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Anabolic Steroid and Human Growth Hormone Abuse: Creating an Effective and Equitable Ergogenic Drug Policy

George Fan†

Many recent news stories have focused public attention on ergogenic, or performance enhancing, drug abuse. Some of the most memorable of these stories, such as the Olympic Committee's revocation of Canadian sprinter Ben Johnson's Olympic gold medal,¹ or the death of former Oakland Raiders football player Lyle Alzado,² exemplify the tragedy and misfortune that may accompany the abuse of these drugs. However, an even more tragic side of ergogenic drug abuse exists that does not make major headlines—adolescent abuse of these substances.

Adolescent abuse of anabolic steroids ("steroids"), one of the more popular ergogenic drugs, is a widespread and growing problem. One study recently reported in U.S. News and World Report found that one-half of the estimated one million American steroid abusers are adolescents.³ Furthermore, a 1988 study shockingly found that children under the age of fifteen are more likely than other groups to abuse steroids.⁴

Concerns about adolescent abuse of these drugs, as well as concerns for public safety as a whole, led Congress to enact the Anabolic Steroids Control Act of 1990 (the "Act").⁵ The Act placed steroids on Schedule III of the Controlled Substances Act (the "CSA"),⁶ thereby increasing the penalties for distributing

† A.B. 1992, Harvard University; J.D. Candidate 1995, University of Chicago.
² Robert Huizenga and Shelly Smith, A Doctor’s Warning Ignored, Sports Illustrated (July 8, 1991).
³ See Joannie M. Schrof, Pumped Up, 112 US News and World Rep 54 (June 1, 1992).
⁶ The CSA divides drugs and other controlled substances into five schedules depending on: (1) their potential for abuse; (2) their accepted medical uses within the United States; and (3) their potential for psychological or physical addiction. See 21 USC § 812 (1993).
steroids and for possessing steroids with the intent to distribute, and criminalizing simple possession of the drug.\(^7\) The major shortcoming of the Act, however, is the statutory scheme it created to address another ergogenic drug, human growth hormone ("HGH"). Although the Act criminalized distribution and possession of HGH with the intent to distribute,\(^8\) it did not place HGH on any CSA schedule. Therefore, the penalties for distribution and possession of HGH with the intent to distribute are less severe than the analogous penalties associated with steroids.\(^9\)

The Act's bifurcated approach to steroids and HGH undermines Congress's overall objective of eliminating ergogenic drug abuse. The lower penalties associated with HGH use, combined with the inability of any known drug test to detect HGH\(^10\) and the common belief that HGH has fewer side effects than steroids,\(^11\) present HGH as a clear alternative to steroids.

Furthermore, the disparity in criminal sanctions conflicts with Congress's intent to protect the public. Although no quantitative data exists addressing the long-term side effects of steroid and HGH abuse,\(^12\) existing data concerning the short-term side effects of steroid and HGH abuse suggest that HGH is as dangerous as steroids, if not more dangerous.\(^13\) Moreover, the data suggest that HGH abuse is as widespread as steroid abuse.\(^14\)

The goal of this Comment is threefold. First, it shows that HGH and steroids are so similar in terms of their limited clinical

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\(^7\) See 21 USC §§ 841, 844 (1994). Compare 21 USC § 333(e) (1988). 21 USC § 333(e) was not repealed by the Act. Because the CSA provides for higher penalties for the same offenses, however, most actions fall under the penalty provisions associated with the CSA rather than this provision.

\(^8\) Title XIX, Pub L No 101-647, 104 Stat 4851 (1990), codified at 21 USC § 333(f) (1994).

\(^9\) The Act placed steroids on Schedule III of the Act. Possession of Schedule III drugs are punishable by up to one year imprisonment. Distribution and possession with the intent to distribute steroids are punishable by up to five years imprisonment.

The Act also amended the FDA Act, making the distribution and possession with the intent to distribute HGH punishable by up to five years imprisonment unless the recipient was under eighteen years old, in which case the maximum punishment is ten years imprisonment. No penalty exists for possession of HGH under the FDA Act. See 21 USC § 844(a) (West 1988 & Supp 1993); 21 USC § 841 (b)(1)(D) (1988).


\(^12\) Id at 73.

\(^13\) See notes 61-101 and accompanying text. Compare notes 132-150 and accompanying text.

\(^14\) See notes 55-60 and accompanying text. Compare notes 119-130 and accompanying text.
uses, the number and demographics of abusers, and the side effects associated with abuse that any difference in penalties is unjustified. Second, the Comment compares the side effects and medical uses of HGH with other drugs in Schedule III of the CSA and concludes that HGH should be classified as a Schedule III drug. Finally, this Comment explores alternative avenues of deterrence, including education and social sanctions.

I. BACKGROUND

A meaningful comparison of HGH and steroids, as well as any attempt to determine the similarities between HGH and other Schedule III drugs, requires an in-depth understanding of the drugs and their side effects. Therefore, this Comment first addresses several issues, including:

1. The clinical uses of steroids and HGH;
2. The history of steroids and HGH abuse;
3. The mechanisms by which steroids and HGH work;
4. The estimated number and demographics of steroid and HGH abusers; and
5. The possible side effects associated with steroid and HGH abuse.

A. Steroids

Steroids are patterned after testosterone, a male sex hormone. Testosterone affects the human body in two ways. First, it promotes constructive metabolism and tissue repair, an "anabolic effect." Second, it induces secondary male sex characteristics, an "androgenic effect." Because athletes desire only the anabolic effects of testosterone, steroids were constructed by tinkering with the testosterone molecule in an attempt to isolate its anabolic from its androgenic effects. However, because scientists have been unable to isolate its anabolic effects completely, steroids have certain undesired effects ("side effects").

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15 Jon C. Wagner, Abuse of Drugs Used to Enhance Athletic Performance, 46 Am J of Hospital Pharmacy 2059, 2062 (1989).
16 Id.
17 Id.
18 Id.
19 Id.
Steroids may be taken in two forms. They can be injected into the body using hypodermic needles or administered orally. In oral form, steroids are "washed out" of the body more quickly and are therefore detectable for a shorter period of time. Orally administered steroids, however, may cause more side effects than injected steroids. Steroid abusers often follow a regime that meshes oral and injectable forms, a combination known as "stacking."

1. Clinical use.

Although public discourse about steroids focuses on abuse by athletes, steroids also have medical uses. These uses, however, are very limited. The Food and Drug Administration ("FDA") recommends steroids as a treatment only for some forms of anemia, breast cancer, hereditary angioedema, allergic reactions to insect bites, and certain viruses. Non-FDA recommended uses include treatment for cachexia (wasting of the body associated with chronic illnesses), osteoporosis, hypogonadism, and athletic injuries.

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20 Wagner, 46 Am J of Hospital Pharmacy at 2063 (cited in note 15).
21 Id.
23 Id.
24 Id.
26 Id at 619.
27 Id.
28 Id. Symptoms of hypogonadism include the underdevelopment of the gonads, deficient sperm production, deficient secretion of gonadal hormones, atrophy of the gonadal region, deficient development of the secondary sexual characteristics, and, in prepubertal males, an altered body shape characterized by a short trunk and long limbs. See Stedman's Medical Dictionary 750 (Williams & Wilkins, 25th ed 1990).
2. History.

Athletes have long claimed that steroids can increase lean body mass, strength, and aggressiveness, and that steroids reduce recovery time during training. The first scientific studies on steroids, however, mistakenly concluded that they had no effect on athletic performance.

Recent studies have confirmed what athletes have always believed—steroids improve athletic performance. For example, a 1984 article concluded that steroids increase an athlete’s strength if the athlete combines steroid use with: (1) an intense weight training program before and during the steroid regimen; and (2) a high-protein, high-calorie diet. Other studies show that steroid use increases lean body mass. In 1987, the American College of Sports Medicine finally acknowledged the anabolic potential of steroids.
Despite the medical community's capitulation, its reputation and credibility among steroid users may have suffered irreparable damage.\textsuperscript{35} The medical community's original conclusions of inefficacy differed so much from athletes' experiences that steroid abusers began to distrust all scientific studies on steroids.\textsuperscript{36} Many athletes today disbelieve the magnitude and severity of the side effects associated with steroid abuse because they suspect that medical reports documenting these effects are incorrect and serve primarily as scare tactics.\textsuperscript{37}

To fill the information gap, many steroid abusers turn to \textit{The Underground Steroid Handbook} (the "Handbook"). This book is written, edited, and revised by weight lifters who themselves abuse steroids.\textsuperscript{38} A survey of steroid abusers shows that most abusers find the Handbook "instrumental in designing their steroid regimens" and believe it is reliable.\textsuperscript{39} The Handbook has widened the rift between steroid abusers and the medical profession. It has also undermined the medical profession's attempts to educate the public by disparaging and minimizing all scientific individuals.

\textsuperscript{35} Anabolic-androgenic steroids do not increase aerobic power or capacity for muscular exercise.


\textsuperscript{36} Haupt and Rovere, 12 Am J of Sports Medicine at 481 (cited in note 30).

\textsuperscript{37} Hainline and Wadler, Contemporary Exercise and Sports Medicine Series at 66 (cited in note 11).

\textsuperscript{37} Id.


\textsuperscript{39} Id at 427. Among the "facts" listed in the handbook are:

1. The more that you take, the more you'll grow (if you eat enough and train right).
2. Some brands work better than others.
3. Orals do more damage to your liver than [intramuscular injectables].
4. The less toxic an oral is to your liver, the less effective it is for growth.
5. There is no such thing as taking too much steroid, it varies from person to person. 'Too much' for one may not be enough for another.
6. 'Too much' is only related to your health. No doctor, no researcher, no one has determined the optimum dosage for athletic performance.
7. Most of the people who have taken massive amounts of steroids and shot their blood test results past the normal ranges didn't get ill, didn't die, and had the test results drop into the normal range after the cessation of the drugs.
8. Never assume that you are like 'most people' until you prove it.

Id at 426, quoting \textit{The Underground Steroid Handbook}. 
and medical claims that steroid abuse can cause serious side effects.\(^4\)

Believing steroids give athletes an unfair competitive advantage, several sports organizations have banned steroid use. For example, the NCAA,\(^4\) the International Olympic Committee ("IOC"),\(^4\) and the National Football League ("NFL")\(^4\) have banned steroid use among competitors. These organizations enforce their bans through urinalysis or blood tests that detect steroid use.\(^4\) Nevertheless, steroid abuse continues.\(^4\)


Researchers have suggested five mechanisms that may cause the ergogenic effects of steroids:

1. Steroids increase production of proteins by increasing the production of RNA, the nucleic acid that carries the instructions for creating proteins.\(^4\)
2. Steroids increase the retention of nitrogen, one of the building blocks of proteins.\(^4\)
3. Steroids stimulate the release of endogenous growth hormone, which has significant anabolic effects.\(^4\)
4. Steroids lead to gains through psychological effects.\(^4\)

\(^4\) The *Handbook's* opinion of medical claims is that most of the stories you've heard about steroid side effects are untrue. There are side effects and they are mostly all temporary. The various drug manufacturers will list every possible side effect that could happen to both men and women while on anabolic steroids. In the real world of healthy athletes we have never seen such drastic reactions as pattern baldness, liver cancer, extreme sex changes, etc.

This excerpt suggests that the medical profession is far from regaining the trust of steroid abusers. Perry, Anderson, and Yates, 18 Am J of Sports Medicine at 427, quoting The Underground Steroid *Handbook* (cited in note 38).

\(^4\) Wagner, 12 Sports Medicine at 254 (cited in note 30).
\(^4\) Id at 253.
\(^4\) Id at 618, 619.
\(^4\) Id.
\(^4\) Wagner, 46 Am J of Hospital Pharmacy at 2062 (cited in note 15).
\(^4\) In other words, the athlete thinks he should be able to train harder; therefore, he does train harder, and, as a result, he experiences significant gains. See Wagner, 46 Am J of Hospital Pharmacy at 2062 (cited in note 15). See also Gideon Ariel and William Saville, *Anabolic Steroids: The Physiological Effects of Placebos*, 4 Medicine and Science in Sports 124, 125 (1972) (revealing that athletes who were given placebos and told they were receiving steroid treatment demonstrated significant strength increases).
Steroids reduce symptoms of fatigue in athletes, allowing the athlete to train at high levels for longer periods of time. An important aspect of the ergogenic potential of steroids is that the gains in muscle mass and strength caused by steroid abuse can only be sustained through continued steroid use. Steroids are so similar to natural testosterone that increased levels of steroid use lead to decreased levels of natural testosterone. Even after steroid use is discontinued, the concentration of naturally produced testosterone does not immediately return to normal levels. This reduced natural testosterone level, without the artificial boost of circulating steroids, cannot support the increased muscularity achieved during steroid abuse. Therefore, upon cessation of steroid abuse, the size and strength gains achieved with the help of steroids quickly disappear. Athletes who discontinue steroid use also lose any psychological boost that the drug provided, further increasing the loss of mass and strength. Faced with the prospect of losing “hard-earned” gains, the athlete is caught in a “steroid trap” and may elect to continue using steroids indefinitely.


The exact incidence of steroid abuse among amateur and professional athletes is unknown but is suspected to be widespread. Researchers also suspect that steroid abusers in this

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50 Haupt, 21 Am J of Sports Medicine at 468 (cited in note 16) (observing that most gains associated with steroid use were attributable to the drug’s ability to reduce fatigue).  
52 Id at 65-66.  
54 Id.  

Estimating abuse levels in international competition is more difficult, but anecdotal evidence suggests that this kind of abuse is equally widespread. For example, at the 1983 Pan American Games in Caracas, Venezuela, nineteen competitors were disqualified when their steroid use was detected by unannounced tests. Other competitors withdrew from the games, probably to avoid detection. Haupt and Rovere, 12 Am J of Sports Medicine 469 (cited in note 30).
group often do not report their steroid abuse because they fear the sanctions associated with admitting steroid use.  

Most steroid abusers, however, are not athletes competing on elite or intercollegiate levels but rather non-competitive athletes who take steroids for cosmetic reasons. A 1988 study conducted by W. E. Buckley found that 6.6 percent of all high school male seniors under the age of eighteen had used or were currently using steroids. Another study of high school students found that those who took steroids generally obtained them through the black market.

Steroid abuse by non-competitive athletes is especially troubling because, although competitive athletes usually terminate their steroid abuse after a competition, cosmetic users take steroids indefinitely to maintain their appearance and physique. Therefore, the "steroid trap" may lead these users to take even more steroids than competitive athletes.

5. **Side effects.**

Scientists have associated numerous side effects with steroid use, but the data documenting these effects may severely underestimate steroids' true side effects, since the data derives from studies involving clinical dosages of steroids equalling as little as 0.1 percent of the dosages steroid abusers actually take. Even at these low levels, however, steroids can cause severe side effects. Aside from clearly visible side effects such as acne, steroid abuse can cause liver damage, kidney failure, immune

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58 Buckley, 260 J Am Medical Assn at 3442 (cited in note 4).
59 Robert Windsor and Daniel Dumitru, Prevalence of Anabolic Steroid Use by Male and Female Adolescents, 21 Medicine and Science in Sports and Exercise 494, 495 (1989) (surveying 1,010 high school students and finding that 85.2 percent of those responding that they used steroids indicated that they obtained these drugs from the black market). See also Hainline and Wadler, Contemporary Exercise and Sports Medicine Series at 61 (cited in note 11) (stating that 80 percent of the estimated $100 million spent annually on steroids is spent on black market drugs); Buckley, 260 J Am Medical Assn at 3443 (cited in note 4) (noting that 60 percent of male high school seniors who used steroids obtained them on the black market).
61 Hainline and Wadler, Contemporary Exercise and Sports Medicine Series at 67 (cited in note 11).
63 Sterling abuse can lead to changes in liver functions and liver disorders such as peliosis hepatis and hepatic tumors. Peliosis hepatis is a condition where blood-filled sacs form in the liver. Although this disease has not yet been documented in athletes, doctors
system deficiencies,65 circulatory problems,66 and heightened have detected the disease in patients who have been given therapeutic doses of steroids for an extended period of time; therefore, this disease may also occur in steroid abusers. See Wagner, 12 Sports Medicine at 258 (cited in note 30). See also Hainline and Wadler, Contemporary Exercise and Sports Medicine Series at 65 (cited in note 11); Jean D. Wilson and James E. Griffin, The Use and Misuse of Androgens, 29 Metabolism 1278, 1287 (1980); Wagner, 46 Am J of Hospital Pharmacy at 2062 (cited in note 15). In addition, "hepatic" or liver tumors have been discovered in athletes who abuse steroids as well as in patients who have been treated with steroids. One study documented thirty-six separate instances of benign and malignant tumors in patients who received steroids for more than twenty-four months. See, for example, T. M. Creagh, A. Rubin, and D. J. Evans, Hepatic Tumours Induced by Anabolic Steroids in an Athlete, 41 J of Clinical Pathology 441 (1988); Hainline and Wadler, Contemporary Exercise and Sports Medicine Series at 65 (cited in note 11). Finally, athletes taking steroids have experienced elevations in liver function. Haupt and Rovere, 12 Am J of Sports Medicine 469 (cited in note 30). See also R. J. Shephard, D. Killinger, and T. Fried, Responses to Sustained Use of Anabolic Steroid, 11 British J of Sports Medicine 170 (1977). But see Markku Alen, Androgenic Steroid Effects on Liver and Red Cells, 19 British J of Sports Medicine 15 (1985) (stating that liver function is mildly impaired because of sustained high-dose testosterone administration).

Hainline and Wadler, Contemporary Exercise and Sports Medicine Series at 65 (cited in note 11).

Steroid abuse depresses the body's immune system. The effects of these changes, which could include an increased risk of cancer and opportunistic infections, are not yet known. In addition, due to the increased incidence of needle sharing, steroid use increases the risk of contracting Acquired Immune Deficiency Syndrome (AIDS) and Hepatitis B. See Haupt, 21 Am J of Sports Medicine at 469 (cited in note 16); Howard M. Sklarek, et al, AIDS in a 22 year old Bodybuilder Using Anabolic Steroid, 311 New England J of Medicine 1701 (1984).

Studies have suggested a causal relationship between steroid use and: (1) acute myocardial infarction, Robert A. McNutt, et al, Acute Myocardial Infarction in a 22 Year Old World Class Weight Lifter Using Anabolic Steroids, 62 Am J of Cardiology 164 (1988); Stedman's at 779 (cited in note 28) (explaining that a myocardial infarction, one type of heart attack, is a sudden insufficiency of blood supply to an area of the heart muscle, usually as a result of a blockage of a coronary vessel); (2) cardiac enlargement, Tingus and Carlson, 25 Medicine and Science in Sports and Exercise 485 (cited in note 33); B. De Piccoli, Anabolic Steroid Use in Body Builders: An Echocardiographic Study of Left Ventricle Morphology and Function, 12 Intl J of Sports Medicine 408 (Aug 1991) (steroids can enlarge and thicken the left ventricle of the heart, reducing its flexibility and decreasing its blood output); T. T. Kurowski and S. M. Czerwinski, Glucocorticoid Modulation of Cardiac Mass and Protein, 22 Medicine and Science in Sports and Exercise 312, 314 (1990) (enlargement can occur within two days, but some evidence suggests that the increased mass is lost with prolonged treatment); (3) strokes, M. A. Franklin, Rodolfo Eichberg, and Sally B. Zachariah, Anabolic Androgenic Steroids and a Stroke in an Athlete: Case Report, 69 Archives of Physical Medicine 632, 633 (1988); (4) high blood pressure, Deborah Riebe, Bo Fernhall, and Paul D. Thompson, The Blood Pressure Response to Exercise in Anabolic Steroid Users, 24 Medicine and Science in Sports and Exercise 633 (1992) (systolic and diastolic blood pressure were elevated both during rest and during exercise in subjects that used steroids); J. W. Lenders, et al, Deleterious Effects of Anabolic Steroids on Serum Lipoproteins, Blood Pressure and Liver Function in Amateur Body Builders, 9 Intl J of Sports Medicine 19, 22 (1988); and (5) in some cases, heart degeneration, T. E. Takala, et al, Effects of Physical Training, Methandione and Their Combination on the Lysosomal Hydrolytic Activities in Dog Heart, 13 Intl J of Sports Medicine 52, 54 (1992) (steroid abuse, in conjunction with exercise, significantly increases the activity of the heart's lyso-
cholesterol levels.\textsuperscript{67}

Additionally, steroids have specific physiological side effects within different sex and age groups. In males, these side effects occur because steroids closely resemble testosterone but do not completely mimic its functions.\textsuperscript{68} While circulating steroids are sufficiently similar to testosterone to convince the body to shut off its natural testosterone producing mechanism,\textsuperscript{69} steroids are not exact copies of testosterone and cannot accomplish some body functions that depend on testosterone. For instance, a decrease in the level of natural testosterone\textsuperscript{70} may reduce sperm production,\textsuperscript{71} cause the testes to shrink,\textsuperscript{72} and alter the sex drive.\textsuperscript{73}
Prolonged steroid abuse may lead to infertility, gynecomastia (male breast development), and male pattern baldness.

As might be expected, the side effects of steroids, a derivative of a male sex hormone, are more pronounced and generally more serious in female users. In addition to disorders common to both sexes, such as kidney damage, female steroid abusers face decreased breast size, uterine abnormalities, menstrual irregularity or cessation, increased libido, and increased facial hair. While these side effects disappear with cessation of steroid use, other side effects, such as deepening of the voice, increased clitoris size, and male pattern baldness, are irreversible.

Steroid side effects among adolescents are even more devastating. Most notably, adolescents may experience premature epiphyseal closure of the long bones of their body, a condition in which the growth areas on bones irreversibly fuse into one another, prematurely arresting growth.


74 Testosterone has been used for the last twelve to fifteen years as a controlled method of male birth control by injecting relatively low doses of steroids weekly. No serious side effects have been reported. See Jay S. Cox, Presidential Address of the American Orthopaedic Society for Sports Medicine: Drug Abuse in Sports, 18 Am J of Sports Medicine 568, 569 (1990).

75 Gynecomastia, or male breast development, results from an excess of estrogen in males. Estrogen, a female sex hormone, is produced through the transformation of androgen, a byproduct of steroid use. A steroid user can combat this condition by taking antiestrogen; breast size usually returns to normal without treatment once steroid use is stopped. See Wagner, 12 Sports Medicine at 258 (cited in note 30).


77 Hainline and Wadler, Contemporary Exercise and Sports Medicine Series at 61 (cited in note 11).


81 Id.

82 Strauss, Liggett, and Lanese, 253 J Am Medical Assn at 2871 (cited in note 78).


84 Id.

85 Id. See also Strauss, Liggett, and Lanese, 253 J Am Medical Assn at 2871 (cited in note 78).


87 Id at 467.

88 See Wagner, 12 Sports Medicine at 258-59 (cited in note 30); Haupt, 21 Am J of Sports Medicine at 470 (cited in note 16). In fully grown adults, premature epiphyseal closure is not possible, but steroid abuse may lead to tendon degeneration and resulting tendon ruptures. For instance, many patients who are treated for ruptures of the triceps
Aside from these physiological side effects, steroids may also cause adverse psychological reactions. These side effects, commonly known as "roid rages," cause a "Jekyll-and-Hyde personality... where even the slightest provocation can cause an exaggerated, violent and often uncontrolled response." As a result, arrest records are common among steroid users.

An uncontrolled tendency toward violent behavior is not, however, the only emotional change attributed to steroid abuse. A 1988 study of forty-one known abusers of steroids found that 22 percent were manic or depressive during exposure to, or withdrawal from, steroids. Steroid use may also cause feelings of euphoria or enthusiasm, irritability, hyperactivity, paranoia, and insomnia. Moreover, one study found that while taking steroids, 12 percent of the athletes examined had experienced psychotic symptoms such as hallucinations or delusions.


Id.


Id.


Pope and Katz, 145 J Am Psychiatry at 487 (cited in note 91). Until recently, no clinical study had overcome the methodological shortcomings of case studies. In 1993, however, Su and Pagliaro performed a double-blind, placebo-controlled experiment on the neuropsychiatric effects of steroids. They concluded that steroids have a significant impact on mood and behavior in normal male volunteers even during short-term, relatively low-dose administration of steroids. Subjects experienced subtle but significant increases in (1) positive mood and sexual arousal, (2) negative moods such as irritability, anger, and hos-
These feelings of euphoria, well-being, libido, energy, and self-esteem resulting from steroid use also create a high potential for addiction. In fact, one study found evidence of acute and delayed withdrawal symptoms "similar to those seen in opioid, alcohol, and cocaine withdrawal," and it documented some cases in which steroid users began to use other street drugs in an attempt to reduce the side effects of steroid withdrawal. Finally, social factors also motivate addiction; real or perceived social acceptance and approval among the user's peers drive individuals to continue to abuse steroids.

B. Human Growth Hormone

HGH, a hormone naturally secreted by the body's anterior pituitary gland, is responsible for normal human growth and affects almost every tissue and organ in the body. Athletes first turned to HGH because they believed that it could provide many of the benefits of steroid use without two of its major drawbacks. First, athletes mistakenly believed that the side effects associated with HGH were less severe than those of steroids. Second, and perhaps more importantly, there was, and continues to be, no effective test to detect HGH use.

1. Clinical use:

Currently, HGH's only clinical use is in the treatment of growth hormone deficiency. In the future, HGH may be used to treat osteoporosis, obesity, and trauma.
2. History.
Paralleling early steroids studies, current HGH studies have not proven that HGH produces any ergogenic effect. Although studies on animals have shown that HGH increases the size and weight of atrophied muscles, its effects on contractile elements—the portion of the muscle that contracts to provide function—is unclear. Therefore, the enlarged muscle may be larger, but it may not be proportionally as strong. Furthermore, it is unclear whether HGH triggers similar effects in healthy muscle tissue.

3. Mechanism.
Like steroids' anabolic effect, HGH's anabolic effect stems from several mechanisms. First, as with steroids, HGH may increase nitrogen retention, and it may increase the rate at which amino acids are transported and transformed into proteins. Because proteins are the building blocks of muscle tissue, HGH users experience quick gains in muscle mass.

Second, HGH stimulates the conversion of fat into energy, allowing quicker muscle growth because resources that would have been used for energy may now be converted to muscle tissue. Finally, although not yet proven by scientific study, some gains from HGH use, in a fashion similar to steroids, may stem from psychological factors. In other words, the HGH user believes the drug will make him stronger; therefore, he trains harder and becomes stronger.


107 Haupt, 21 Am J of Sports Medicine at 471 (cited in note 16). ("There are no studies available that investigate the ergogenic effects of growth hormone in athletes, and anecdotal reports on the effects of growth hormone are inconsistent.").


109 Id.

110 Id.


112 Id.

113 Stedman's at 56 (cited in note 28).


115 Id.

116 Id.

117 See note 49 and accompanying text.


The high cost of obtaining HGH, combined with the screening requirements, production limits, and post-marketing surveillance imposed by the few manufacturers of HGH, restrict HGH abuse. Studies, however, have found an alarming increase in the number of athletes who inquire about HGH; some studies have reported that HGH has replaced steroids as the "ergogenic drug of choice." Furthermore, the Handbook gives HGH rave reviews, further fueling demand.

These qualitative statements about the prevalence of HGH have been supported by quantitative data. One study surveyed 224 male and 208 female tenth-grade students and found that 5 percent of males participating in the survey had prior contact with HGH. By comparison, in the same survey, 5 to 11 percent of males admitted some steroid use. The survey also found that HGH users take the drug regularly; 70 percent of HGH users indicated that they used HGH more than one time per month. The demographics of tenth-grade HGH users is even more frightening than the demographics of tenth-grade steroid users: 78 percent of tenth-grade steroid users participated.

119 Some estimates place the cost between $1,000 and $1,500 for an eight-week supply. Id at 471-72.
122 Hainline and Wadler, Contemporary Exercise and Sports Medicine Series at 72 (cited in note 11). The Handbook lauds the beneficial nature of HGH:

Wow, is this great stuff! It is the best drug for permanent muscle gains. . . . People who use it can expect to gain 30 to 40 pounds of muscle in ten weeks if they can eat about 10,000 calories per day. . . . we think this to be another best buy. . . . This is the only drug that can remedy bad genetics as it will make anybody grow.


The Handbook downplays the possible side effects of HGH:

A few side effects can occur, however. It may elongate your chin, feet and hands, but this is arrested with cessation of the drug. Diabetes in teenagers is possible with it. It can also thicken your ribcage and wrists. Massive increase in weight over such a short time can, of course, give you heart problems.

Id.

The Handbook’s final conclusion on HGH is that HGH “is the biggest gamble that an athlete can take, as the side effects are irreversible. Even with all that, we LOVE the stuff.” Id.

123 Rickert, 31 Clinical Pediatrics at 725 (cited in note 10).
124 Id at 723.
125 Id.
in competitive sports, but only 50 percent of tenth-grade HGH users were competitive athletes.\textsuperscript{126}

This survey presents insights into the motivations underlying HGH abuse. All users reported taking HGH as a means of increasing body size and strength; many hoped to strengthen tendons and ligaments as well.\textsuperscript{127} HGH abuse was also driven by its undetectability and its ability to reduce the level of fat stores within the body while building muscle.\textsuperscript{128}

Furthermore, half of all users in the survey could not identify a single common side effect.\textsuperscript{129} Therefore, dissuaded from using steroids because of its widely known side effects, some athletes have started using HGH, believing the drug has few or no side effects. Perhaps the most troubling reported cause of HGH abuse is parents who administer HGH to their child because they feel that they should help their athletically gifted, but small, child succeed.\textsuperscript{130}

5. Side effects.

Researchers know as little about the toxicity of HGH as they know about its ergogenic potential.\textsuperscript{131} Almost every organ in the body, however, depends on growth hormone for proper growth and development,\textsuperscript{132} therefore, HGH abuse potentially could disrupt normal function in most body systems.

The side effects most closely linked to HGH abuse are acromegaly and gigantism.\textsuperscript{133} Gigantism, characterized by a general overgrowth of the entire body or any of its parts,\textsuperscript{134} results when children or adolescents with normal growth hormone levels take HGH.\textsuperscript{135} Individuals with gigantism usually suffer from osteoporosis and muscle weakness;\textsuperscript{136} many die of cardiac failure.\textsuperscript{137}

\begin{itemize}
\item \textsuperscript{126} Id at 725.
\item \textsuperscript{127} Rickert, 31 Clinical Pediatrics at 725 (cited in note 10).
\item \textsuperscript{128} Id.
\item \textsuperscript{129} Id.
\item \textsuperscript{130} Hainline and Wadler, Contemporary Exercise and Sports Medicine Series at 72 (cited in note 11).
\item \textsuperscript{131} Id at 73.
\item \textsuperscript{132} Haupt, 21 Am J of Sports Medicine at 471 (cited in note 16).
\item \textsuperscript{133} Id at 472.
\item \textsuperscript{134} Stedman's at 644 (cited in note 28).
\item \textsuperscript{135} Haupt, 21 Am J of Sports Medicine at 471 (cited in note 16).
\item \textsuperscript{136} Although the muscle is larger, it is not as strong as normal muscle. Id at 472.
\item \textsuperscript{137} Id.
\end{itemize}
In adults, HGH cannot cause gigantism because growth zones in bones have sealed. It can, however, cause a related disease called acromegaly, a condition marked by the progressive enlargement of peripheral parts of the body, especially the head, hands, and feet. Like those suffering from gigantism, acromegalics may appear muscular, but their muscles are quite weak. They may also suffer from osteoporosis and diabetes, and they may bear an increased risk of cardiac failure. Furthermore, about one third of all men with acromegaly become impotent, and almost all women have menstrual irregularities.

HGH abuse has also been linked to peripheral neuropathy, cardiomyopathy, hypothyroidism, and arthritis. Like steroid abuse, HGH abuse may also increase the risk of AIDS and Hepatitis B. Finally, some researchers consider HGH to have a high “potential for addiction.”

II. THE ANABOLIC STEROIDS CONTROL ACT OF 1990

The Anabolic Steroids Control Act of 1990 (the “Act”) significantly changed the regulatory framework for the possession and distribution of steroids and HGH. Prior to the Act, the unauthorized distribution of steroids carried a punishment of not more than three years imprisonment or, if the recipient was a minor under eighteen years old, not more than six years imprisonment.

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138 Id at 471.
139 The hands become broad and spade-like with sausage-like fingers. Facial features become coarse as a result of increased growth of subcutaneous tissue. Stedman's at 18 (cited in note 28).
141 Id.
142 Id.
143 Id (50 percent die by the age of fifty and 89 percent die by the age of sixty).
145 Hainline and Wadler, Contemporary Exercise and Sports Medicine Series at 73 (cited in note 11).
146 Id. See also Stedman's at 248 (cited in note 28) (defining cardiomyopathy as a condition which affects the heart muscle only, leaving other cardiac structures intact).
147 Wagner, 12 Sports Medicine at 260 (cited in note 30); Stedman's at 746 (cited in note 28) (defining hyperthyroidism as an abnormality of the thyroid gland in which secretion of thyroid hormone is usually increased and is no longer under regulatory control of the hypothalamic-pituitary centers; hyperthyroidism is characterized by a hypermetabolic state, usually with weight loss, tremulousness, and elevated plasma levels of thyroxin).
150 Wagner, 46 Am J of Hospital Pharmacy at 2065 (cited in note 15).
151 Anabolic Steroids Control Act, 104 Stat 4851.
The only sanctions against unauthorized distribution of HGH prior to the Act were provided by Title 21, Section 331 of the United States Code, which required no more than one year imprisonment. Simple possession of either substance was not criminalized.

Sponsors of the Act hoped to protect society as a whole, and adolescents in particular, from the dangers of steroids and HGH. Senator Biden, a leading and early supporter of the Act, attempted to stir support for the bill by arguing that steroids were detrimental to the health and morals of America's youth. Furthermore, in several hearings, the Senate Judiciary Committee and House Criminal Justice Committee focused particularly on adolescent steroid use.

In the end, however, the desire to protect America's youth was balanced against fairness concerns. Therefore, the version of the bill eventually signed into law was less stringent than the version originally proposed in either the Senate or the House. Most notably, the original Senate version of the Act placed steroids on Schedule II of the CSA. Despite the harsh sentences traffickers of Schedule II drugs face, the Senate Judiciary

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154 In remarks on the floor, Biden concentrated on the dangers of adolescent abuse: "[t]oo many young athletes regularly abuse these dangerous substances, and too often this abuse leads to serious physical and psychological injury." S 17336, 100th Cong, 2d Sess (Oct 18, 1988), in 134 Cong Rec 151 (Oct 21, 1988) (statement of Senator Biden).

During Senate debate, Biden stated that steroid abuse was disturbing, not only because of the serious health consequences, but because steroid abuse "is cheating .... [S]ports offers a chance to learn some of society's most basic values. Those values includes [sic], among others, dedication, drive, and sportsmanship. But the use of steroids threatens to undermine these values." S 16615, 101st Cong, 2d Sess (Oct 2, 1990), in 136 Cong Rec 147 (Oct 24, 1990) (statement of Senator Byrd).


For example, as originally proposed, the House version would have amended the CSA to provide criminal penalties for coaches and other physical trainers and advisers who persuade or induce any person to possess illegally or use steroids. This offense would have been punishable by up to two years imprisonment, or up to five years if the person was under eighteen years of age. Crime Control Act of 1990, HR Rep 101-681 at 70 (cited in note 155).

157 Trafficking of a Schedule II drug carries a maximum sentence of fifteen years im-
Committee felt that the dangers of steroids warranted these high penalties.\textsuperscript{158}

Two arguments against placing steroids on Schedule II, however, eventually prevailed. First, the House was uncomfortable placing steroids in the same class as opium, heroin, and cocaine.\textsuperscript{159} This "similar drugs" reasoning underscores the House belief that when a drug is classified under the CSA, it should be comparable to other drugs on the proposed Schedule. Second, the House was reluctant to place steroids in Schedule II because it did not believe that the maximum sentence for trafficking a Schedule II drug, twenty years imprisonment, was appropriate considering that the definition of "trafficker" under the CSA is broad enough to include young people who share steroids with others.\textsuperscript{160}

Therefore, in its final form, the Act classified steroids as a Schedule III drug.\textsuperscript{161} As a Schedule III drug, the first conviction for distribution or possession with the intent to distribute steroids carries a maximum sentence of five years imprisonment and/or a fine of not more than $250,000.\textsuperscript{162} Subsequent conviction for the first offense and thirty years imprisonment for subsequent offenses.

See 21 USC § 841 (1994).

\textsuperscript{158} The Senate Report on the Steroid Trafficking Act of 1990 stated:

[Steroids have a high potential for abuse. An estimated 1 million Americans use anabolic steroids for nonmedical reasons; 500,000 of these users are high school children. Second, steroids are indicated for the treatment of certain medical conditions, including specific forms of anemia and reproductive disorders. The committee notes, however, that with the development of new drugs and given the harmful side effects associated with steroids therapy, steroids are the primary or favored pharmacological treatment for a decreasing number of medical disorders. Finally, steroid abuse may lead to severe psychological and physical dependence . . . . The committee concludes that the abuse potential of steroids is similar to that of cocaine hydrochloride and other so-called hard drugs, and that steroids should be regulated under the safeguards and controls of schedule II substances.


\textsuperscript{160} Id.

\textsuperscript{161} Schedule III includes all drugs that fit the following description:

(A) The drug or other substance has a potential for abuse less than the drugs or other substances in Schedules I and II.

(B) The drug or other substance has a currently accepted medical use in treatment in the United States.

(C) Abuse of the drug or other substance may lead to moderate or low physical dependence or high psychological dependence.


\textsuperscript{162} 21 USC § 841(b)(1)(D) (1994).
tions carry penalties of up to ten years imprisonment and/or a fine of not more than $500,000. If the recipient of the drug is under twenty-one years old, the CSA provides that the penalties for the first offense are doubled, and those for subsequent penalties are tripled. Under the CSA, simple possession of steroids carries a sentence of not more than one year imprisonment, a fine of at least $1,000, or both.

Congress, however, decided not to schedule HGH under the CSA. Congress based this decision upon testimony that HGH was not, at that time, as great a threat to adolescents as steroids. Congress did, however, amend the Food, Drug and Cosmetic Act to criminalize HGH distribution or possession with the intent to distribute. Convictions for these offenses carry maximum

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163 Id.
165 21 USC § 844(a) (1994).
166 Ronald G. Chesemore, Associate Commissioner for Regulatory Affairs of the FDA, testified before the House that a consensus did not exist among the scientific community regarding the abuse potential of HGH. He noted that HGH manufacturers had instituted strict controls to prevent diversion of their product and that the FDA had found that the illegal distribution of HGH was much less widespread than the illicit distribution of steroids. See Hearing on HR 4658 at 47 (cited in note 159). The Senate also heard testimony that although HGH had a “wide abuse potential,” use would probably be limited by the expense of the product. Abuse of Steroids in Amateur and Professional Sports: Hearings Before the Subcommittee on Crime of the Committee on the Judiciary House of Representatives, 101st Cong, 2d Sess 85 (1990).

The most forceful testimony came from Dr. Louis Underwood, Professor of Pediatrics at the University of North Carolina at Chapel Hill. Testifying before the House, he stated that although steroids had a variety of different side effects, HGH had “very few undesirable side effects and in the 25 years we have used it in the treatment of short children, it has had amazingly few adverse effects.” Id. Dr. Underwood proceeded to compare steroids and HGH. He stated that HGH use would not cause aggressive behavior usually found in steroid abusers. Id. Furthermore, he asserted that HGH did not cause psychological dependency. Id. Finally, he concluded that unlike steroids, HGH had a rapid rate of clearance from the body, “thereby not allowing it to build up in the body as in the case of anabolic steroids.” Id.

Dr. Underwood also testified that three adverse effects result from coupling HGH with steroids. First, adverse psychological effects might result in the small children who required HGH treatment for normal growth. Classifying HGH as a Schedule III drug would instill a belief that these children were doing something wrong because they were taking a highly regulated drug. Id. Second, scheduling HGH with steroids might create an inconvenience for patients receiving HGH treatment. Tighter controls on HGH would require children to return for treatment more often, necessitating more missed days of school, thereby causing their parents to miss more days at work and increasing medical and transportation costs. Id. Finally, scheduling HGH with steroids might cause a disruption in the supply for patients who currently received free growth hormone. Upon the imposition of the stringent controls, both the manufacturer and the endocrinologist who administered the drug would be less likely to offer free services due to additional registration costs. Id.

terms of five years imprisonment. If, however, the recipient of HGH is under eighteen years of age, the maximum term of imprisonment increases to ten years.\footnote{21 USC § 333(f)(2). The Act also authorized the Drug Enforcement Administration (the "DEA") to investigate potential offenses involving the distribution of HGH, despite its classification under the Food and Drug Act, 21 USC § 333(f)(5). This authorization resulted from a study by the Senate Judiciary Committee on FDA supervision of steroid trafficking which found that the FDA was unequipped to handle the steroid problem. The Report found that the FDA staff was inadequate, with only thirty-eight full-time personnel to control a $300 to $400 million illegal steroids trade. Furthermore, it found that FDA investigators had neither the authority nor the expertise to attack the increasingly sophisticated steroid trade, citing their inability to execute search warrants, conduct undercover investigations, or carry guns. S Rep 101-433 at 9 (cited in note 158). Even so, steroid investigations under the FDA resulted in the seizure of over $18 million worth of illegal drugs, $500,000 in cash, numerous cars, guns, computers, and other equipment. Hearings on HR 4658 at 42 (cited in note 159).}

Therefore, HGH and steroids are treated differently under the Act in two significant ways. First, a subsequent conviction for distribution or possession with the intent to distribute steroids carries a much higher penalty than subsequent convictions for HGH. Second, unlike simple possession of HGH, simple possession of steroids is criminalized.

These pivotal differences strongly affect the Act's ability to deter trafficking and use of each substance. Criminalization of simple possession places the threat of criminal sanctions upon the trafficker's buyers. As a result, in order to avoid the social stigma associated with a criminal charge, some users may refrain from purchasing steroids, drying up the trafficker's demand. Furthermore, criminalization of simple possession allows conviction in cases where evidence does not support a trafficking conviction, thereby further undermining the steroid market.

Additionally, increased penalties for subsequent offenses effectively combat trafficking. Because dealers are more likely to face these increased penalties, it is likely that fewer people will deal steroids. In addition, increased subsequent penalties more effectively deter users who have been convicted of prior offenses. Finally, the CSA's tripling of penalties associated with subsequent convictions for distribution and possession with the intent to distribute steroids to persons under eighteen provides additional deterrence, at the margin, against drug sales to minors.

The statutory scheme created by the Act to cover HGH does not criminalize simple possession, nor does it punish subsequent offenses more severely. Therefore, it misses the opportunity to control HGH abuse more effectively.
III. DISCUSSION

An analysis of current medical and sociological knowledge about HGH and steroids, in conjunction with an analysis of the legislative history of the Act, yields three conclusions: (1) the current distinction between the criminal sanctions for HGH and steroid trafficking is artificial; (2) HGH should be reclassified as a Schedule III drug; and (3) classification of HGH and steroids as Schedule III drugs must be accompanied by educational programs to succeed in eradicating abuse.

A. The Act's Artificial Distinction Between HGH and Steroids is Unjustified

HGH and steroids are similar in several ways. First, the clinical uses of both drugs are limited. Second, the demographics of HGH and steroid abusers are equivalent. Third, the side effects associated with the two substances are analogous. Finally, the addiction potentials of the two drugs are comparable. Yet the current statutory system treats these two drugs very differently. This differential treatment is unjustified.

Under the CSA, one of the criteria used to determine the scheduling of a drug is the number of accepted medical uses. Both HGH and steroids have very limited clinical uses. HGH has only been accepted as a method of treatment for one disease, while the FDA recommends steroid treatment for five different conditions. This difference suggests that the criminal sanctions associated with HGH should be at least as great as, and certainly not less than, those associated with steroids.

169 21 USC § 812 (1994). Criminal sanctions for violations of the Controlled Substances Act are most stringent for violations related to drugs or substances under Schedule I and are least stringent for violations related to drugs or substances under Schedule V. See 21 USC § 841.

One of the criteria used to determine the Schedule in which a drug or substance should be placed is whether the drug has any accepted medical uses. In order to be placed in Schedule I, the drug must have no currently accepted medical use in the United States. Schedule II drugs may have a currently accepted medical use in the United States or a currently accepted medical use with severe restrictions. Schedule III, IV, and V drugs all have currently accepted medical uses in the United States.

170 See notes 25-29 and accompanying text.

171 See notes 105-06 and accompanying text.

172 This type of reasoning, however, is not adopted by the CSA. Under the CSA, the important factor is whether a drug has any medical use. No distinction exists between a drug with one medical use and a drug with few or even many medical uses. Hearings on HR 4658 at 19 (cited in note 159).
In addition, the demographics of HGH and steroid users do not support unequal sanctions. Senator Biden stressed that the chief purpose of the Act was to eliminate steroid abuse among adolescents. Vaughn Rickert, in a study on the prevalence of HGH abuse in tenth-grade males, found that 5 percent of his survey population abused HGH. The survey also found that 5 percent of all tenth graders admitted some steroid abuse. This comparable number of adolescent HGH and steroid abusers suggests that no sound reason exists to provide different penalties for HGH and steroids.

Furthermore, although no studies have quantitatively analyzed the side effects of HGH, qualitative studies on the side effects associated with HGH and steroids, as well as case studies examining the side effects of these two substances, suggest that the two drugs have similar side effects. For example:

1. Steroid use leads to liver, cardiovascular, and connective tissue disorders. Similarly, two diseases associated with HGH-induced acromegaly—cardiomyopathy and organomegaly—cause disfunction in the heart, the liver, connective tissue, and other organs.
2. Continued steroid use can cause infertility in men and menstrual irregularity and cessation in women. Similar effects accompany HGH abuse.
3. Steroid use can cause irreversible abnormal growth in adolescents, specifically premature epiphyseal closure. HGH use can cause irreversible abnormal growth in adolescents, specifically gigantism.
4. Steroid use increases the risk for cardiovascular disease by decreasing the HDL/LDL ratio. HGH use promotes cardiac failure.

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172 Rickert, 31 Clinical Pediatrics at 725 (cited in note 10).
173 Id. This study is corroborated by a study by W. F. Buckley finding that 6.6 percent of high school male seniors had used or were currently using steroids.
174 The Dezelsky study found that as many as 20 percent of males surveyed abused steroids. See Hainline and Wadler, Contemporary Exercise and Sports Medicine Series at 56 (cited in note 11), citing Dezelsky, Toohey, and Shaw, 37 Bull Narc 49 (cited in note 55). A similar study by Pope and Katz found comparable numbers. See Hainline and Wadler, Contemporary Exercise and Sports Medicine Series at 73 (cited in note 11), citing Pope, Katz, and Champoux, 16 Phys Sportsmed 75 (cited in note 55). A comparison of these studies to the Rickert study is not dispositive because the studies surveyed different populations. Rickert's survey population was tenth-grade males, while Dezelsky's survey population was college athletes. This difference in subject group makes the studies non-comparable.
(5) Steroid use can alter the user's appearance, including altered breast size, increased facial hair, increased clitoris size, and male pattern baldness. HGH, by causing diseases such as acromegaly, similarly alters the appearance of users.

(6) Intravenous use of either steroids or HGH increases the risk of AIDS and Hepatitis B.

While less is known about the side effects of HGH use than is known about the side effects of steroid use, some users have taken this lack of knowledge as a signal that HGH does not have harmful side effects; therefore, many users have discontinued steroid use in favor of HGH. Preliminary evidence, however, suggests that HGH poses dangers equivalent to steroids, therefore, any disparity in criminal sanctions based upon perceived differences in the number or scope of side effects is unjustifiable.

Finally, HGH may be as addictive as steroids. Kenneth Kashkin and Herbert Kleber found that, in the case of steroids, the need for peer approval and acceptance could contribute to abuse. HGH users face similar social pressures; therefore, the desire for peer approval could also lead to HGH abuse. Furthermore, the higher cost of HGH increases the possibility that users might deal street drugs or commit secondary crimes to support their habits.

B. HGH Should Be Classified as a Schedule III Drug

HGH closely fits the criteria that define a Schedule III drug. Under Title 21, Section 812 of the United States Code, Schedule III drugs must have potential for abuse, some currently accepted medical use, and a tendency for moderate or low physical dependence or high psychological dependence.

Congress reclassified steroids as a Schedule III drug because it did not believe that steroids were comparable to Schedule II

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176 Hainline and Wadler, Contemporary Exercise and Sports Medicine Series at 72 (cited in note 11).
177 See notes 61-101 and accompanying text. Compare notes 131-150 and accompanying text.
178 Kashkin and Kleber, 262 J of the Am Medical Assn at 3167 (cited in note 98).
179 See note 101 and accompanying text.
180 See 21 USC § 812.
181 Id.
drugs.\textsuperscript{182} This reclassification evidenced a desire that drugs within the same Schedule should be comparable. Therefore, because the prevalence, the limited medical uses, the possible addictive nature, and the side effects of HGH are comparable to those of steroids and other Schedule III drugs such as amphetamines, barbiturates, codeine, and morphine,\textsuperscript{183} HGH should be reclassified as a Schedule III drug.

The rates of HGH abuse are similar enough to other Schedule III drugs that HGH should be placed on Schedule III. As noted above, current studies show that approximately 5 percent of all high school students abuse HGH,\textsuperscript{184} a figure comparable to the prevalence of abuse of other Schedule III drugs.\textsuperscript{185}

Furthermore, HGH has fewer clinical uses than other Schedule III drugs. The only current clinical use of HGH is in the treatment of growth hormone deficiency in children, whereas some drugs in Schedule III are used to treat several diseases.\textsuperscript{186} Although the CSA does not distinguish between drugs with only one medical use and those with several medical uses,\textsuperscript{187} HGH's sole medical use indicates that it should be treated at least as stringently as other Schedule III drugs.

All Schedule III drugs have addictive properties. Amphetamines, barbiturates, codeine, and steroids all create some psychic dependence.\textsuperscript{188} Given that HGH users face the same set of...

\textsuperscript{182} Hearings on HR 4658 at 14 (cited in note 159).

\textsuperscript{183} See 21 USC § 812.

\textsuperscript{184} See note 123 and accompanying text.

\textsuperscript{185} In 1992, 7.1 percent of high school seniors stated that they had used amphetamines or stimulants within the past twelve months. Sourcebook of Criminal Justice Statistics, Table 3.85 at 328 (1992). Among the same group, 2.8 percent of students reported barbiturate or depressant use. Id. Moreover, 3.3 percent reported use of codeine or morphine. Id. Finally, as discussed above, 6.6 percent of high school seniors abused steroids, the Schedule III drug most similar to HGH. See notes 174-175 and accompanying text.

\textsuperscript{186} Amphetamines are used to treat manic-depressive or schizoid psychoses and to aid in dieting by suppressing appetite. Less common uses include relieving mild, temporary states of depression, and breaking an alcoholic's "vicious circle," in which the alcoholic drinks to relieve the depression caused by his previous hangover. Richard R. Lingeman, Drugs From A to Z: A Dictionary 5-6 (McGraw Hill Book Company, 2d ed 1974).

In small doses, barbiturates relieve tension and anxiety. Furthermore, they can be used as an anticonvulsant in epilepsy, as an analgesic, and as an anesthetic. Id at 15. Codeine is used as an analgesic for minor pain and is a common ingredient in cough medicine. Id at 46. Morphine is used as a general pain killer. Id at 174.

\textsuperscript{187} Hearings on HR 4658 at 19 (cited in note 159).

\textsuperscript{188} Use of amphetamines does not cause physical dependence, but it can cause psychic dependence. Upon withdrawal, the user may experience fatigue, depression, weakness, tremors, gastrointestinal disturbances, and a long exhausted sleep, sometimes lasting for days. Lingeman, Drugs from A to Z at 6 (cited in note 186).
social motivations as steroid users, a high probability exists that HGH is addictive. Because Congress was willing to base its decision to place steroids on Schedule III on Kashkin and Kleber’s social-factor addiction hypothesis for steroids, Congress should similarly place HGH on Schedule III.  

The side effects associated with HGH use are similar to those associated with steroid use. On that basis alone, HGH should properly be classified as a Schedule III drug. The side effects associated with HGH abuse, however, are more severe than those associated with other Schedule III drugs, further supporting a Schedule III designation.

Finally, although some of the side effects associated with other Schedule III drugs are psychological—an area that has not yet been explored with HGH abuse—most of the physical side effects associated with...
effects associated with these drugs are neither life-threatening nor permanent unless massive doses are taken. By contrast, the side effects of HGH abuse, which may include permanent disfigurement and disruption of internal organs, are clearly more extreme than the side effects of other Schedule III drugs. This factor leads to the conclusion that HGH should be treated at least as stringently as, if not more stringently than, other Schedule III drugs.

C. A Viable Deterrence Strategy Must Include Education and Social Sanctions

Although equally stringent criminal sanctions should apply to both steroid and HGH abuse, these sanctions alone would not fully deter ergogenic drug use. The testimony of Richard Sandlin, a former steroid abuser, supports this conclusion:

Athletes today are not concerned about [the possibility for internal damages], they see the immediate results of anabolic steroids and keep on taking the drugs. Their only concern is winning at any cost, trading a moment's worth of fame and fortune for possibly a lifetime of sickness and disease. I know because during my first hospitalization in 1983, my doctor stated "if you don't stop using steroids, they are going to kill you" and my comment was "at least, I'll die happy" . . . . During [the time that I took steroids] I believed I was invincible and nothing which made me so strong could ever be bad for me. Criminal sanctions likely would not deter those, like Sandlin, who are willing to "win at any cost."

Two reasons explain why criminal sanctions would be ineffective with adolescents. First, Richard Sandlin's testimony demonstrates that adolescents often believe they are invulnerable and immortal. This belief reduces their ability to assess the probability of being caught, prosecuted, and sentenced for ergogenic drug use. Furthermore, because adolescents are more likely to believe that they cannot be harmed by ergogenic drugs, they

\[192 \text{ See notes 131-150 and accompanying text.}\]
\[193 \text{ Abuse of Steroids in Amateur and Professional Sports: Hearings Before the Sub- committee on Crime, Committee on the Judiciary, House of Representatives, 101st Cong, 2d Sess 50, 51 (1990).}\]
would not believe that the statute is "right," leading them to ignore the statute.

Second, many adolescents use ergogenic drugs because of, or at least in conjunction with, peer pressure. Criminal sanctions most likely would not counter the strong effects of peer pressure.

These two concerns require any viable drug policy that aims to deter adolescent abuse to include: (1) education programs focused directly on decreasing peer pressure to take ergogenic drugs and convincing adolescents both that ergogenic drugs will harm their bodies and that their drug use will be detected and punished; and (2) stricter sanctions against the use of ergogenic drugs by independent sports authorities such as the NCAA, the IOC, and the NFL that would remove one incentive for ergogenic drug use as well as decrease the number of ergogenic drug users as adolescent role models.

1. Education.

The first supplement to criminal sanctions is education. Robert E. Larsen, team physician for the University of Minnesota football team, testified that education was the "best tool" for fighting steroid abuse. In fact, the American Medical Association believes that education will be more of a deterrent to future ergogenic drug abuse than criminal sanctions. To succeed, however, an education program must attack the underlying problem: the social and peer pressures on the athlete to excel at any cost and on the cosmetic user to look better at any cost.  


194 Id at 65, 78.

The AMA did not support the scheduling of steroids on the CSA. It stated that a more effective approach to curb steroid abuse was to educate athletes, coaches, and trainers about steroid abuse. Steroids in Amateur and Professional Sports—The Medical and Social Costs of Steroid Abuse: Hearings Before the Committee on the Judiciary at 77, 80 (cited in note 155).

While other organizations do not adopt such a radical stance, most groups recognize prevention through education as a sound alternative. Ergogenic drugs are a good prospect for education because the user must initially make a rational decision to use the drugs. Leslie Southwick, Deputy Assistant Attorney General, stated in testimony before the Subcommittee on Crime of the House of Representatives: "Anabolic steroids are not like many drugs of abuse which, over the last twenty years, have been regulated and controlled under the Controlled Substances Act (CSA). Anabolic steroids are not taken to get 'high' or to 'escape from reality,' but to enhance physical performance and to improve physical appearance". Because the goal of abusing these substances is not the immediate gratification associated with other drugs, education stands a better chance of deterring abusers. Hearings on HR 4658 at 14 (cited in note 159).

196 Education that consists simply of the dissemination of factual material, however, will not likely be effective, given the general distrust of the medical community's views on ergogenic drugs. For instance, Larsen cites an information-based steroid education pro-
campaign conveying the message that ergogenic drug use is “cheating” and/or “unfair” might succeed in transforming peer pressure from a force encouraging ergogenic drug abuse into a positive influence deterring abuse.

An education plan must also counteract the adolescent’s natural belief that he or she is invincible and immortal. To achieve this goal, the plan might model itself after the educational program currently utilized in the war against cigarette smoking. Media bombardment has successfully transformed smoking from a socially acceptable habit to a socially unacceptable habit, and the population of smokers has declined radically. More importantly, adolescents now believe that cigarette smoking can kill. A similar campaign against ergogenic drugs might be just as successful.

2. Stricter social sanctions against ergogenic drug abuse.
Most people agree that steroids should not be used to boost performance in athletic competitions. The American College of Sports Medicine, in a 1987 position statement, denounced steroid use by athletes as contrary to the ethical principles of athletic competition. It stated that the eradication of steroid use is in the best interest of all sports and, as a means to this end, endorsed the development of procedures for drug detection and policies that exclude from competition those athletes who “refuse to abide by the rules.”

Removing ergogenic drug abuse and abusers from athletic competition would deter adolescent abuse of these substances. First, it would remove ergogenic drug abusers as adolescent role

gram for high school athletes in Oregon that increased the incidence of abuse. Abuse of Steroids in Amateur and Professional Sports: Hearings Before the Subcommittee on Crime at 78 (cited in note 193).  
197 Id at 76.  
198 The percentage of adults who smoke a half pack or more a day has decreased from 20.2 percent in 1986 to 15.7 percent in 1992. Sourcebook of Criminal Justice Statistics, Table 3.90 at 333 (cited in note 185).  
200 Id at 537. Three years later, the need for private enforcement of a steroid ban was echoed by Dr. Jay Cox, former president of the American Orthopaedic Society for Sports Medicine. In a 1990 address, he stated that “major results [in the war against steroid abuse] will be achieved only after athletes, teams, schools and federations are willing to renew a commitment to fair play, deemphasize winning, and no longer tolerate, either actively or passively, the abuse of drugs in sports.” See Cox, 18 Am J of Sports Medicine at 572 (cited in note 74).
models. Second, it would remove a key goal of ergogenic drug use: abusers would be completely banned from competition.

One possible means of achieving this goal is for athletic associations to follow the advice of the American College of Sports Medicine by first threatening and then permanently expelling any athlete who tests positive for steroid use. If these threats were credible, many athletes would think twice before using steroids. Unfortunately, while many leagues today impose testing and penalty schemes for steroid abuse, permanent expulsion is not a credible threat.

No quick solution exists to this problem. Before any system of self-enforcement can be effective, the leagues and players must realize that the phrase “winning at any cost” does not include steroid abuse. Leagues must be willing to sacrifice the short-term gains of fielding ergogenic drug-enhanced athletes if they desire steroid-free competition to return.

Unfortunately, the lack of an effective test to detect HGH use complicates imposing a ban. In fact, without a viable means to detect HGH use, imposing strict penalties on athletes who test positive for steroids will only result in users switching to HGH. In other words, because HGH tests are not effective, the sanctions based upon these tests cannot be effective. Therefore, in order to provide additional deterrence, leagues may need to impose other penalties to deter HGH use, such as penalizing ath-

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201 The possible efficacy of these athletic sanctions should not be taken lightly. One study focusing on the apparent lack of improvement of weight lifters at the Junior World Championships of Weight Lifting from 1981 to 1984 as compared to 1978 and 1981 attributed the lack of improvement to more effective doping control imposed during that period. K. Virvidakis, G. Sideras, and E. Papadakis, Effect of Doping Control on Weightlifting Performance, 8 Intl J of Sports Medicine 397 (Dec 1987).

202 For example, Brian Bosworth signed a multiyear football contract after he had tested positive for steroids. Rick Telander, Mail-order Muscles: How big is the market for illegal bodybuilding drugs? Sports Illustrated (Nov 22, 1993). This story is only one example of the tendency of independent sports agencies to gloss over infractions of their ergogenic drug policies. For example, although the NFL has long maintained a policy against steroid use, it was not until 1987 that it began making a serious effort to enforce that policy. In 1987, the NFL began testing for steroids in training camp and disciplining those players who tested positive.

The NCAA drug testing program has similarly floundered. Only since January 1988 have voluntary off-season drug tests been part of the NCAA drug testing program. Under this program, schools may opt to have a drug testing crew visit the school once each year to test twenty-four athletes. The school decides who will be tested, when they are tested, and the penalties for testing positive. LaBree, 31 J of Sports Medicine and Physical Fitness at 618 (cited in note 25); Hearing on Abuse of Steroids (March 22, 1990) at 4; NCAA does off-season testing for steroids, 16 Physical Sports Medicine 49 (1988).
letes who are caught with HGH even when use has not been detected.

CONCLUSION

Ergogenic drugs such as steroids and HGH are a widespread and growing problem among the American population. While the Anabolic Steroid Control Act of 1990 alleviated some concerns by placing steroids under the CSA, its failure to impose appropriate criminal sanctions on HGH use will likely result in future problems with HGH abuse.

A short-term solution to this problem is to classify HGH, along with steroids, as a Schedule III drug under the CSA. Any long-term solution to the underlying problems of ergogenic drugs, however, must include an education program that convinces potential abusers that the harms of ergogenic drugs outweigh the benefits and that it is socially unacceptable to use these drugs.