of athletes' doping); Whitman, *supra* note 140 (recommending that federal government develop comprehensive drug management strategies for doping in professional sports).

¹⁴⁷ Daniel Kahneman & Amos Tversky, *Prospect Theory: An Analysis of Decision Under Risk*, 47 ECONOMETRICA 263 (1979). For an analysis of the role of cognitive biases in athletes' decision-making concerning competing contract offers, *see* Michael McCann, *It's Not About the Money: The Role of Preferences, Cognitive Biases, and Heuristics Among Professional Athletes*, 71 BROOK. L. REV. 1501 (2006).

¹⁴⁸ Russell B. Korobkin & Thomas S. Ulen, *Law and Behavioral Science: Removing the Rationality Assumption from Law and Economics*, 88 CALIF. L. REV. 1051, 1091 (2000).

group.¹⁴⁹ Thus, with respect to doping, many athletes likely overestimate the likelihood that their performances are enhanced, and underestimate the likelihood of being caught or incurring long-term harm.

Further tipping the equation, examples of enhancement successes are more readily available than those of enhancement failures. For this, “success” can be understood as the times an athlete uses a performance-enhancing substance and becomes more successful, while a “failure” occurs when an athlete uses a substance in order to enhance performance, but the substance fails to deliver: there is no associated improvement in performance benefit, it causes harm equal to or greater than any benefit it provides, or performance declines with use.

Lance Armstrong,¹⁵⁰ Tyson Gay,¹⁵¹ Ryan Braun,¹⁵² and Alex Rodriguez¹⁵³ are all highly visible examples of enhancement successes: Athletes who are known to have used performance enhancing substances and reached the top of their sports. Even in the absence of direct evidence of doping, though, we often assume that record-breaking performances are examples of successful enhancement. For example, sixteen-year-old Chinese swimmer Ye Shiwen became the subject of speculation concerning doping after swimming the final fifty meters of the women’s 400-meter Individual Medley at the 2012 Summer Olympics faster than American Ryan Lochte did in winning the men’s race.¹⁵⁴ While Shiwen may have used as-yet undetectable but prohibited substances—testing cannot conclusively prove lack of doping—there is currently no analytical, testimonial, or documentary evidence that she did so.¹⁵⁵ Instead, the speculation rests solely on her record-breaking performance. Contrary to the schoolyard taunt, we assume that winners often cheat, and cheaters often win.

At the same time, enhancement *failures* are largely invisible. Athletes who experience unwanted side effects from the use of a prohibited substance are unlikely to complain because admitting to side effects from doping is admitting to doping itself. Even when an athlete is known to have taken performance-enhancing substances, evidence of physical injury from the use

¹⁴⁹ Cass Sunstein, *Selective Fatalism*, 27 J. LEGAL STUD. 799, 807 (1998).

¹⁵⁰ See *supra* notes 5–9, and accompanying text.

¹⁵¹ See *infra* note 174.

¹⁵² See *supra* notes 125 & 128.

¹⁵³ See *supra* notes 127 & 128.

¹⁵⁴ See Erik Niiler, *Olympic Doping Scandal Over Chinese Swimmer Grows*, DISCOVERY, (Aug. 1, 2012, 3:00 AM), <http://news.discovery.com/adventure/extreme-sports/ye-shiwen-doping-scandal-olympic-swimming-120801.htm>, archived at <http://perma.cc/6CBZ-UAGQ>.

¹⁵⁵ *Id.*

is often lacking: Athletes suspended for doping are generally at the top of their game and, while some may appear over-developed, few appear to be suffering from ill health.

Public evidence of long-term harmful effects is also thin. While Arnold Schwarzenegger has spoken openly about his use of anabolic steroids throughout the 1970s,¹⁵⁶ Terry Bollea (better known as Hulk Hogan) testified that he used steroids during the 1980s,¹⁵⁷ and Mark McGwire admitted using steroids and HGH in the 1990s,¹⁵⁸ all appear to be aging normally. Only in rare cases do athletes suffering from ill health associated with the use of performance-enhancing substances publicly reveal their use and symptoms. One such example is former professional football player Lyle Alzado, who attributed his brain cancer to his use of steroids and human growth hormone.¹⁵⁹ At the time of his use, however, the National Football League did not ban these substances so there was no cost—in terms of lost legacy, stripped titles, or suspensions—to the revelations. Moreover, at least one expert publicly questioned whether the substances Alzado used could even have caused the type of cancer he had,¹⁶⁰ undermining any clear connection between these substances and the harm suffered by Alzado.

Athletes who use prohibited substances but fail to reach the highest level of their sport are equally unlikely to disclose their use, and far less likely to be tested. After all, drug testing is heavily concentrated at the upper end of the athletic hierarchy: In each event of the 2012 Summer Olympics, for example, only the top five finishers and two randomly selected athletes were drug tested.¹⁶¹ That means that in an event like the 2012 Olympic men's 100-meter sprint where there were 75 competitors, there was less than a 3% chance that the athletes finishing sixth place or

¹⁵⁶ Tom Farrey, *Conan the Politician*, ESPN (Nov. 17, 2003), http://espn.go.com/columns/farrey_tom/1655597.html.

¹⁵⁷ *Hulk Hogan, On Witness Stand, Tells of Steroid Use in Wrestling*, N.Y. TIMES, July 15, 1994, <http://www.nytimes.com/1994/07/15/nyregion/hulk-hogan-on-witness-stand-tells-of-steroid-use-in-wrestling.html>.

¹⁵⁸ *McGuire Apologizes to La Russa, Selig*, ESPN (Jan. 12, 2010, 2:01 PM) <http://sports.espn.go.com/mlb/news/story?id=4816607>, archived at <http://perma.cc/LT7G-ZVYK>.

¹⁵⁹ Lyle Alzado, *I'm Sick and I'm Scared*, 75 SPORTS ILLUSTRATED 20 (July 8, 1991), available at <http://sportsillustrated.cnn.com/vault/article/magazine/MAG1139729/index.htm>, archived at <http://perma.cc/QG9U-VUGU>.

¹⁶⁰ BIGGER STRONGER FASTER* (Mad Men Films 2008) (including statements of Dr. Norm Fost to that effect).

¹⁶¹ *Olympic Factsheet*, *supra* note 114, at 1.

lower were tested.¹⁶² This includes, for example, Jamaican Asafa Powell who finished in eighth place in the event and, less than a year later, tested positive for a banned stimulant at the Jamaican National Trials.¹⁶³ Out-of-competition tests are even less frequent and similarly focused on the top athletes.¹⁶⁴ Thus, the chance a middle of the field elite athlete will test positive and have his use of a prohibited substance revealed is low, so no counterexamples weaken the connection between enhancement and athletic success. Instead, the absence of information about enhancement failures—or even enhancement successes that do not achieve super-stardom—dilutes the limited clinical evidence that exists concerning the physical costs of performance-enhancing substances.

This asymmetry makes athletic success seem inevitably a product of enhancement, and enhancement a necessary component of athletic success. Because individuals overweigh outcomes they consider certain relative to those they consider merely possible,¹⁶⁵ this consistent and strong association between athletic success and the use of performance-enhancing substances, especially paired with the invisibility and uncertainty of enhancement failures, causes athletes to miscalculate the relative benefits and costs of enhancement. This miscalculation then magnifies the effect of the optimism bias.

The difference in timing between the realization of enhancement benefits and any costs further unbalances the equation. Christine Jolls, Cass Sunstein, and Richard Thaler analyze the limitations that bounded willpower impose on decision-making: Even when individuals know there are long-term negative consequences to an action, they still often pursue it to achieve a lesser short-term pay-off.¹⁶⁶ This effect is greater where there is a close association between an action and a short-term gain, but an unclear relation-

¹⁶² See *London 2012 Athletics, 100m Men*, OLYMPIC.ORG (2013), <http://www.olympic.org/olympic-results/london-2012/athletics/100m-m>, archived at <http://perma.cc/CM55-CG9N>.

¹⁶³ *Id.*; see also *Statement from Asafa Powell*, ASAFA POWELL, <http://www.iamasafa.com/asafa-scoop/statement-from-asafa-powell/>, archived at <http://perma.cc/ST8F-DQ4F>.

¹⁶⁴ See Alan Abrahamson, *Most drug-tested: Ryan Lochte*, 3 WIRE SPORTS (July 27, 2013), <http://www.3wiresports.com/2013/07/27/most-drug-tested-ryan-lochte/>, archived at <http://perma.cc/L3ZA-AHYC> (critiquing data concerning out of competition drug tests of swimming and track and field athletes).

¹⁶⁵ Kahneman & Tversky, *supra* note 147, at 265 (labeling this a “certainty effect”).

¹⁶⁶ Christine Jolls, et al., *A Behavioral Approach to Law and Economics*, 50 STAN. L. REV. 1471, 1479 (1998).

ship to the long-term harm.¹⁶⁷ Thus, in the context of the studied criminal behavior, potential offenders often behaved contrary to expectations because of the time lapse between when they realized the near-term benefits of a crime and some indefinite point in the future when they may incur costs.¹⁶⁸ The result is that the potential costs involved with a chosen course of action are discounted—at times dramatically—because of the degree of self-control necessary to forego short-term gains for long-term losses.

Similarly, athletes generally realize any benefits of enhancement rather quickly. Assuming a substance is effective, an athlete who uses it might win a race, gain strength, or set a record in the minutes, days, or months after use. The costs, though, are often delayed, even if ultimately realized: While stimulant use in a competition at which the athlete is tested likely will lead to swift consequences, non-analytic positives and long-term negative health effects come to light only after the passage of often-significant time, if ever.

The combination of these effects means that athletes misjudge the objective benefits and costs they can expect to experience from their use of performance-enhancing substances in predictable ways. Without research into the effects specific substances have on performance, there is no objective data available to correct the resulting mistaken weights assigned the various benefits and costs of enhancement. In other words, in the absence of information, we can expect athletes to overestimate the helpfulness of performance-enhancing substances and underestimate both their harmfulness and the possibility of detection.

2. Overestimations of rates of use lead to increased use

While athletes' use of performance-enhancement substances is often understood as an attempt to beat the competition, even high-profile athletes caught for doping often cite their use as a way merely to "level the playing field" with competitors they believe are doing the same thing.¹⁶⁹ While it may be tempting to dismiss such explanations as convenient rationaliza-

¹⁶⁷ *Id.*

¹⁶⁸ *Id.* at 1538.

¹⁶⁹ Among others, Lance Armstrong and Ben Johnson (who was stripped of an Olympic gold medal after testing positive for a steroid at the 1988 Olympic Games) have claimed doping was commonplace in their sports. See *Oprah and Lance Armstrong*, *supra* note 4 (Armstrong); *Athletics still 'all corrupt' claims Ben Johnson*, BBC SPORT, <http://news.bbc.co.uk/sport2/hi/athletics/8798855.stm>, archived at <http://perma.cc/KXE7-FWPD> (last updated July 8, 2010) (Johnson). See also Roger Gardner, *On Performance-Enhancing Substances and the Unfair Advantage Argument*, 16 J. PHIL. SPORT 59 (1989) (examining the unfair advantage argument against enhancement).

tions, ignorance concerning actual rates of use of banned substances may result in athletes' overestimations of these rates. These overestimations, in turn, influence athletes otherwise undecided whether to use prohibited substances to do so.¹⁷⁰

When judging the likely frequency of an event, individuals employ heuristics—mental shortcuts—to ease the task.¹⁷¹ One commonly employed shortcut is the availability heuristic: Because large classes of associated events are easier and quicker to recall than smaller classes, individuals often estimate the frequency of an event by how easy it is to think of relevant examples.¹⁷² This approach can be rational where ease of recollection is, in fact, associated with frequency of occurrence, but it leads to mistakes in logic when other factors, like the publicity given to one set of outcomes instead of another, affect recall.¹⁷³

In many sports, examples of athletes known to use performance-enhancing substances are easy to call to mind. The impossibility of proving an athlete is definitively clean, though, makes it much more difficult to name with any degree of certainty athletes who have never used a performance-enhancing substance: Today's clean athlete may well be tomorrow's doper.¹⁷⁴ However, the relative ease of identifying examples does not reveal the actual frequency of doping.

¹⁷⁰ See Jaime Morente-Sanchez & Mikel Zabala, *Doping in Sport: A Review of Elite Athletes' Attitudes, Beliefs, and Knowledge*, 43 *SPORTS MEDICINE* 395, 398 (2013) (citing studies showing that athletes' decisions to take prohibited substances is influenced by a belief that their competitors are doing so); Thomas H. Murray, *Drugs, Sport, and Ethics*, in *ANALYZING MORAL ISSUES* 317 (Judith Boss, ed., 2004) (arguing that many athletes take steroids only because they believe others do the same).

¹⁷¹ Amos Tversky & Daniel Kahneman, *Availability: A Heuristic for Judging Frequency and Probability*, 5 *COG. PSYCH.* 207, 207 (1973).

¹⁷² *Id.*

¹⁷³ See *id.* at 208–09.

¹⁷⁴ For example, sprinter Tyson Gay was one of eleven athletes who signed USADA's "My Victory" pledge. See *Athletes, MY VICTORY*, <http://www.usada.org/MyVictory/athletes/>, archived at <http://perma.cc/932Y-H74J> (last visited Oct. 8, 2013). The pledge states, in relevant part, "The only sport I believe in is clean sport, sport that is free of all cheating, including doping." *Take the Pledge!*, MY VICTORY, <http://www.usada.org/MyVictory/take-pledge/>, archived at <http://perma.cc/Y58M-A9KT> (last visited Oct. 8, 2013). As part of the pledge, Gay promised to always compete clean. *Id.* In May 2013, he tested positive for a prohibited substance at an out-of-competition test and has been reported to have tested positive additional times during competition. *Report: Tyson Gay failed drug test at Nationals*, *SPORTS ILLUSTRATED*, <http://sportsillustrated.cnn.com/more/news/20130726/tyson-gay-drug-tests-u-s-nationals.ap/index.html> (last updated July 26, 2013).

The narratives of athletes who have been caught using performance-enhancing substances are often highly salient, contributing to this bias.¹⁷⁵ For example, Armstrong's personal story of near death from cancer followed by repeated success in one of the world's most grueling competitions is well-known inside and outside of bicycle racing circles. His many denials, the surrounding drama and lawsuits, and the use of experimental cocktails to fuel his miraculous turnaround only increase the memorability of the story.

The sensationalism of Armstrong's account does not make it more likely that other athletes dope than if he was simply a successful rider who had tested positive for drugs with little fanfare. Yet for an athlete deciding whether to use a performance-enhancing substance, the easy recall of Armstrong's story, paired with the lack of verifiable examples of clean athletes and ignorance concerning the actual rates of doping in sport, means the athlete is more likely to overestimate the frequency of use than to underestimate it. This overestimation has a domino effect on use rates: it increases the likelihood that the athlete will use the banned substance himself, both as a way to fit into the sporting culture¹⁷⁶ and to compete on equal terms with his competitors who he believes are doping. With this increased use, other athletes then have more examples to draw on in making their own decisions concerning doping, increasing the likelihood they too will choose to enhance.

3. Lack of information about unergogenic effects increases risk-taking

Some individuals most likely forego the use of performance-enhancing substances because of the uncertainty about the physical side effects and possible long-term harm from use. However, sport itself is a physically risky activity,¹⁷⁷ and elite athletes repeatedly demonstrate their disregard for the many associated bodily risks.¹⁷⁸ For elite athletes the risk of physical harm is normalized. As a result, vague warnings concerning possible side effects and

¹⁷⁵ See Amos Tversky & Daniel Kahneman, *Judgment Under Uncertainty: Heuristics and Biases*, 185 SCIENCE 1124, 1127 (1974) (finding that salience increases the retrievability of instances, strengthening availability bias).

¹⁷⁶ Jay Coakley terms this desire by athletes to conform even to harmful norms as "deviant overconformity." Coakley, *supra* note 12, at 155–56.

¹⁷⁷ See, e.g., Kevin Young, *Violence, Risk and Liability in Male Sports Culture*, 10 SOC. OF SPORT J. 373 (1993) (noting that rates of injury in men's professional contact sports are often higher than those at construction sites, oil-drilling rigs, or underground mines).

¹⁷⁸ Smith & Stewart, *supra* note 107, at 126 (noting that male athletes show a propensity toward high risk experiences). In fact, even where athletes are informed of the known side effects and possible health risks from the use of medications, their

the risk of long-term physical harm can be expected only to minimally affect athletes' decision-making.¹⁷⁹ As Cass Sunstein explained in the context of the tendency by individuals to treat certain risks as "background noise" while worrying a great deal about quantitatively identical risks, "For people immersed in a particular culture, it is hard to even see the relevant risks as such."¹⁸⁰

The little data that does exist about the risk of harm from the use of performance-enhancing substances rarely includes information about the harm that might be expected to most heavily influence athletes' decision-making: the risk that a substance will impede performance. Even when information about nonergogenic effects of commonly used performance-enhancing substances is available, popular culture fails to afford it the same prominence as reports of potential ergogenic effects. For example, while it is well-known that Mark McGwire used andro during his homerun record-setting year,¹⁸¹ findings that andro increases the natural production of estrogen and decreases the body's own production of testosterone,¹⁸² thereby perhaps impeding performance, have received much less publicity. The invisibility of this negative information, even when it exists, means it does not inhibit risk-taking by athletes.

4. Prohibition itself increases desirability

In many instances, simply prohibiting substances increases demand for them.¹⁸³ For athletes, three factors contribute to this phenomenon: (1) an erroneous assumption that only substances that enhance performance are banned; (2) psychological reactance; and (3) a placebo effect. As a result,

attitudes concerning the use remain unchanged. Morente-Sanchez & Zabala, *supra* note 170, at 405.

¹⁷⁹ Willy Voet, soigneur for former professional bicycle racing team Festina, recounted that "all some of the riders wanted was to become guinea-pigs for new kinds of doping." Willy Voet, *BREAKING THE CHAIN: DRUGS AND CYCLING: THE TRUE STORY* 105 (Yellow Jersey Press 2002).

¹⁸⁰ Sunstein, *supra* note 149, at 805.

¹⁸¹ See *Special Report: Who Knew*, *supra* note 75, and accompanying text.

¹⁸² Tokish, *supra* note 73, at 1550.

¹⁸³ This effect can be seen outside the sporting world as well: Alcohol consumption in the United States increased during Prohibition, both in terms of quantity and strength of alcohol consumed. In addition, both glue-sniffing and dropping acid increased greatly in popularity after publicity campaigns warned of injury and laws were passed against the practices. Edward M. Brecher, et al., *LICIT AND ILLICIT DRUGS* 321–33 & 368–89 (Consumers Union 1972).

prohibiting a substance's use without evidence of any ergogenic effect¹⁸⁴ may well increase the demand for that substance—and any harm it might cause—without actually decreasing enhancement itself.

First, athletes understand prohibitions against the use of certain substances as implicit acknowledgements that the substances enhance performance.¹⁸⁵ That non-athletes may freely use many prohibited substances and doctors may prescribe others for medical purposes reinforces this perspective: If the substances were really so unsafe, surely they would be impermissible for everyone's use? One logical interpretation for the athletic prohibition, then, is that the banned substance "works"—it enhances performance.¹⁸⁶

For some individuals, prohibition may create an even stronger incentive. Instead of mistakenly extrapolating efficacy from prohibition, they affirmatively seek out items they can't have *simply because* they can't have them. Here, the loss of a previous behavioral freedom motivates an individual's desire to restore it.¹⁸⁷ To the extent he believes the loss is illegitimate or unjustified, an individual will experience this "psychological reactance" more strongly.¹⁸⁸ The implications in the context of performance-enhancing substances are clear: Prohibiting a formerly permissible substance can be expected to engender a reaction in favor of the substance, which will be greater in magnitude if the prohibition seems illegitimate. Thus, adding substances to the prohibited list without providing legitimizing data may well prove counterproductive by making athletes more inclined to seek out the substances to reassert their freedom.

¹⁸⁴ See *supra* notes 46–60 & 86, and accompanying text, critiquing the processes by which Congress and WADA have prohibited the use of potentially enhancing substances.

¹⁸⁵ Melethil, *supra* note 86, at 87 ("The mere listing of a substance or method . . . is misinterpreted by most athletes that the substance or method offers an advantage. The logic simply is: If a substance or method does not offer an advantage, why would WADA put it on the list?").

¹⁸⁶ *Id.* This problem extends beyond athletes: Because there is little to no policing of performance-enhancing substances in the United States outside the context of elite sport, recreational athletes assume the substances banned in elite competition will improve their conditioning and physique with no realistic repercussions. As a result, the use of performance enhancing substances in society generally seems to be increasing. See Kayser & Smith, *supra* note 108, at 86.

¹⁸⁷ Jack W. Brehm, *Control, Its Loss, and Psychological Reactance*, in CONTROL MOTIVATION AND SOCIAL COGNITION 3, 15 (G. Weary, et al., eds., Springer-Verlag 1993). See also Jack W. Brehm, et al., *The Attractiveness of an Eliminated Choice Alternative*, 2 J. EXPERIMENTAL SOC. PSYCH. 301 (1966) (finding this phenomenon only where the choice was originally available, then later removed).

¹⁸⁸ Jack W. Brehm, A THEORY OF PSYCHOLOGICAL REACTANCE 7–9 (Academic Press 1966).

Moreover, in the absence of contrary evidence, this association between prohibition and enhancement means that nonergogenic substances may actually produce a placebo effect in users, encouraging further use.¹⁸⁹ Researchers have at times attempted to disentangle the actual and perceived ergogenic effects of performance-enhancing substances by measuring their placebo effects. One early study focusing on anabolic steroids found that competitive weightlifters who took pills they thought were steroids got stronger than the athletes in a control group, even though both groups were given placebos.¹⁹⁰ In another study comparing the effects of positive and negative information about a substance on performance, researchers randomly assigned participants to two groups.¹⁹¹ Each participant completed a timed sprint workout before taking a gelatin capsule filled with cornstarch.¹⁹² Researchers told one group that the substance was likely to improve performance, and the other that it was likely to negatively impact performance.¹⁹³ Twenty minutes later, the participants repeated the sprint workout.¹⁹⁴ Members of the first group did the same or better than in the baseline test, and members of the second group did worse.¹⁹⁵ This shows that the effect an athlete ascribes to a substance affects his physical response to it, independent of the substance's actual biological effect.¹⁹⁶ Thus, what athletes believe about a substance—whether they believe it helps or hurts

¹⁸⁹ See Tokish et al., *supra* note 73, at 1550 (“A critical review of the literature reveals that substances that . . . are even perceived to improve performance[] are widely used by athletes.”). See also Christopher J. Beedie, et al., *Positive and Negative Placebo Effects Resulting from the Deceptive Administration of an Ergogenic Aid*, 17 INT’L J. SPORT NUTRITION & EXERCISE METABOLISM 259, 266 (2007) (finding that approximately 35% of the United States’ population is placebo-responsive).

¹⁹⁰ Gideon Ariel & William Seville, *Anabolic Steroids: The Physiological Effect of Placebos*, 4 MEDICINE & SCIENCE IN SPORTS 124, 124–25 (1972).

¹⁹¹ Beedie, et al., *supra* note 189, at 260.

¹⁹² *Id.* at 261 (the workout consisted of 3 timed sprints of 30 meters each).

¹⁹³ *Id.*

¹⁹⁴ *Id.*

¹⁹⁵ *Id.* at 262.

¹⁹⁶ Coaches and trainers recognize and exploit this effect at times. See, e.g., ARMSTRONG REASONED DECISION, *supra* note 5, at 19 (noting that a team official “came up with a placebo, whittling down an aspirin pill and wrapping it in tin foil” when cortisone Armstrong requested was unavailable); see also *The Mitchell Report: The Illegal Use of Steroids in Major League Baseball: Hearing Before the Comm. on Oversight and Gov’t Reform of the House of Representatives*, 110th Cong (2008) (Testimony of Donald M. Fehr (“undoubtedly there are [baseball] players, and perhaps most of them, who use [a prohibited substance] because they think it has [ergogenic] effects whether it does or not”) (hereinafter “THE MITCHELL REPORT”)).

performance—likely affects their rates of use of the substance and any harm resulting from that use.

Some of the harm from an athlete's increased use of banned but ultimately ineffective substances is abstract. Regardless of the effect on his body, the athlete has still violated the rules of his sport. However, if the substance has negative side effects or injures the athlete's long-term health, increased use also means increased physical harm. Therefore, prohibition in the absence of evidence of actual ergogenic effects may serve to increase demand and harm with no offsetting fairness or other benefit to sport. Of course, a sporting ban might still make sense even if a collateral effect of the prohibition is increased demand by some athletes: That is simply a decision about the permissible parameters of sport. However, this is distinct from any legal prohibitions on use or governmental enforcement of sporting regulations.

C. Ignorance Increases Harm from Athletes' Use of Performance-Enhancing Substances

In addition to increasing rates of use of performance-enhancing substances, ignorance about purported performance-enhancing substances increases any harm to athletes that may result from this use in two ways. First, ignorance critically undermines medical authority so that athletes rely on faulty anecdotes and rumors, instead of medical advice, in using banned substances. Second, it ensures that individuals who encourage or even facilitate the use of dangerous substances are not legally liable for any harm that results from their use.

1. Ignorance undermines medical authority

The actual efficacy and long-term effects of many purported performance-enhancing substances are unknown.¹⁹⁷ As a result, for years many medical professionals denied that anabolic steroids had any effect on performance¹⁹⁸ and doctors made dire predictions about the increased likelihood of death and other ill effects in an effort to discourage use of the drugs.¹⁹⁹ However, anecdotal and easily observable examples of steroids' effects on users' bodies,²⁰⁰ coupled with few examples of longtime users exper-

¹⁹⁷ See *supra* Part I.

¹⁹⁸ Testimony of Dr. Yesalis, 1989 STEROID HEARINGS, *supra* note 38, at 48.

¹⁹⁹ Kayser & Smith, *supra* note 108, at 87; Testimony of Dr. Yesalis, 1989 STEROIDS HEARINGS, *supra* note 39, at 48.

²⁰⁰ See *infra* note 239, and accompanying text (listing examples of these changes).

encing these side effects,²⁰¹ undermined this official stance. Moreover, in the high profile BALCO,²⁰² Armstrong²⁰³ and Biogenesis²⁰⁴ scandals, doctors and chemists in highly specialized practices worked closely in developing new performance-enhancing substances for some of the most successful athletes of the past decade, while journeymen athletes struggle to find sources for less exotic drugs. As a result, athletes do not trust many mainstream doctors' objectivity and medical advice concerning performance-enhancing substances.²⁰⁵

This lack of medical authority increases the likelihood athletes' use of prohibited substances will physically harm them. It causes athletes to ignore medical assessments of harm and to fail to disclose information about their use that is necessary or helpful for diagnosing and treating illness.²⁰⁶ Moreover, at least some athletes never learn best practices for safe use and, instead, rely on internet searches and locker room gossip in developing enhancement regimes, resulting in combinations, dosages, and processes more likely to harm than to enhance.²⁰⁷ Thus pronouncements about the dangers of enhancement become self-fulfilling prophecies.

2. Ignorance prevents legal liability for harm

While information about the potential for harm from use of a performance-enhancing substance may not discourage its use by an athlete,²⁰⁸ the associated risk of liability for encouraging use could influence the behavior

²⁰¹ See Testimony of Dr. Yesalis, 1989 STEROID HEARINGS, *supra* note 39, at 48.

²⁰² See *supra* notes 94–102, and accompanying text.

²⁰³ See *supra* INTRODUCTION, at 3–5.

²⁰⁴ See *supra* notes 125–128, and accompanying text.

²⁰⁵ See, e.g., Ivan Waddington & Andy Smith, AN INTRODUCTION TO DRUGS IN SPORT: ADDICTED TO WINNING? 229 (2009) (“[U]sers of anabolic steroids generally felt that most medical practitioners had little knowledge of their use and were unable to provide unbiased information on different drugs and their effects on health.”); *cf.*, American Academy of Pediatrics, *Policy Statement: Use of Performance-Enhancing Substances*, 115 PEDIATRICS 1103, 1103 (2005) (“Attempts to discourage use through scare tactics or by dismissing known performance-enhancing effects of these substances may seriously damage the credibility of the physician and do little to diminish use.”).

²⁰⁶ See *supra* notes 105–30, and accompanying text.

²⁰⁷ See Smith & Stewart, *supra* note 107, at 126; Kayser, et al., *supra* note 145; see also Ian Lovett, ‘Tattooed Guy’ Was Pivotal in Armstrong Case, N.Y. TIMES, Oct. 18, 2012, at B11, *archived at* <http://perma.cc/FVU6-XHCG> (relating guesswork involved in determining EPO dose for one user, and resulting side effects).

²⁰⁸ See *supra* INTRODUCTION at 6–7.

of an athlete's entourage: the coaches, trainers, team management, teammates, and other sports professionals that surround and advise him.

In many instances, an athlete's decision to use performance-enhancing substances is not an isolated one. It is based on the advice or encouragement of his entourage.²⁰⁹ In the absence of hard evidence concerning the causation of any negative physical effects from an athlete's use of performance-enhancing substances, these individuals may be subject to criminal or sporting sanctions for helping to acquire or cover up use of the drug, but not held responsible for any harm to the athlete himself. As a result, any harm caused by the use of prohibited substances is currently borne entirely by the athlete and not shared by the network that encouraged and facilitated the use.

3. Ignorance increases collateral harms

Prohibition itself may increase the risk of harm from the substances athletes use. Some of these harms are similar to those caused by prohibitions of recreational drugs, such as a high reliance on black market, counterfeit, and/or contaminated formulations.²¹⁰ Some of the harms, though, are unique. Athletes emphasize undetectability over efficacy or safety in selecting between substances and thus, at times, select more dangerous, but less easily detected, substances over safer ones. This is the case with, for example, anabolic steroids. While injectable steroids are more effective and less damaging than oral steroids in the therapeutic context, they stay in the body weeks longer.²¹¹ Thus, the window for detecting them is significantly greater. Because of this difference, athletes often opt for the oral formula-

²⁰⁹ See Johanna O. Thomas, et al., *Illicit Drug Knowledge and Information Seeking Behaviors Among Elite Athletes*, SCIENCE & MEDIC. IN SPORT 278, 278 (2011); John Hoberman, 'Athletes in Handcuffs?' *The Criminalization of Doping*, in Mike McNamee & Verner Moller, DOPING AND ANTI-DOPING POLICY IN SPORT 99; Holger Strulik, *Riding High: Success in Sports and the Rise of Doping Cultures*, 114 SCAND. J. ECONOMICS 539, 541 (2012).

²¹⁰ See Tokish, et al., *supra* note 73, at 1544 (reporting annual black market sales of steroids in excess of \$100 million)

²¹¹ See GOV'T REFORM COMM., REPORT ON INVESTIGATION INTO RAFAEL PALMEIRO'S MARCH 17, 2005, TESTIMONY BEFORE THE COMM. ON GOV'T REFORM 15 (reporting that injectable stanozolol is detectable for three to four weeks while oral formulations are only detectable for seven to ten days); Sidney Gendin, *Ban Athletes Who Don't Use Steroids*, in PERFORMANCE-ENHANCING DRUGS 60, 60 (James Haley, ed.) (2003) (comparing side effects of oral and injectable steroids); Kayser, et al., *supra* note 145 ("The [ease of] detection of oil-based esters of nandrolone, belonging to a class of anabolic steroids with little side effects and low risk for hepatic disease, has led to the use of oral-based analogues with more side effects, but more rapidly eliminated from the body and thus less easy to detect."); Paul J. Perry, et al., *Ana-*

tions over injectable ones. Moreover, athletes often turn to new and unproven substances for which tests are not yet available, instead of those about which more is known (including how to detect them),²¹² effectively acting as guinea pigs in uncontrolled drug trials.²¹³ Alternatively, they at times use veterinary formulations since they are easier to obtain than prohibited substances that are designed for human use.²¹⁴ These formulations are completely untested on humans, and sold in dosages appropriate for the horses and other large livestock for which they were developed instead of for much-smaller humans.

While these harms are not the direct product of ignorance concerning performance-enhancing substances, they do result from prohibitions on the use of these substances. Where those prohibitions prevent greater harms from the prohibited substances themselves, the risk of these harms may be worth taking. However, prohibiting substances based on anecdotes and conjecture risks exposing athletes to these additional harms without a reduction in physical or competitive harm.

What evidence exists suggests that the contemporary regulatory scheme concerning performance-enhancing substances has been stunningly ineffective in preventing their use. Instead, it has largely been effective only in ensuring that legislators, athletes, and fans remain ignorant about the use and effects of performance-enhancing substances. This ignorance, then, contributes to the use of these substances and increases the harm that results from this use. While other commentators have suggested increasing the

bolic Steroid Use in Weightlifters and Bodybuilders, 15 CLINICAL J. SPORT MED. 326 (2005) (noting hepatotoxicity risk of oral steroids as opposed to injectable).

²¹² See L. ELAINE HALCHIN, REPORT FOR CONG., RL 32894 CRS-5, ANTI-DOPING POLICIES: THE OLYMPICS AND SELECTED PROFESSIONAL SPORTS (2007); see also Kirkwood, *supra* note 146, at 186 (noting that by the time a test for synthetic EPO existed, “the substance was already antiquated and athletes had moved on to brand-new substances with unknown side and long-term effects”).

²¹³ See WILLY VOET, BREAKING THE CHAIN: DRUGS AND CYCLING: THE TRUE STORY 96 (2002) (A first person account of this approach, noting that “[t]o work out [the effects of clenbuterol] precisely, we needed a guinea-pig We found the right man soon enough: me.”).

²¹⁴ For examples of athletes who tested positive for horse steroids, see Todd Zolecki, *Phillies Minors Pitcher Solano Suspended*, MLB.COM (Jan. 20, 2011), http://mlb.mlb.com/news/print.jsp?ymd=20110120&content_id=16471982&vkey=news_mlb&c_id=mlb; MLB.com, *archived at* <http://perma.cc/CP26-HJQJ>; Conway, *Parke Banned 10 Matches for Positive Drug Tests*, ESPN.SOCERNET (Oct. 16, 2008), <http://espnfc.com/news/story?id=582565&sec=mls&cc=5901>, *archived at* <http://perma.cc/4K9X-RJLS>; Ivan Trembow, *Bonnar Suspended for 9 Months for Steroid Use*, MMAWEEKLY.COM (Nov. 3, 2006), www.mmaweekly.com/bonnar-suspended-9-months-for-steroid-use-2, *archived at* <http://perma.cc/ZV9-9BXQ>.

sanctions for violations of these regulations, this focus rests on unproven assumptions about the substances' effectiveness and capacity to harm, and fails to recognize the impossibility of rational decision-making in the absence of information. By contrast, this Article suggests that information alone can reverse some of the more critical failures with respect to the effective regulation of performance-enhancing substances while minimizing the risk of harm to the athletes using them and to the legitimacy of sport.

III. INFORMATION: WHAT DO WE NEED (AND HOW DO WE GET IT)?

More information is, in itself, not necessarily a solution: An endless search for information can impede decision-making, and in some instances people make *worse* decisions when presented with more information.²¹⁵ Thus, it is important to define narrowly the needed information and connect it to the current problems it would resolve to ensure the information would actually affect athletes' decisions instead of serving merely as an end in itself. While filling in the details is well beyond the scope of this Article, this Part concludes by identifying potential sources of data that can be gathered and analyzed, ethically and efficiently.

While sporting organizations may have different goals, including ensuring more competitive and engaging events, this analysis emphasizes harm reduction. Thus, its focus is on identifying the information that will best help overcome the risk of harm from the regulation and use of performance-enhancing substances.²¹⁶ In this, harm is defined broadly, to include harm to

²¹⁵ See, e.g., Crystal C. Hall, et al., *The Illusion of Knowledge: When More Information Reduces Accuracy and Increases Confidence*, 103 *ORG. BEHAV. & HUMAN DECISION PROCESSES* 277 (2007) (finding that, in predicting the outcome of basketball games, participants were less accurate, but more confident when provided with additional information than when provided only with limited relevant information). Moreover, the task is not done even once the information is gathered; instead, the ways in which information is conveyed shapes the decisions people make. See, e.g., Jolls, et al., *supra* note 195, at 1533–34; 1536–37 (discussing role of the presentation of information in decision-making).

²¹⁶ Other scholars have also argued in favor of a harm reduction approach to the regulation of performance-enhancing substances. See, e.g., Ross Coomber, *Drugs in Sport: Rhetoric or Pragmatism*, 4 *INT'L J. DRUG POLICY* 169 (1993) (advocating a pragmatic, harm-reduction approach to the regulation of drugs in sport); Kayser & Broers, *supra* note 145, at 33 (citing “needle and syringe exchange programmes, safe use facilities, opiate substitution therapy, overdose prevention and chemical analysis of party drug” as successful harm reduction strategies concerning recreational drugs); Kayser & Smith, *supra* note 108, at 87 (arguing in favor of regulating athletes' health rather than their doping).

competition and public support for elite sport, as well as direct physical harm to athletes themselves.

A. *Information We Need (and Why We Need It)*

There are five types of information that are critical to overcoming the biases and miscalculations described above, namely: (1) data concerning the rates of use of performance-enhancing substances by athletes; (2) identification of substances commonly thought to be performance enhancing that fail to deliver an ergogenic effect; (3) examples of athletes for whom doping did not equate with athletic success; (4) verifiable causal links between enhancements and physical injury; and (5) identification of the substances used by athletes.

1. Rates of use

Estimates of rates of performance-enhancing substances use by athletes vary widely—between 1%²¹⁷ and 95%.²¹⁸ This range may be due to the populations studied in each case, the definition of “use” employed, the way data is collected, or the fact that athletes are not necessarily forthcoming about their use. In any event, the extreme breadth of this range indicates that we simply do not know whether doping is an occasional practice of relatively small groups of athletes or if it is commonplace throughout elite sport.²¹⁹

Obtaining this information is critical.²²⁰ Data concerning the pervasiveness of doping within different sports would clarify for athletes whether their own use of performance-enhancing substances provides them an advantage over competitors or if it levels a playing field otherwise tilted by others’ doping. Moreover, it would allow governing bodies to address enhancement in a more finely tuned way than is possible currently.

If background rates of enhancement are low in a sport, many athletes using performance-enhancing substances may well choose to stop using

²¹⁷ This figure is based on actual rates of positive doping tests. See Abrahamson, *supra* note 116.

²¹⁸ Petroczi, et al., *supra* note 124, at 20.

²¹⁹ See Carnegie Research Institute, Leeds Metropolitan University, INTERNATIONAL LITERATURE REVIEW: ATTITUDES, BEHAVIORS, KNOWLEDGE AND EDUCATION—DRUGS IN SPORT: PAST, PRESENT AND FUTURE 91 (2007) (“At the present time a reliable estimate of prevalence is yet to be established.”).

²²⁰ Social scientists Berno Buechel, Eike Emrich, and Stefanie Pohlkamp called this the most important scientific question concerning doping. See Buechel, et al., *supra* note 108, at 2.

them. This is because doping has a strong social norm component: In evaluating whether to use performance-enhancing substances, the attitude of fellow athletes influence an individual's decision-making in two important ways.²²¹

First, when caught for using banned substances, many athletes protest that they were simply doing what others in their sport were doing.²²² Thus, they claim they were not gaining an advantage over the competition, but merely participating according to the same unwritten rules. Taken at face value, this would mean that these individuals believe they are only doping *defensively*—in response to perceived doping by others.²²³ Even if this is just a rationalization, revealing it as a false one could prove helpful. The claim itself seems to be a way to differentiate enhancement that the athlete believes to be cheating—that meant to chemically assist his performance—from that which he believes is legitimate—meant to allow him to maintain his relative rank in the athletic hierarchy. To the extent actual rates of use in a sport are low, athletes deciding whether to use banned substances will know they are choosing between cheating and competing on their own merits, forcing a more honest evaluation of the situation.

Additionally, in many instances athletes learn about doping and are encouraged in their use of prohibited substances by their compatriots.²²⁴ In sports where sufficiently many athletes are doping, this practice means that the use of prohibited substances becomes the norm.²²⁵ Even the *perception* that many others are using prohibited substances can influence the development of this norm, since peer influence comes from what individuals think others believe or do, not necessarily what is objectively true.²²⁶

To the extent athletes currently overestimate the use of banned substances by their peers, information about sport-specific rates of use may successfully reduce enhancement where regulations have failed. Research into peer influence on underage drinking shows that many adolescents increase

²²¹ Holger Strulik, *Riding High: Success in Sports and the Rise of Doping Cultures*, 114 SCAND. J. ECONOMICS 539 (2012).

²²² See *supra* note 169.

²²³ See Kenneth Kirkwood, *Defensive Doping: Is There a Moral Justification for 'If You Can't Beat 'Em—Join 'Em?'*, 36 J. SPORT & SOCIAL ISSUES 223, 224–25 (2012) (summarizing and critiquing the distinction between offensive and defensive doping).

²²⁴ Strulik, *supra* note 221, at 541.

²²⁵ *Id.*

²²⁶ See H. Wesley Perkins, *The Emergence and Evolution of the Social Norms Approach to Substances Abuse Prevention*, in THE SOCIAL NORMS APPROACH TO PREVENTING SCHOOL AND COLLEGE AGE SUBSTANCE ABUSE 8 (H. Wesley Perkins, ed., John Wiley & Sons 2003) (hereinafter “Perkins, SOCIAL NORMS”).

their own consumption of alcohol to match more closely what they believe is the average rate of drinking by their peers.²²⁷ In that context, interventions focused on publicizing actual rates of consumption have dramatically reduced rates of heavy drinking.²²⁸ Thus, to the extent athletes currently overestimate the prevalence of banned substance use among their competitors and alter their own use as a result, it may be that simply learning actual rates of use would decrease the use of performance-enhancing substances.²²⁹

Furthermore, different rates of enhancement suggest different anti-doping enforcement approaches. If research shows that very few athletes engage in doping in a specific sport, then it may be that the current approach—focusing on testing the highest achievers with some small amount of random testing farther down—is effectively capturing the most problematic use within that sport and preventing much of the possible harm. Moreover, more recent efforts to monitor biological profiles²³⁰ and power output,²³¹ and to strategically test athletes who turn in aberrational values or performances, should go a long way to ensuring athletes do not use doping to get ahead of their competition.

However, to the extent enhancement is pervasive within a sport,²³² this testing and monitoring for abnormalities can be expected to capture very

²²⁷ *Id.* at 9.

²²⁸ Michael P. Haines & Gregory P. Barker, *The Northern Illinois University Experiment*, in Perkins, SOCIAL NORMS, *supra* note 226, at 21; H. Wesley Perkins & David W. Craig, *The Hobart and William Smith Colleges Experiment*, in Perkins, SOCIAL NORMS, *supra* note 226, at 35.

²²⁹ Of course, this information could have the opposite effect: To the extent athletes are more interested in using banned substances to get ahead than to level the field, learning about low rates of use in their sport may encourage increased doping. However, this is not a reason to remain ignorant, but a reason to monitor any interventions carefully and adjust them as needed.

²³⁰ See *supra* note 89 discussing the biological passport program.

²³¹ Intriguingly, some sports scientists did this for Tour de France riders in 2013. Exercise physiologist Ross Tucker estimated power output by the top riders on the hardest climbs of the 2013 Tour and compared these calculations to past performances known to be doping-fueled. In doing so, he identified specific performances that pushed the limits of physiological possibility. See James Dao, *Watchdogs Seek Doping Clues From a Distance*, N.Y. TIMES, July 18, 2013, at B11, *archived at* <http://perma.cc/9TKC-U7EM>; see also Ross Tucker, *The Power of the Tour de France: Performance analysis, laying the groundwork*, THE SCIENCE OF SPORT, (July 3, 2013), <http://www.sportsscientists.com/2013/07/the-power-of-tour-de-france-performance.html>, *archived at* <http://perma.cc/TJ5D-PLZY> (explaining the “pVAM” method used by Tucker to calculate and interpret riders’ power output).

²³² WADA’s own research suggests this is the case in at least some sports. See Rohan, *supra* notes 135-138 (discussing track and field athletes’ admitted rates of use in a recent WADA study).

little of the existing use. Since most athletes will likely not be tested, and most performances will not appear anomalous—instead, the general performance level will just be elevated—enhancement will remain common and necessary for anyone interested in participating at the sport's highest level. Thus, for any sport in which use is above some threshold point that routine testing should control, regulators will need to develop a different approach. Depending on the sport, that approach may be making a substantial economic investment in widescale testing until the sport's norms change, working with sports organizations to change social norms concerning doping, or regulating hormone levels and other physiological markers rather than testing for substance use.²³³

From a policy and regulatory perspective, data concerning the background rates of doping on a sport-specific level is the most critical piece of missing information. Without it, it is impossible to evaluate the success or failure of a regulatory regime based on testing. Moreover, this information would help athletes locate their intended behavior within the actual norms of their sport instead of presumptions based on guesswork and the most visible examples.

2. Identity of “performance-enhancing substances” that do not enhance performance

In discussing the troubling absence of information about performance-enhancing substances, other commentators have largely focused on the lack of *safety* information.²³⁴ In these analyses, the implicit or explicit assumption is that if athletes knew a substance was unsafe, either in terms of its immediate side effects or long-term physical harm, they would choose not to use the substance. Thus, FDA oversight of safety testing for supplements and drugs as used for enhancement proves a common prescription.²³⁵ Yet, as previously discussed, risk of physical harm is not a dissuading factor for

²³³ This is already done in some instances. For example, in addition to testing for EPO, some sports federations regulate blood doping by capping the proportion of red blood cells in an athlete's bloodstream. A level too high results in the athlete being declared unfit for the instant competition, but does not result in an anti-doping violation. Mario Ziroli, *Biological Passport Parameters*, 6 J. HUMAN SPORT & EXERCISE 2, 205 (2011).

²³⁴ See, e.g., Henry T. Greely, *Remarks on Human Biological Enhancement*, 56 U. KAN. L. REV. 1139 (2008) (discussing the ways athletes use banned substances that have never been scientifically tested or are not otherwise known to be safe).

²³⁵ *Id.*

many elite athletes who routinely put their health and their bodies at risk as an everyday part of their training and competing.²³⁶

Instead, a more relevant risk from an elite athlete's perspective is that of a nonergogenic effect from a banned substance: it simply doesn't work. In this case, the athlete risks detection and punishment without receiving a performance benefit, and in some instances may have his performance impaired. The cost-benefit equation is clearly tilted against use. Thus, to the extent research establishes that a substance commonly thought to be performance-enhancing fails to provide an ergogenic boost, information alone should eliminate its without need for regulation or anti-doping controls.²³⁷

The scientific literature contains hints and suggestions concerning prohibited substances that may not enhance performance, at least under some important circumstances.²³⁸ Intriguingly, at least some uses of anabolic steroids may be in this category for elite athletes. In summarizing the existing research into the use of steroids, Eric Boyce lists increases in strength (by 14%-18%), muscle size, and lean body mass (8%).²³⁹ Seemingly proof of the *ergogenic* effects of steroids, the data behind these studies prove less beneficial for elite athletes upon close inspection: Boyce specifies that the studies showing strength increases used untrained and elderly men as subjects.²⁴⁰ Importantly, Boyce concluded that, "[T]here was no difference in the strength of elite, highly trained athletes between those who used and those who did not use anabolic-androgenic steroids."²⁴¹ These results raise the question whether anabolic steroids increase maximum attainable strength, or merely reduce the time and effort needed to achieve maximum strength.²⁴² In other words, athletes who are already at the top of their sports may not enhance their performances through the use of anabolic steroids. If that is, in fact, the case, then there is no reason other than ignorance

²³⁶ See INTRODUCTION, *supra*, and *supra* notes 178–179 and accompanying text.

²³⁷ Ross Tucker has opined that substances that have not been established to provide an ergogenic effect should be removed from sporting prohibitions in order to simplify, and thus improve the credibility of, enforcement of anti-doping regulations. Ross Tucker, *Time to rethink sports doping*, SPORT LIVE (July 22, 2013, 7:54), <http://www.sportlive.co.za/opinion/article9581915.ece>.

²³⁸ See, e.g., D.S. King, et al., *A-Z of Nutritional Supplements: Dietary Supplements, Sports Nutrition Foods and Ergogenic Aids for Health and Performance—Part 34*, 46 BRIT. J. SPORTS MEDICINE 689, 689–690 (2012) (finding that ribose and smilax, prohormones commonly thought to enhance athletic performance, fail to provide an ergogenic benefit).

²³⁹ Boyce, *supra* note 78, at 25.

²⁴⁰ *Id.* at 26.

²⁴¹ *Id.*

²⁴² *Id.* at 27.

about the actual effects of these substances for athletes to continue to use steroids to gain strength or speed once they have reached the elite level.

In addition, the use of steroids by elite athletes may at times have a *negative* effect on performance. Gains in muscle size and lean body mass not associated with strength gains may simply be increases in water weight.²⁴³ In many sports, larger size is itself not correlated with success; only in sports like football or sumo wrestling do size gains, independent of increases in strength, improve performance.²⁴⁴ In other sports, for athletes who have already attained their maximum strength, the use of steroids may not help, and could actually hurt, performance by simply adding unaerodynamic water weight to carry around.²⁴⁵

If anabolic steroids do not enhance performance for elite athletes, then current prohibitions and enforcement mechanisms are not preventing enhancement. As previously shown, prohibition itself may *increase* the use of the banned substances both by suggesting the substances enhance performance and due to psychological reactance.²⁴⁶ Testing, though, only focuses on *use* by *elite* athletes; actual ergogenic effect is not required for a positive test, and only in rare cases are developing athletes monitored closely.²⁴⁷ As a result, current testing may only capture steroid use by those athletes who do not actually benefit from it contemporaneously. It may be that information alone could curb the use of anabolic steroids by athletes who have already attained the elite level,²⁴⁸ freeing resources for use in other more effective anti-doping efforts.

²⁴³ See Fred Hartgens & Harm Kuipers, *Effects of Androgenic-Anabolic Steroids in Athletes*, 34 SPORTS MED. 513, 519 (2004).

²⁴⁴ See generally, David Epstein, *THE SPORTS GENE* (2013) (discussing, *inter alia*, data on ideal body types by sport).

²⁴⁵ See Hartgens & Kuipers, *supra* note 243, at 519.

²⁴⁶ See Brehm, *Control, Its Loss, and Psychological Reactance*, *supra* notes 187–188, and accompanying text.

²⁴⁷ See *supra* notes 161–93, and accompanying text.

²⁴⁸ Similarly, economist Kjetil Haugen has provocatively suggested that, Research on doping effectiveness may also be an interesting strategy. If athletes believe (more strongly than they actually have scientific reason to do so) in the effects of dope, then the task of fighting doping may . . . be a very hard one . . . [O]pen knowledge about actual effects of various doping strategies may, by itself, prove valuable in the fight against doping. Kjetil Haugen, *The Performance-Enhancing Drug Game*, 5 J. SPORTS ECONOMICS 67, 85 (2004).

3. Examples of enhancement failures

Currently, the examples of enhancement that are the most highly visible are enhancement successes: Athletes who used performance-enhancing substances and became highly successful in their sports.²⁴⁹ However, enhancement failures are undoubtedly more common. Identifying and publicizing these cases could help undermine the current strong association between doping and athletic success by providing visible counter-narratives.

For example, statistical analysis of data on baseball players identified as using performance-enhancing substances found that “There is no example of a mediocre player breaking away from the middle of the pack and achieving stardom with the aid of drugs.”²⁵⁰ Instead, close examination of players’ performances immediately before and in the years after each was alleged to begin their use of these substances undercuts the narrative that steroids and other banned substances as actually used by athletes significantly alter baseball players’ performance given the complexity and variety of skills required for success. Specifically, the study concludes that, “in most cases the drugs had either little or a negative effect.”²⁵¹

This story, though, is not the one usually told about performance-enhancing substance use in baseball. Instead, the public narrative of enhancement is a glamorous one of home run championships or skinny players bulking up and garnering multi-million dollar paydays along the way. What if equal time was given to the player who never made it out of the minor leagues despite his use of steroids, HGH, and andro? Or to the aging player, desperate to hold onto his career and fame, whose performance tailed off in a pattern similar to that of Babe Ruth or Joe DiMaggio despite regular injections of steroids and HGH?

For many athletes, telling these stories—putting faces on enhancement’s mediocrity, failure, and decline—could well prove more persuasive in dissuading use than citing statistics about the probability of long-term harm from the use of various substances. While objective evidence of harm may be persuasive to individuals who are already disinclined to use banned substances, narrative examples of enhancement failures may prove more effective at persuading individuals biased in favor of use to change their pref-

²⁴⁹ See *supra* notes 150–155, and accompanying text (defining enhancement success and failure and discussing the reasons for this high visibility).

²⁵⁰ Jonathan R. Cole & Stephen M. Stigler, *More Juice, Less Punch*, N.Y. TIMES (Dec. 22, 2007), <http://www.nytimes.com/2007/12/22/opinion/22cole.html>, archived at <http://perma.cc/3787-B5RL>. The study on which this op-ed is based is currently unpublished.

²⁵¹ See *id.*

erences.²⁵² Thus, providing visibility to the many athletes who have used performance-enhancing substances but not become superstars, or who ceased improving after beginning heavy use, or who have experienced performance setbacks due to their use of banned substances may ultimately dissuade more athletes from use, and especially use that results in cognizable harm, than statistical data concerning risk of physical harm.

4. Proof of harm

While most likely ineffective in dissuading use by many athletes, sound data concerning injury causation could affect decisions by an athlete's entourage to encourage or assist doping. If, for example, research established a link between the enhancement use of anabolic steroids and brain tumors, individuals who promote and assist in this use, as well those providing the drugs, could be held civilly liable for the resulting injuries.

Of course, in the case of anabolic steroids these individuals may already be criminally liable under the CSA.²⁵³ However, athletes currently have little or no incentive to assist the government in pursuing convictions because, at best, revealing use will negatively impact their own athletic legacies and, at worst, they could also be prosecuted themselves for their illegal use of these substances.²⁵⁴ In addition, athletes receive no personal vindication for the convictions—no acknowledgement of the damage to their bodies—since the underlying offense is selling or otherwise distributing prohibited substances, not causing harm to the athlete.²⁵⁵

Because of the lack of data concerning physical harm caused by banned substances, athletes currently internalize all of the risks from the use of performance-enhancing substances despite the fact that use is seldom a completely isolated act. Establishing harm causation means an athlete could recoup medical costs and other damages from the personnel involved in his

²⁵² This disparity occurs at least in the context of changing behavior towards alcohol use. See Michael D. Slater & Donna Rouner, *Value-Affirmative and Value-Protective Processing of Alcohol Education Messages That Include Statistical Evidence or Anecdotes*, 23 COMMUNICATION RESEARCH 210 (1996). See also John B.F. de Wit, et al., *What Works Best: Objective Statistics or a Personal Testimonial? An Assessment of the Persuasive Effects of Different Types of Message Evidence on Risk Perception*, 27 HEALTH PSYCHOLOGY 110 (2008) (finding narrative evidence more successful than statistical data in communicating health risks to participants otherwise inclined to undertake high risk sexual behavior).

²⁵³ See *supra* note 52, and accompanying text (describing criminal liability under the CSA).

²⁵⁴ *Id.*

²⁵⁵ *Id.*

use of ultimately harmful substances, under either battery or negligence theories, ultimately reducing the likelihood that these individuals would encourage and assist in the use in the first place.

5. What athletes are actually taking

For as little information as we have about what athletes *believe* they are taking, we know even less about what in fact they *are* injecting and ingesting. Because many desired substances cannot be obtained legally, and even where they can be they require a doctor's prescription, athletes often obtain the substances they use through black market or other untrustworthy sources.²⁵⁶ In many instances, the labeling and contents of these substances do not match. For example, one study of steroids obtained from black markets found that 53% of the injectable steroid samples and 21% of the oral ones were counterfeit and, in some cases, contaminated with bacteria known to cause abscesses.²⁵⁷ Another study found that only four of eleven confiscated black market performance enhancement products actually contained what their labels advertise.²⁵⁸ Even when obtained from reputable sources, this mismatch between contents and labeling exists routinely for supplements.²⁵⁹ As a result, even studies that successfully elicit truthful responses from athletes about what they use do little to reveal what they actually use.

If we do not know what substances athletes are actually taking, thoughtfully reducing the use of harmful substances and minimizing any harm resulting from their use becomes nearly impossible. Athletes cannot possibly make a rational decision about whether to use a potentially enhancing substance without knowing, in the first instance, what is in the product they propose to use. Moreover, no generalizable causal link between substance use and any outcome—positive or negative—is possible where the substance used is unidentified.

Further revealing the importance of information concerning what is contained in the products used by athletes, interventions intended to reduce optimism biases prove successful only where they offer individuals information about their own particular likelihood of experiencing a potential

²⁵⁶ See Tokish et al., *supra* note 73, and accompanying text.

²⁵⁷ Michael R. Graham, et al., *Counterfeiting in Performance- and Image-Enhancing Drugs*, 1 DRUG TESTING & ANALYSIS 135 (2009).

²⁵⁸ Kohler, et al., *supra* note 74, at 536–37.

²⁵⁹ See *id.* at 536–37 (discussing the lack of consistency in the contents of nutritional supplements).

harm.²⁶⁰ More general manipulations, such as alerting participants to relevant risk factors for health hazards,²⁶¹ presenting risk factors in a way that encourage participants to see their own status as non-ideal,²⁶² inducing participants to visualize a person who embodied high risk factors before judging their own risk,²⁶³ and asking participants to generate a list of factors that would increase or decrease a risk,²⁶⁴ each served, contrary to the researchers' expectations, to exacerbate pre-existing optimism biases.²⁶⁵ As a result, common strategies intended to decrease undesirable behavior, such as media campaigns emphasizing the negative effects of substance use, may well increase athletes' tendency to unreasonably discount these risks.²⁶⁶ Successfully reducing the optimism bias instead requires specific information about an athlete's own likelihood of experiencing a negative outcome; absent information about what substances an athlete is actually taking, this level of specificity is impossible.

We currently know very little about performance-enhancing substances and athletes' use of them. What we do know is that, in at least some critical instances, the current regulatory approach is largely ineffective in preventing and detecting their use. Instead of continuing to legislate in the dark, the focus of lawmakers and sporting organizations should be on obtaining the most critical information we currently lack in order to more effectively prevent harm to the athletes using these substances, to competitors deciding whether to use them, and to the spirit of competition.

B. Sources of Information

If information concerning performance-enhancing substances and their use by athletes were easy to collect, it would undoubtedly already have been done: Both Congress and researchers have acknowledged the need for more information for at least half a century.²⁶⁷ However, because doping is a cov-

²⁶⁰ Neil D. Weinstein & William M. Klein, *Resistance of Personal Risk Perceptions to Debiasing Interventions*, in *HEURISTICS AND BIASES: THE PSYCHOLOGY OF INTUITIVE JUDGMENT* 313, 322 (Thomas Gilovich, et al., eds, Cambridge University Press 2002).

²⁶¹ *Id.* at 314–16.

²⁶² *Id.* at 316–17.

²⁶³ *Id.* at 317–20.

²⁶⁴ *Id.* at 320–22.

²⁶⁵ *Id.* at 322.

²⁶⁶ *Id.* at 323.

²⁶⁷ See *supra* notes 53–62 & 77–83, and accompanying text; see also Kayser & Smith, *supra* note 108, at 87 (“rigorous clinical and policy studies are imperative”); David R. McDuff & David Baron, *Substance Use in Athletics: A Sports Psychiatry Per-*

ert activity, information about it is elusive: Even where use is common in an athlete's cohort, many of the specifics remain private. Moreover, when testimony or other evidence establishes an athlete's use of banned substances, public and official attention focuses on the identity of other transgressors—who assisted the athlete in obtaining, learning about, and using prohibited substances, and who else used them—not the specifics of use. The resulting ignorance in turn increases athletes' use of banned substances, increasing the potential for harm.

Yet this ignorance does not need to persist. The amount of information that exists about performance-enhancing substances is staggering: Athletes keep exhaustive records of their use, team personnel monitor and medical professionals and adapt programs for efficacy for the athletes under their care, and human bodies register and record the effects of substances taken long after their use is discontinued. What if, instead of focusing on finger-pointing and retroactive record-erasing, anti-doping efforts were focused on accumulating the information already available but largely unanalyzed in order to develop a more effective and less harmful approach to enhancement for the future?

A primary source of information concerning athletes' use of performance-enhancing substances and the effects of use on their bodies exists in the exhaustive documentation kept by many teams, physicians and athletes. For example:

- Professional cycling teams records that detail the riders' drug protocols and the physical effects of enhancement in minute detail;²⁶⁸
- United States Olympic Committee records from 1991-2000 that, over the course of 30,000 pages, detail the use of prohibited substances by United States athletes;²⁶⁹

spective, 24 CLINICS IN SPORTS MED. 895 (2005) (calling for large scale clinical trials where possible); Melethil, *supra* note 86, at 88 (calling for animal studies where human trials are not possible).

²⁶⁸ See, e.g., ARMSTRONG REASONED DECISION, *supra* note 5, at 77 & 109 (describing internal testing and calibrations on the United States Postal Service cycling team). See also Benjamin D. Brewer, *Commercialization in Professional Cycling 1950-2001: Institutional Transformations and the Rationalization of "Doping"*, 19 SOCIOLOGY SPORT J. 276, 294 (2002) (chronicling oversight and tracking of doping by team management); Juliet Macur, *Welcoming Testing, Team Battles Cycling's Image*, N.Y. TIMES, Feb. 13, 2007, available at <http://www.nytimes.com/2007/02/13/sports/othersports/13cycle.html> (last visited Aug. 23, 2013) (focusing on internal testing and record-keeping by the Slipstream professional cycling team).

²⁶⁹ See Tim Layden & Don Yaeger, *Playing Favorites?*, SPORTS ILLUSTRATED (Apr. 21, 2003) (describing records possessed by Dr. Wade Exum, the USOC's former director of drug control administration).

- East German records reporting the results of doping research and the use of performance-enhancing substances by the country's top athletes since 1966;²⁷⁰
- An as-yet-unpublished 800-page report detailing West German doping since the 1950s;²⁷¹ and
- Records from the BALCO²⁷² and Biogenesis investigations.²⁷³

Gathering and analyzing this information should be the focus of officials investigating collateral or past instances of doping. While these records are not always based on scientific experiments, they provide much more information than is currently available. The current emphasis on retroactive punishment means that, instead, athletes and team personnel have strong incentive to destroy their records at the first hint of trouble,²⁷⁴ perpetuating ignorance of the use and effects of performance-enhancing substances.

A further source of information is athletes themselves. As indicated by the 2011 WADA survey of track and field athletes,²⁷⁵ if properly assured of anonymity many athletes will provide some of the critical data that is currently lacking. Cooperating athletes should not receive amnesty for any use they disclose as part of the process, but the data itself should not be able to be used against the athletes providing it. While this data would be comprised of anecdotes and suffer from the usual self-reporting constraints,²⁷⁶ in the aggregate it could prove helpful in identifying rates of use of prohibited substances, athletes' beliefs about these substances, and how the substances are actually used by athletes.

Furthermore, researchers should gather data concerning the long-term effects of performance-enhancing substance use from athletes known to have used these substances. This could be accomplished in two ways. Recently

²⁷⁰ See Charles E. Yesalis & Michael S. Bahrke, *History of Doping in Sport*, in PERFORMANCE-ENHANCING SUBSTANCES IN SPORT AND EXERCISE 9 (Michael S. Bahrke & Charles E. Yesalis, eds.) (noting the existence of these records).

²⁷¹ See *Study Says West Germany Used Doping*, N.Y. TIMES, Aug. 4, 2013, at SP10, available at <http://www.nytimes.com/2013/08/04/sports/study-says-west-germanys-athletes-used-doping.html> (revealing existence of the study).

²⁷² See *supra* notes 94–102, and accompanying text.

²⁷³ See *supra* notes 125–128, and accompanying text.

²⁷⁴ At times, this destruction is even legally mandated. See Juliet Macur, *Spanish Judge Orders Destruction of Evidence*, N.Y. TIMES, May 1, 2013, at B19, available at <http://www.nytimes.com/2013/05/01/sports/cycling/spanish-doctor-sentenced-in-operation-puerto-doping-case-in-cycling.html>.

²⁷⁵ See *supra* notes 135–138, and accompanying text (discussing the survey).

²⁷⁶ For example, there would most likely be a selection bias among those who agreed to participate and some athletes may further choose not to be truthful in order to maintain a competitive advantage or because they distrust the intermediary.

retired athletes could be offered amnesty from invalidation of records and public disclosure of use in return for disclosure of past use to sporting researchers and on-going physical monitoring. In addition, researchers should follow-up with the high school and college athletes who were the subjects of early experiments concerning anabolic steroids²⁷⁷ to determine the effects on their morbidity and other aspects of long-term health. In each case, careful collection and analysis of this data could help identify any real long-term health consequences to the use of steroids and other substances as enhancements, not therapy.

Finally, a number of doctors could be trained to assist athletes in safe practices to the extent they feel comfortable doing so within the bounds of their professional responsibilities.²⁷⁸ While this would not need to extend to issuing prescriptions or otherwise procuring substances for use by athletes, it could include testing substances obtained by athletes prior to use to identify the contents, and working with researchers to provide anonymized data on the substances used and observed physical effects. This assistance could serve to reduce collateral harms from doping, including harm from unsafe processes and contaminated substances,²⁷⁹ provide valuable real-time information to researchers about the enhancements being employed by athletes, and help rehabilitate the reputation of medical professionals with athletes.²⁸⁰

Of course, collating and organizing this information in a meaningful way would be a daunting task. However, models for similarly mammoth information-gathering and analysis exist. For example, using its “Sentinel” system, the FDA collects the electronic records of prescriptions filled, associated diagnoses, and adverse events. From these records, then, it derives patterns of causality between events that historically simply took too much

²⁷⁷ See Yesalis & Bahrke, *supra* note 270, at 65–66 (describing the studies).

²⁷⁸ But see John Hoberman, *Sports Physicians and the Doping Crisis in Elite Sport*, 12 CLINICAL J. SPORTS MED. 203 (2002) (summarizing ethical conflicts inherent in doctors’ participation in doping, even where it reduces the harm to the athletes involved); see also Steve P. Calandrillo, *Sports Medicine Conflicts: Team Physicians vs. Athlete-Patients*, 50 ST. LOUIS U. L.J. 185 (2005) (examining the ethical conflicts that team physicians employed by teams have when treating athletes, particularly when using substances or procedures with questionable therapeutic value); Barry R. Furrow, *The Problem of the Sports Doctor: Serving Two (Or is it Three or Four?) Masters*, 50 ST. LOUIS U. L.J. 165 (2005) (same).

²⁷⁹ For this reason, other commentators have also suggested encouraging medical oversight of athletes’ doping. See, e.g., Preface, in Murray, et al., PERFORMANCE-ENHANCING TECHNOLOGIES, *supra* note 25 (discussing this approach). But see Urban Wiesing, *Should Performance-Enhancing Drugs in Sport be Legalized Under Medical Supervision?*, 41 SPORTS MEDICINE 167 (2011) (arguing against this approach).

²⁸⁰ See *supra* notes 197–207, and accompanying text.

manpower to analyze.²⁸¹ The FDA intends the system to identify and quantify adverse-events quickly and accurately, optimizing the safety and efficacy of medication.²⁸² In addition, researchers have been collecting and analyzing medication and symptom-related queries entered into major search engines, allowing them to identify evidence of otherwise-unreported drug side effects more quickly than under formal warning systems.²⁸³ Similarly, collecting and analyzing the large repositories of data concerning the use of performance-enhancing substances, in combination with novel approaches to gathering contemporary information anonymously, may well yield significant insights into the use of these substances. While the details remain to be worked out, the critically needed information is not unknowable or, in some instances, truly unknown.

CONCLUSION

The current approach to regulating the use of performance-enhancing substances has proven ineffective. Repeated scandals and WADA's own research shows that, at least in many sports, the use of prohibited substances is pervasive. The only thing more pervasive, it seems, is ignorance about enhancement.

This ignorance is in many ways voluntary: The information we need to overcome it in many cases exists, but is uncollected, unpreserved, and unanalyzed. This Article argues in favor of an approach to regulating performance enhancement that emphasizes reducing the risk of harm from use of these substances in a way that is both pragmatic and persuasive given the norms and practices of elite sport.

²⁸¹ Jerry Avorn & Sebastian Schneeweiss, *Managing Drug-Risk Information—What to Do with All Those New Numbers*, 361 NEW ENG. J. MED. 647, 647 (2009).

²⁸² *Id.* at 649.

²⁸³ Ryen W. White, et al., *Web-Scale pharmacovigilance: listening to signals from the crowd*, J. AM. MED. INFORMATICS ASS'N 403 (2013).