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The complexities of anti-doping violations: a case study of sanctioned cases in all performance levels of USA cycling

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Abstract

The use of banned substances and techniques in sport is regulated by anti-doping rules co-ordinated by the World Anti-Doping Agency. The purposes of these rules are to protect the health of the athlete, the level playing field and what WADA refers to as the spirit of sport. In this article, we review the known cases of sanctions in USA cycling since 2001. We show that the diversity of cases expands upon the simplistic, one-dimensional understanding of doping as risky and cheating. Contrary to this paradigm, we establish a typology of cases that challenges the one size fits all approach and, more specifically, we argue that WADA should develop new policies with independent standards for amateur and masters athletes.

Keywords

Doping; Anti-doping; Cycling; Sport; Amateur; United States

Introduction

The use of performance-enhancing drugs (PEDs) for sports purposes is one component of a wider phenomenon known as *doping*. The latter is defined by the World Anti-Doping Agency (WADA) as a violation of the WADA Code, of which there are ten types (WADA, 2015b). These range from testing positive for a banned substance through a urine or blood sample, to supplying and/or helping others administer banned substances or through techniques such as blood transfusions. The doping behaviours of the highest level United States cyclists are well-documented, including Lance Armstrong and other members of the U.S. Postal team. These resonate with and confirm a basic level of understanding which is prevalent about doping cases: that the athletes involved have deliberately cheated, gained some performance-enhancement benefit from the substances involved, have taken risks with

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their own health, and passively or actively encouraged others to dope. However, much less attention has been given by researchers to the potentially more serious public health issue of PED use in the amateur ranks of cycling (Laure, 1997) or to the range of doping contexts. Underscoring the need for more attention on the non-professional levels of cycling, The Cycling Independent Reform Commission (CIRC) Report (2015) found 'doping in amateur cycling is becoming endemic' (p.68).

The focus of most research on doping in cycling has focused mainly on young, aspiring cyclists motivated by prizes and celebrity (Bloodworth & McNamee, 2010; Christiansen, 2010; Outram & Stewart, 2015). Yet, anti-doping policies apply to all athletes across sports and competitive levels, with few exceptions.[1] By design, these policies and their prescribed testing protocols treat doping as a clear-cut issue where an athlete either has or has not used a banned substance. Athletes are afforded a defence only if they appeal their case, a costly option pursued by few athletes. While this approach is expedient for issuing competition bans, much of the nuance and deeper understanding of the underlying behaviour is lost. Currently, all athletes with a positive test are labelled as dopers (Pluim, 2008) and run counter to the clean cycling narrative that is often reinforced through media coverage (Sefiha & Reichman, 2014).

In order to move beyond this dichotomous view, we offer a new typology of anti-doping case types based on analysis of all officially decided doping cases of amateur cyclists between 2001 and 2013. This typology is a necessary corrective, as the analysis reveals that the circumstances of doping cases can vary widely between athletes and competitive levels within the same sport, and that athletes using banned substances are far from the homogenous group they are often portrayed to be in the media.

We focus solely on known cases: those athletes who were sanctioned through the combined efforts of the United States Anti-Doping Agency (USADA) and the national governing body, USA Cycling. We draw from a range of primary and secondary source materials—including official records, interviews, and media coverage—to more throughly explore the situational contexts of PED use. Our findings show a variety of behavioural patterns and a significant cause for concern, especially at the lower amateur and masters levels of competition. These patterns should be understood as part of a wider culture of medicalisation, supplementation and drug use that are banned by sports governing bodies (Henning, 2014; Hoberman, 2005), and raise new questions about how and why non-professional athletes may use banned substances and techniques. We argue that the phenomenon of doping in amateur cycling provides new insights into what we know about doping and requires a reconsideration of anti-doping policies and testing protocols. Our conclusions discuss the subsequent challenges facing policy makers in trying to reduce consumption of PEDs and recommend revisions to anti-doping policies that would reflect the experiences and realities of amateur athletes' lifestyles and training choices.

[1]WADA does ban some substances in selected sports or during competition that are allowed in other sports or out of competition. For full list, see section on 'Substances Prohibited in Particular Sports' in the WADA Banned Substances List (2015a)

Background and Literature

Anti-doping is a system of testing athletes' biological samples (e.g. urine, blood) for substances banned by WADA that meet two of three criteria: the potential risk to health, the potential to enhance one's performance, and the violation of the spirit of the sport (WADA, 2015b). The United States Anti-Doping Agency (USADA) undertakes testing in collaboration with USA Cycling (USAC). A positive test, or the use of other evidence such as self-admission, results in a series of bureaucratic procedures that are pre-determined by WADA and outlined in its Code (WADA, 2015b). This is a standardised set of rules with which almost all countries and sports have agreed to comply. Under these procedures the athlete is given the option of having their 'B' sample tested (testing a second, concurrently collected sample); unless there is a different outcome from the 'B' test, a sanction is applied. Athletes can appeal to the Court of Arbitration for Sport (CAS), in this case to the North American CAS (other cases have been heard by the international CAS based in Switzerland). However, this can be a lengthy and expensive process, and the burden of proof lies with the athlete and their legal representatives to explain the presence of the banned substance (McNamee & Tarasti, 2010).

The WADA Code defines ten Anti-Doping Rule Violations (ADRVs) by which an individual might be found in violation of the Code. The definition of 'doping' is to have violated the Code and being found guilty of an ADRV (WADA, 2015b). Of these, two relate specifically to the use or attempted use of a prohibited substance. The rest are in a sense contextual, as they cover indirectly related offences: refusing to submit a sample, failure to provide whereabouts information for testing officials, tampering with the doping control process, possession, trafficking, assisting the administration or cover-up of doping, complicity in an ADRV, and prohibited association with specified ineligible persons. Though the Code includes these ten violations, we are focusing on only those that involved positive tests for prohibited substances.

Most first time Code violations evoke the standard sanction of a two or four-year ban from all competition, depending on the type of ADRV. This can be reduced in some circumstances, such as for genuine inadvertent consumption (e.g. using a supplement containing an unlabeled banned substance) (Amos, 2007; WADA, 2015b). However, it is central to the WADA Code that the rule of strict liability is applied, wherein the athlete is deemed responsible for any substance identified in their sample (WADA, 2015b). While this was designed to undermine excuse-making in the appeals process, it has led to controversial cases where athletes may have unknowingly ingested a banned drug.

Researchers and anti-doping agencies have struggled to determine the full extent of doping (Lentillon-Kaestner & Ohl, 2011; Pitsch, Emrich & Klein, 2007). Studies using sophisticated methodologies for assessing prevalence of doping or high-risk attitudes towards doping in other contexts have shown that the official figures from testing are significantly under-reporting actual usage (Dimeo & Taylor, 2013; Lentillon-Kaestner & Ohl, 2011). In a rare public admission, the Director-General of WADA said that, prior to the London 2012 Olympics, he estimated around 10% of the athletes competing will have benefited from the use of banned substances or techniques (Magnay, 2012). Moreover, the

evidence from the US Postal/Lance Armstrong case showed how the testing system could be undermined even by athletes targeted for testing by anti-doping agencies (USADA, 2012). Similar claims have emerged periodically in the national media, such as after the BALCO scandal in California in 2004 when Victor Conte, lab owner and admitted distributor of banned substances, explained how his athletes managed their drug regimen in order to avoid being caught. Conte was particularly skilled at managing his athletes' schedules to avoid out-of-competition (OOC) testing procedures (Fainaru-Wada & Williams, 2006).

Amateur sport has very little OOC testing, potentially allowing uninhibited use of drugs during training periods. An extensive range of studies in the U.S. over the past 30 years have highlighted this, from high school, college and non-professional athletes, and physical culture pursuits like bodybuilding, have shown a consistent level of doping practice (Backhouse, McKenna, Robinson & Atkin, 2007). Prevalence statistics vary over time, place and activity, and can differ significantly between studies (Lentillon-Kaestner & Ohl, 2011). Sports leagues and anti-doping agencies consistently report a 2% positive test rate, though research on doping prevalence has found official reports unreliable for estimating prevalence (Laure, 1997; Pitsch, Emerich, & Klein, 2007). One study of elite athletes using advanced statistical methods showed a single-season use rate of 48.1% (Dimeo & Taylor, 2013). Reflecting this likely widespread use of PEDs, Timothy Armstrong, Coordinator of the Surveillance and Population-based Prevention Unit of the World Health Organisation, said in September 2012 that PEDs now represent an important public health issue (O'Connor, 2012).

In the case of non-elite American cycling, there is specific evidence of doping from a number of sources that suggest the sanctioned cases are only a small fraction of the reality of doping sub-cultures in competitive cycling. An indication of the demand for PEDs emerged in 2006 when former professional cyclist Joseph Papp tested positive, then explained to investigators that he was the supplier to a large number of professional and amateur clients (Ford, 2011; Lovett, 2012). This story became notorious and the so-called 'Papp list' reportedly had 187. Papp was called to testify in the tribunal held for the professional cyclist Floyd Landis who tested positive for testosterone while leading the Tour de France in 2007 (Lovett, 2012). Other cyclists were also sanctioned as a result of their association with Papp (Ford, 2011).

Evidence of the availability of anti-ageing drugs such as the synthetic hormones testosterone and dehydroepiandrosterone (DHEA) were documented by Andrew Tilin (2011). Tilin was a journalist and an amateur cyclist who, aged 42, researched and used anti-ageing products through a wide number of books, websites, interviews, and clinics. Evidence suggests a rising trend in the use of such products and increasing ease of access in the U.S. (Hoberman, 2005). A market report by BCC Research (2013) estimated the total (products and services) global anti-ageing market to be worth $249.3 billion in 2012, with growth projections of 5.7% per year to $345.8 billion by the end of 2018 (Ibid). It is likely that individuals who wish to use these may also be interested in competitive cycling, another increasing U.S. trend. However, these forms of evidence are less substantial than the objective evidence of sanctioned cases. It should be noted that patterns of violations cannot be extrapolated to establish true patterns, they are better understood as the meeting point of policy and drug use

behaviours. They reveal the mechanisms and impacts of policies, and how these policies may or may not treat athletes fairly and consistently.

Such is the developing concern over the potential risk of doping behaviours in non-elite groups that voluntary cycling organisations and the managers of high-profile races have increasingly called for anti-doping testing to be conducted among amateurs and Masters age groups (Burns, 2014). There is a significant cost to organising such testing. Firstly, there is the additional time to raise funds, plan, publicise, implement testing procedures and assist with any subsequent sanctions. Secondly, is the direct financial cost to be borne as the national authorities only have a limited budget for testing that is concentrated on the higher profile, professional athletes. As will be discussed below, the movement towards increasing testing in response to a perceived problem requires substantial commitment of time and money to have it resolved. However, without systematic OOC testing, many PEDs can be used without restriction as they are ‘washed out’ of the users’ system long before they compete in a race. The advantages are gained in the training periods, but usage is not detected through current levels of testing.

The analysis presented here focuses on the ADRVs related to usage. The U.S. cycling case study can broaden conceptual understanding of situations in which athletes find themselves. We therefore draw from specific cases to organise this case study and to extend and deepen the existing analytical framework.

Methods

This research follows a case study method, utilizing the available sources of evidence from contemporary history. Details of cases were drawn from the reported outcomes of official doping testing procedures available through the websites of USADA and USA Cycling. Using these on-line records, we collected data from the 66 cases of a positive anti-doping test resulting in a sanction. The USA Cycling website was used to collect information regarding each sanctioned athlete’s competitive history, including the category in which he or she raced and in which cycling discipline (i.e. road, mountain, track). From the USADA online archives we recorded details regarding whether the case was based on an in-competition or OOC test, the substance tested positive for, and the duration of any competition ban. In instances where an athlete chose to challenge a decision through the CAS, the full decision details were acquired via the USADA’s website, recorded, and included in the analysis.

We also drew from media coverage of doping cases, mainly from news reports of sanctions following a positive test. As only the most high-profile or unusual cases generated mass media attention, we gathered information from online news sources and cycling publications (i.e. VeloPress) in addition to more mainstream media sources. Using Google, we searched for each cyclist’s name. When the cyclist’s name returned only irrelevant results, a second search using the word ‘doping’ after the athlete’s name was done. At least one relevant result was returned for each case apart from USADA records or press items. Few news pieces were available for many of the athletes competing in lower competitive categories, even though cases not widely discussed or covered by the media are useful for this analysis

(Laurendeau and Moroz, 2013). These news reports were analysed for details of background, circumstances, or alternative explanations for a positive test. Often, these provided quotes from the athlete in question.

Though we relied on websites and sources that were journalism-based, as opposed to such things as blogs or posts on forums, we did view them with a critical eye and used our judgement in selecting quotes and interpretations. This was especially important as accounts of athlete denials, diversions, admissions, and even confessions cannot necessarily be trusted (Lamont-Mills & Christensen, 2008). As such, we avoided accepting any single account as the 'truth', and cross-referenced journalistic reports with available information from USA Cycling, USADA, and CAS. Together, these data formed the basis for developing the typology presented below. These will be summarised to outline patterns of case type, and then specific details will be presented within a conceptual framework. Where we present details of specific cases, we have done so because each is representative of its case type.

Findings

Based on data compiled from USA Cycling's database of licensed cyclists, 69% of professional male road cyclists were between 20–30 years old as of July 15, 2015 (USA Cycling, 2015). Age ranges vary by cycling discipline, with some disciplines skewing older —44% of cross country mountain bike pros are over age 30—or younger— 88% of pro males in all track disciplines combined are 30 or younger. Though some remain highly competitive into their 40s, it is likely performance peaks before age 35. Though studies of peak cyclist age are few (Balmer, Bird & Davison, 2008) studies of other endurance sports suggest athletes peak in their late 20s (Allen, Vandenbogaerde & Hopkins, 2014; Balmer, Bird & Davison, 2008; Berthelot et al., 2012; Schultz & Curnow, 1988) and it is likely that ageing performance decline is similar across several sports, including cycling (Baker & Tang, 2010). Professional female road cyclists are slightly older—59% are over age 30, though there are far fewer professional females compared with males. However, it is likely that the peak age for female performance is now similar to that of males (Elmenshawy, Machin & Tanaka, 2015). The age group of non-professional cyclists most likely to have tested positive for banned drugs is 30–50 years, as shown in Table 1. Notably, there are also a small number of cases in the age groups over 50 years. Previous academic studies have not focused on doping among higher age bracket competitors—often known as *Masters* or *Veterans*—though there are sociological studies focused on athletically ambitious older, competitive runners (Tulle, 2003).

There has been a marked increase over the past decade of middle-aged competitors in cycling partially inspired by the achievements of Lance Armstrong and his peers. Membership in USA Cycling continues to grow annually in all categories (USA Cycling, 2012). Despite this and the increased attention to PED use in cycling, the number of positive tests for PEDs annually has remained relatively stable with few exceptions, as shown in Table 2.

It is possible to identify patterns in doping violations from the brief details explaining sanctions provided by doping authorities. The use of banned substances is a distinct set of

behaviours. Table 3 shows that most cyclists who received a doping ban were tested for and found to have used PEDs. We cannot say for certain which substances those sanctioned for non-analytic reasons (i.e. admission of use, missed tests) have used as these cases are built on self-reporting and contextual rules violations rather than a positive PED test. However, athletes sanctioned in this way have engaged in detection avoidance behaviours that would likely be employed only by athletes who would show positive for PEDs if tested, have admitted to at least some of their PED use, or have been shown by alternative evidence and testimony to have used PEDs—all use behaviours. Those who tested positive for non-performance-enhancing recreational drugs (i.e. marijuana) engaged in similar behaviours to those testing positive for enhancing drugs, but differ in that this type of use may not necessarily impact one's cycling performance. Most cyclists sanctioned for any reason did not contest these cases, and the small number that did go through the appeals process failed to have the sanction reversed.

While these figures reflect the findings from testing and related investigations carried out by the main governing agencies, they do not fully capture the range of contexts and explanations for positive tests. The testing and sanctioning process is generally one-sided, with anti-doping agencies conducting the test and issuing the initial competition ban without opportunity for explanation or consideration of any mitigating circumstances from the athlete. Athletes are only able to share their accounts via the often lengthy and expensive arbitration process, or through media channels. Analysis of these accounts from the athletes reveals a much more nuanced and complex picture of doping in cycling that is often obscured in the anti-doping process where cases are presented, and often reported upon, as cut and dry. Below we present a typology that parses out these cases, rather than lumping all cases together as dopers. Most cases fit squarely into the various categories. Some cases were more difficult to classify into a particular type, such as David LeDuc who was suspended for two years after testing positive for EPO, testosterone, and amphetamines (USADA, 2013a). This case is complicated due to both the testosterone and amphetamine being doctor prescribed, though the non-prescribed EPO seems to have been strictly to enhance performance (Cycling News, 2014). Cases like LeDuc's were the exception, however, and the typology presented allows for all current cases to be classified. We present two examples as representative of each type before providing a broader discussion.

Typology and cases

a) Deliberate use of PEDs to gain a performance benefit, often during early career development, with potential for significant extrinsic rewards and/or future professional career

- Kirk O'Bee tested positive for testosterone in 2002, receiving a one-year suspension. He was later implicated in two additional ADRVs (including a positive test for EPO in 2009), resulting in a lifetime ban (USADA, 2010b).
- Adam Bergman, 23, a member of a high-category domestic team (Jelly Belly) tested positive for EPO in 2004 and was banned for two years (USADA, 2004).

The most high profile of this type of case are those of the U.S. professional cyclists who were formed into a team to compete in the top European races from the mid-1990s onwards, though these have not been included in this research. These cases have been well documented as they include the seven-time winner of the Tour de France, Lance Armstrong, and several of his teammates (USADA, 2012b). Their doping behaviours are explained by the fact that cycling was their profession and over-whelming ambition. They learned of other teams' doping and then recruited the help of Spanish and Italian doctors willing to supply and administer banned PEDs. There are some cases of cyclists who appeared to be on the pathway to elite success but were derailed by a doping sanction, including O'Bee and Bergman.

Much academic research has focused on the motivations of athletes at this level, demonstrating that while winning and the promise of the fame and monetary awards motivate their use (Donahue, Miquelon, Valois, Goulet, Buist & Vallerand, 2006; Engelberg, Mosten & Skinner, 2014), it is often assumed by spectators that extrinsic rewards motivate all doping behaviours. This is not an illogical view, as this category includes the highest-profile cases of well-known professionals and there is little reporting on cases of lesser-known athletes or other behaviours. The tendency of the media to focus on scandals involving well-known professionals presents a singular doping context where outside awards may explain the behaviour. The result is little discussion of the more complicated or innocuous cases, often involving lesser-known amateur competitors, and the resulting sanctions. With the debate around doping in cycling focused on the narrow context, it is understandable that some may view the issue as isolated to the higher competitive levels of the sport. However, the large majority of cyclists in the U.S. compete at lower levels of competition than that of the elite professionals for their entire careers and often train and race without the promise of any outside reward.

b) Deliberate use of PEDs to gain a performance benefit with little potential for significant extrinsic rewards or future professional career

- Duane Dickey, a category 1 rider (just below professional), was caught in 2001 using phentermine, boldenone and nandrolone and banned for one year. He was sanctioned again in 2010, aged 41, for refusal to submit a sample, use and possession of EPO, backdated to 2007, and was banned for life (USADA, 2010c).
- Yoelkis Aira, a category 3 rider, received a two-year ban at age 41 after testing positive for the banned stimulant phentermine (USADA, 2013b).

By the early 2000s cyclists on the fringes of professional teams were using PEDs (Lentillon-Kaestner, 2013) and EPO had been part of the professional scene for approximately 10 years (Mignon, 2003). Though professional cyclists likely did not come across it until the early-mid 1990s, it seems that by the turn of the century domestic teams had found access and supply systems. There were also a range of steroids being used that indicate increased knowledge and availability (Ibid). It is likely that wider use of the Internet during this period opened up information sources and distribution channels not previously available for athletes seeking PEDs.

Several cyclists in this category were competing at the highest amateur levels and could be classified as semi- or nearly professional. Their behaviours mimic those of the top professionals in the sport. However, given their ages they were unlikely to progress to a top European-based team and become fully professional. As such, the behaviour cannot be explained in the same ways as the extrinsically-motivated professionals, as any reward would be significantly less. Rather, cyclists at this near-elite level may have learned how and when to use PEDs from elites who passed down these behaviours through the ranks of cyclists to the lower levels (Lentillon-Kaestner & Carstairs, 2010).

c) Deliberate use of PEDs to gain a performance benefit in order to remain competitive in higher age group categories (over 35 years old)

- Neal Schubel, 45, was banned for two years in 2010 after evidence showing he had bought and used EPO. Schubel had a very modest record of competitive achievement and admitted that he had been begun using EPO in August 2006 (USADA, 2010a).
- Michael Diamond, 63, refused to submit a sample at the Florida state time trial championships and was banned for two years beginning in November 2011 (USADA, 2011).

The doping behaviours among older riders who admit their intent to enhance performance may be linked to the desire of ageing athletes to remain competitive within their own age group. There was a spate of cases around 2010–12 when testing at Masters competitions became more frequent. Two cases that received national media attention were those of David Anthony, 45 years old, and Gabriele Guarini, 50 years old. Both tested positive for EPO in the same race: the 2012 New York Gran Fondo (Dreier, 2013). This was the first time testing had been implemented at this race, a mass participation event involving cyclists of all levels. Their cases were highlighted in the *New York Times* (Dreier, 2012) and elsewhere, revealing that doping was increasingly prevalent among amateur cyclists. This finding was supported by findings in the CIRC Report (2015) and recent research on amateur cyclists (Henning & Dimeo, 2015).

There has been an upsurge in middle-aged men becoming serious cyclists, yet the explanations for why amateur cyclists would risk their health and a competition ban are not obvious. By this stage in their career they are unlikely to gain any material rewards, such as large prize purses or by becoming a leading professional. However, there appears to exist a culture of competitiveness related to self-identity (defying age), a newfound passion for a sport, and status within a localised cycling community. As the Gran Fondo organiser, Uli Fluhme, said of Anthony and Guarini: ‘The incentive isn’t monetary but just glory’ (Dreier, 2012). Anthony himself admitted that, while not a very successful rider, he became obsessed by his own improvements in performance and social position: ‘The sport is all-consuming; it’s not like weekend softball. I was only involved in it [doping] for four years, and it took over most of my energy … It was about being relevant in the group, which was pretty addicting’ (Dreier, 2012).

Also in this category is the aforementioned case of Andrew Tilin. He is an author and journalist who was a low-level amateur cyclist when he undertook a yearlong course of doping which formed the basis of a 2011 book *The Doper Next Door* (Tilin, 2011). He found it surprisingly easy to access testosterone and hGH through anti-ageing clinics, as well as EPO through websites, though he did not use that substance. Like Anthony, Tilin found the thrill of improvement and beating his own performances exciting and sums up his post-PED use cycling experience as being 'confronted with a sort of drug-free athletic mortality: *I'll never again be as fast as I was in 2008* [when doping]. That is a really unhappy thought' (Tilin, 2011: p. 359).

d) Use of products relating to anti-ageing supplementation that are socially accepted but banned in competitive sport under global anti-doping rules

- Sloan Teeple, 42, was banned for two years after testing positive for synthetic testosterone, which he claimed was a therapeutic dose under the care of a physician, but did not have a TUE (USADA, 2013c). Teeple has developed a career within the anti-ageing industry promoting the benefits of testosterone therapy (Teeple & Teeple, 2012).
- Daniel Baker, 37, tested positive for synthetic testosterone in 2013 and received a two-year suspension (USADA, 2014). At the time of the in-competition test, Baker made the testers aware he was using therapeutic testosterone under a doctor's supervision. However, he had not acquired a TUE.

The experiences of cyclists in this category, most of whom are quite older than any professional cyclists, contrast the highly publicized doping cases in the professional context where most testing is conducted. This category includes a lower number of cases where the interplay of anti-ageing medicines, health, and cycling is explicit. While evidence of cases in this category is limited, it would seem plausible that anti-ageing supplementation is increasing at the same time participation in competitive cycling is increasing across in the U.S. These upwards trends could potentially overlap in a significant way. Of course, not all anti-ageing products are banned in sport, but many experts and clinics advertise the supposed health and rejuvenation effects of hormone replacement therapies, including some that are banned by WADA like testosterone and hGH.

A publicly discussed case that did not lead to a sanction was that of Jeff Hammond, 58, an amateur category 4 Masters cyclist (Beaudin, 2013). He uses supplemental testosterone as treatment for hypogonadism and low bone density. He contacted USADA to request a TUE but was denied, in effect being told to either stop racing or stop medicating. Hammond's analysis of his situation pointed out the anti-doping policy challenge here: 'They're treating us like 20-year old Olympians. Something that's considered a performance-enhancing drug for an 18 year-old may be a necessary life-saving medication for a senior athlete. I think it's very unfair' (Beaudin, 2013). It was reported at this time that USADA had (in 2012) received 409 requests for TUEs, of which 52 were for anabolic agents such as testosterone. The science director for USADA, Matthew Fedoruk, said: 'We're seeing more athletes that are at masters level realising that they were perhaps taking a prohibited substance' (Beaudin, 2013).

Cyclists at all competitive levels may apply for a TUE for a medically necessary treatment. The TUE system is intended to allow the therapeutic use of banned substances while preventing abuse of prescriptions that may have an enhancing effect. However, the TUE system assumes an athlete will recognize they are using a banned substance or that they have a sports doctor knowledgeable of anti-doping policies, and that may face a sanction if they are tested. Of course, many cyclists in the higher age groups may take the view that they are unlikely to be podium finishers in events that have testing procedures so therefore may simply continue with their medical prescription regimes. Nonetheless, if doping behaviours are on the increase among a wider population with variable access to medical expertise, a new and potentially significant public health issue may be emerging.

e) Inadvertent use of small amounts of PEDs that seem to have been consumed accidentally

- Amber Neben, 28, received a reduced ban of six months after an appeal to the CAS determined her positive test for 19-norandrosterone was due to inadvertent ingestion via a nutritional supplement (USADA, 2003b).
- Shelby Stacy, 18, a BMX rider, was banned for six months when an in competition test showed the stimulant methylhexaneamine in her system (USADA, 2012c). Stacy appealed the ruling and received a reduced ban after showing evidence she used a supplement with a misleading ingredients list.

Supplement use is a behaviour that athletes have been found to engage in for a multitude of reasons, including some that may not be related to sport, such as general health or well-being (Ayo, 2012), as well as for performance (Baume, Hellmans & Saugy, 2007; Suzic Lazic et al., 2011). Use of these products is widespread and encouraged among athletes to speed up recovery or otherwise boost performance, including among Masters competitors (Striegel, Simon, Wurster, Niess & Ulrich, 2006). Using tainted or cross-contaminated nutritional supplements widely available in retail stores or online distributors can result in accidental use of PEDs and subsequent positive test. The Food and Drug Administration (FDA) does not regulate these products with the same level of scrutiny as other drugs, leaving their true contents unknown. Independent analyses of commonly used supplements have confirmed the presence of banned substances not listed on the product's label (Cohen, 2009; Cohen, Travis, & Venhuis, 2013). Cyclists may assume an available product is in compliance, only finding out that it contains a banned substance upon failing a test.

Cyclists may also test positive for PEDs if using an over the counter medication that contains a banned substance to self-treat cold, allergy, or flu symptoms (Mottram, Chester, Atkinson & Goode, 2008). Even trainers or doctors unfamiliar with anti-doping protocols may also offer cyclists medication containing a banned PED to treat common illnesses. Amateurs are subject to the strict liability rule and still face competition bans regardless if the use was inadvertent, unless they are able to show their use was completely accidental. Appeals are rare at the amateur level, so many may simply accept a sanction despite a lack of intent to enhance performance.

While either a medication or supplement may lead to a doping violation, this use behaviour differs from those of the other categories. With regard to supplements, unlabelled substances

are clearly outside the control of individual athletes. Even if they are seeking some type of performance enhancement, the barrier to acquisition and use are low. Further, athletes also remain within the letter of the (non-sport) law when using available and accessible products, which may encourage the belief that they are also complying with anti-doping regulations.

f) Use of recreational drugs, such as cannabis, which are not performance enhancing but are banned in competitive sport under global anti-doping rules

- Former professional Kathi Krause, 45, was given a one-year ban for having tetrahydrocannabinol acid (THC) in her system when tested in 2003 at a national level mountain bike race (USADA, 2003a).
- 18-year-old Cesar Lopez received a six-month ban in 2012 when his test results were positive for THC. His ban was shortened after attending a USADA educational program (USADA, 2012a).

Recreational drug use presents a novel problem, as legalization of marijuana for both medicinal and recreational use has begun at the state level in the U.S. Drugs like marijuana will not enhance performance, many scholars are in favour of removing cannabis from the banned substances list. However, USADA and U.S. federal law ban their use. Passive exposure to some recreational drugs can cause positive doping test results (Ramachandra et al., 2012), and it can be difficult to determine whether athletes have used a drug themselves or had second-hand exposure. Again, under the strict liability rule a sanction will still apply as long as the substance remains banned.

The use behaviour associated with recreational drug violations have little in common with those in the other categories, yet are still considered ‘doping’ and treated the same way. The categories where there is potential overlap are categories D and E, above. As medical use of marijuana continues to be legalized, the similarities to the prescription drug use of athletes such as Hammond or Teeple become clear—in each case the substance is prescribed to treat a diagnosed and documented health issue. The behaviour has little to do with sport, yet much to do with health and medical necessity. Recreational drug use, specifically marijuana as the push to legalize its use for any purpose continues, shares with supplements the characteristics of being available, accessible, and legal outside of sport. These use behaviours are quite distinct, as in neither case is any actual performance benefit likely or even desired.

Conclusions

Addressing doping at non-professional levels requires a different approach to be effective. Recent doping cases at the amateur levels of cycling reveal patterns of use that diverge significantly from those of professional cyclists, though there is a single set of rules aimed primarily at elite professionals that applies to all. Understanding the various types of use behaviours among amateur athletes is a first step in rethinking the current approach to anti-doping. As shown above, use behaviours of official doping cases among amateur cyclists fit into six distinct types that differ along lines of age, extrinsic reward potential, likely mode of ingestion, drug effect, and medical necessity. Rather than trying to apply rules aimed at elite

athletes to amateurs, a different approach is necessary. Rules should be developed for athletes at this level that reflect the specific needs and realities of amateur competitors.

Efforts aimed at reducing or preventing doping must be relevant in the context of amateur and Masters competition, and take into account areas of risk largely ignored by current procedures. Potentially more effective than expanding rules or stiffening bans, better education of existing regulations and their rationales that address the lived experiences of amateur and older athletes could more effectively deter PED use. Specifically, amateur cyclists need an expanded and streamlined TUE system that makes extra allowances for medically necessary drugs. Such a change could encourage athletes to report medications and supplements they currently use, preventing some athletes from facing bans resulting from unintentional or therapeutic use of banned substances, and promote an open dialogue between athletes and sport governing bodies. Additionally, revisiting the bans on legalized OOC recreational drug use for amateurs would prevent athletes seeking only recreational effects from receiving competition bans. This will become more imperative if more states continue to legalize recreational marijuana use. Amateur cyclists would also benefit from educational programs that deal with the direct health threats posed by products they are likely to use, such as legal nutritional supplements, rather than focusing on some enhancing drugs whose risks may have been exaggerated (Lopez 2013, 2014).

As we only collected data on amateur cycling cases, we cannot say for certain if these same types of doping are occurring in other adult amateur sporting communities, such as swimming or running. However, we do know that there are contextual factors making some types of use behaviours more likely to occur—such as increasing availability and use of non-sport related hormone and other anti-ageing therapies (Hoberman, 2005), use of potentially tainted or mislabelled nutritional supplements (Gahache et al, 2011), and increasing access to legalized recreational drugs (Pacula & Sevigny, 2014). As these are broader social trends and not isolated to cycling, it would be reasonable that similar issues will come to effect similar sports. It seems unreasonable to expect that amateur athletes would be equipped with the knowledge to avoid any product potentially containing a banned substance.

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References

Allen SV, Vandenbogaerde TJ, Hopkins WG. Career performance trajectories of Olympic swimmers: Benchmarks for talent development. European journal of sport science. 2014; 14(7):643–651. [PubMed: 24597644]

Amos A. Inadvertent Doping and the WADA Code. Bond Law Review. 2007; 19(1):1–25. Retrieved from http://epublications.bond.edu.au/blr/vol19/iss1/1.

Ayo, Nike. Understanding Health Promotion in a Neoliberal Climate and the Making of Health Conscious Citizens. Critical Public Health. 2012; 22(1):99–105.

Backhouse, S.; McKenna, J.; Robinson, S.; Atkin, A. Report to the World Anti-Doping Agency (WADA). 2007. International literature review: attitudes, behaviours, knowledge and education–drugs in sport: past, present and future.

Baker AB, Tang YQ. Aging performance for masters records in athletics, swimming, rowing, cycling, triathlon, and weightlifting. Experimental aging research. 2010; 36(4):453–477. [PubMed: 20845122]

Balmer J, Bird S, Davison R. Indoor 16.1-km time-trial performance in cyclists aged 25ș3 years. Journal of sports sciences. 2008; 26(1):57–62. [PubMed: 17852672]

Baume NL, Hellemans MSaugy. Guide to Over-the-Counter Sports Supplements for Athletes. International Sport Medicine Journal. 2007; 8(1):2–10.

Beaudin M. Is it medicine or dope? A cat. 4 vs. the USADA. Velo News. 2013 Oct 21. Retrieved from http://velonews.competitor.com/2013/10/news/is-this-man-a-doper_306150.

Berthelot G, Len S, Hellard P, Tafflet M, Guillaume M, Vollmer JC, Toussaint JF. Exponential growth combined with exponential decline explains lifetime performance evolution in individual and human species. Age. 2012; 34(4):1001–1009. [PubMed: 21695422]

Bloodworth A, McNamee M. Clean Olympians? Doping and anti-doping: the views of talented young British athletes. International journal of drug policy. 2010; 21(4):276–282. [PubMed: 20056401]

Burns T. 16 Local Groups Join USA Cycling's Race Clean Program. Cyclingnews. 2014 Jan 24. Retrieved from http://www.cyclingnews.com/news/16-local-groups-join-usa-cyclings-raceclean-program.

Christiansen AV. " We are not sportsmen, we are professionals": professionalism, doping and deviance in elite sport. International journal of sport management and marketing. 2010; 7(1):91–103.

Cohen PA. American roulette—contaminated dietary supplements. New England Journal of Medicine. 2009; 361(16):1523–1525. [PubMed: 19812394]

Cohen PA, Travis JC, Venhuis BJ. A methamphetamine analog (N, α-diethyl-phenylethylamine) identified in a mainstream dietary supplement. Drug Testing and Analysis. 2013

Cycling News. Masters racer LeDuc admits to doping. Cycling News [Internet]. 2014 Jan 1. Retrieved from http://www.cyclingnews.com/news/masters-racer-leduc-admits-to-doping

Cycling Independent Reform Commission (CIRC). Report to the president of the Union Cycliste Internationale. 2015. Retrieved from www.uci.ch/mm/Document/News/CleanSport/16/87/99/CIRCReport2015_Neutral.pdf

Dimeo P, Taylor J. Monitoring drug use in sport: The contrast between official statistics and other evidence. Drugs: education, prevention and policy. 2013; 20(1):40–47.

Donahue EG, Miquelon P, Valois P, Goulet C, Buist A, Vallerand RJ. A motivational model of performance-enhancing substance use in elite athletes. Journal of sport & exercise psychology. 2006; 28(4):511.

Dreier F. Cycling's minor leagues of doping. Wall Street Journal. 2013 Mar 21. Retrieved from: http://www.wsj.com/news/articles/SB10001424127887324103504578374681699511190.

Dreier, F. Wider Testing Reveals Doping Among Amateur Cyclists, Too. New York Times. 2012 Jul 27. Retrieved from http://www.nytimes.com/2012/07/28/sports/cycling/doping-in-cycling-reaches-into-amateur-ranks.html?_r=0

Elmenshawy AR, Machin DR, Tanaka H. A rise in peak performance age in female athletes. AGE. 2015; 37(3):1–8.

Engelberg T, Moston S, Skinner J. The final frontier of anti-doping: A study of athletes who have committed doping violations. Sport Management Review. 2015; 18(2):268–279.

Fainaru-Wada, M.; Williams, L. Game of Shadows. New York: Gotham Books; 2006.

Ford B. Joe Papp's long and winding road: Lower-tier pro's career, PED role touched some of cycling's biggest names. ESPN. 2011 Oct 23. Retrieved from http://espn.go.com/espn/otl/story/_/id/7132452/former-cyclist-joe-papp-gets-three-years-probation-ped-case.

Gahache J, Bailey R, Burt V, Hughes J, Yetley E, Dwyer J, Picciano MF, McDowell M, Sempos C. Dietary Supplement Use Among U.S. Adults Has Increased Since NHANES III (1988–1994). NCHS Data Brief. 2011; 61

Henning AD. (Self-) Surveillance, Anti-Doping, and Health in Non-Elite Road Running. Surveillance & Society. 2014; 11(4):494–507. [PubMed: 25379025]

Henning AD, Dimeo P. Questions of fairness and anti-doping in US cycling: The contrasting experiences of professionals and amateurs. Drugs: education, prevention and policy. 2015:1–10. (ahead-of-print).

Hoberman, J. Testosterone dreams: Rejuvenation, aphrodisia, doping. Berkeley: University of California Press; 2005.

Lamont-Mills A, Christensen S. 'I have never taken performance enhancing drugs and I never will': drug discourse in the Shane Warne case. Scandinavian Journal of Medicine & Science in Sports. 2008; 18(2):250–258. [PubMed: 17506862]

Laure P. Epidemiologic approach of doping in sport. A review. The Journal of sports medicine and physical fitness. 1997; 37(3):218–224. [PubMed: 9407754]

Laurendeau J, Moroz S. Morality in the mountains: risk, responsibility, and neoliberalism in newspaper accounts of backcountry rescue. Communication & Sport. 2012; 1(4):382–399.

Lentillon-Kaestner V. The development of doping use in high-level cycling: From team-organized doping to advances in the fight against doping. Scandinavian journal of medicine & science in sports. 2013; 23(2):189–197. [PubMed: 22092601]

Lentillon-Kaestner V, Carstairs C. Doping use among young elite cyclists: a qualitative psychosociological approach. Scandinavian journal of medicine & science in sports. 2010; 20(2): 336–345. [PubMed: 19486486]

Lentillon-Kaestner V, Ohl F. Can we measure accurately the prevalence of doping? Scandinavian journal of medicine & science in sports. 2011; 21(6):e132–e142. [PubMed: 22126721]

López B. Creating fear: the 'doping deaths', risk communication and the anti-doping campaign. International Journal of Sport Policy and Politics. 2014; 6(2):213–225.

López B. Creating fear: The social construction of human Growth Hormone as a dangerous doping drug. International Review for the Sociology of Sport. 2013; 48(2):220–237.

Lovett I. 'Tattooed Guy' Was Pivotal in Armstrong Case. New York Times. 2012 Oct 17. Retrieved from http://www.nytimes.com/2012/10/18/sports/cycling/inquiry-into-kayle-leogrande-led-to-lance-armstrongs-eventual-fall.html?pagewanted=all&_r=0.

Magnay J. London 2012 Olympics: one in 10 athletes are drugs cheats, says anti-doping chief executive. Telegraph. 2011 Aug 18. Retrieved from http://www.telegraph.co.uk/sport/olympics/london-2012/8710041/London-2012-Olympics-one-in-10-athletes-are-drugs-cheats-says-anti-doping-chief-executive.html.

McNamee MJ, Tarasti L. Juridical and ethical peculiarities in doping policy. Journal of Medical Ethics. 2010; 36(3):165–169. [PubMed: 20211997]

Mignon P. The Tour de France and the doping issue. The International Journal of the History of Sport. 2003; 20(2):227–245.

Mottram D, Chester N, Atkinson G, Goode D. Athletes' knowledge and views on OTC medication. International journal of sports medicine. 2008; 29(10):851–855. [PubMed: 18401811]

O'Connor, P. Doping is now a public health issue, conference told. Reuters [Internet]. 2012. Retrieved from http://www.reuters.com/article/2012/09/22/us-doping-health-idUSBRE88L06E20120922

Outram SM, Stewart B. Condemning and Condoning: Elite Amateur Cyclists' Perspectives on Drug Use and Professional Cycling. International Journal of Drug Policy. 2015

Pacula RL, Sevigny EL. Marijuana liberalization policies: why we can't learn much from policy still in motion. Journal of Policy Analysis and Management. 2014; 33(1):212–221. [PubMed: 24358530]

Pelkey, C. Houston-based amateur accepts doping suspension. Velo News [Internet]. 2009 Oct 6. Retrieved from http://velonews.competitor.com/2009/10/news/houston-based-amateur-accepts-doping-suspension_98978

Pitsch W, Emrich E, Klein M. Doping in elite sports in Germany: results of a www survey. European Journal for Sport and Society. 2007; 4(2):89–102.

Pluim B. A doping sinner is not always a cheat. British journal of sports medicine. 2008; 42(7):549–550. [PubMed: 18606830]

Ramachandra K, Narendranat S, Somashekar HS, Patil NA, Reshma SR, Veena A. Drug abuse in sports. Journal of Pharmacy Research. 2012; 5(1):593–603.

Schultz R, Curnow C. Peak performance and age among superathletes: Track and field, swimming, baseball, tennis, and golf. Journal of Gerontology. 1988; 43:113–120.

Sefiha O, Reichman N. Be (coming) clean: confessions as governance in professional cycling. Catalan Journal of Communication & Cultural Studies. 2014; 6(2):177–195.

Suzic Lazic JN, Dikic N, Radivojevic S, Mazic D, Radovanovic N, Mitrovic M, Lazic S, Zivanic Suzic S. Dietary Supplements and Medications in Elite Sport –Polypharmacy or Real Need? Scandinavian Journal of Medicine and Science in Sports. 2011; 21:260–267. [PubMed: 19895385]

Striegel H, Simon P, Wurster C, Niess AM, Ulrich R. The use of nutritional supplements among master athletes. International journal of sports medicine. 2006; 27(03):236–241. [PubMed: 16541381]

Teeple, Sl; Teeple, Su. I'm still sexy so what's up with him? Learn how testosterone can change your relationship. New York: Morgan James; 2012.

Tilin, A. The Doper Next Door: My strange and scandalous year on performance enhancing drugs. Berkeley: Counterpoint; 2011.

Tulle, E. The bodies of veteran elite runners. In: Faircloth, CA., editor. Aging Bodies: Images and Everyday Experience. Oxford: Altamira Press; 2003.

USA Cycling. Results and Rankings. 2015. Retrieved from https://www.usacycling.org/events/rr.php

USA Cycling. Annual Report. 2012. Retrieved from http://www.usacycling.org/2012-annual-report-now-available-online.htm

USADA. US cycling athlete Baker accepts sanction for anti-doping rule violation. 2014 Jan 24. Retrieved from http://www.usada.org/us-cycling-athlete-baker-accepts-sanction-for-anti-doping-rule-violation/

USADA. Cycling athlete, LeDuc, accepts sanction for anti-doping rule violation. 2013a Dec 30. Retrieved from http://www.usada.org/us-cycling-athlete-leduc-accepts-sanction-for-anti-doping-rule-violation/

USADA. US cycling athlete Aira accepts sanction for anti-doping rule violation. 2013b Sep 5. Retrieved from http://www.usada.org/us-cycling-athlete-aira-accepts-sanction-for-anti-doping-rule-violation/

USADA. US cycling and triathlon athlete, Teeple, accepts sanction for anti-doping rule violation. 2013c Jun 28. Retrieved from http://www.usada.org/us-cycling-and-triathlon-athlete-teeple-accepts-sanction-for-anti-doping-rule-violation/

USADA. US cycling athlete, Lopez, accepts sanction for violation. 2012a Aug 31. Retrieved from http://www.usada.org/us-cycling-athlete-lopez-accepts-sanction-for-violation/

USADA. Reasoned Decision Of The United States Anti-Doping Agency On Disqualification And Ineligibility. 2012b Aug 24. Retrieved from http://cyclinginvestigation.usada.org/

USADA. US Cycling athlete Stacy accepts sanction for doping violation. 2012c Jun 12. Retrieved from http://www.usada.org/us-cycling-athlete-stacy-accepts-sanction-for-doping-violation/

USADA. Cycling athlete, Diamond, accepts sanction for anti-doping rule violation. 2011 Nov 18. Retrieved from http://www.usada.org/us-cycling-athlete-diamond-accepts-sanction-for-anti-doping-rule-violation/

USADA. Cycling athlete receives sanction for doping violation. 2010a Nov 24. Retrieved from http://www.usada.org/cycling-athlete-receives-sanction-for-doping-violation/

USADA. Decision O'Bee. 2010b Oct 1. Retrieved from http://www.usada.org/testing/results/arbitration-decisions/

USADA. Cycling athlete receives lifetime ban for second doping violation. 2010c Sep 10. Retrieved from http://www.usada.org/cycling-athlete-receives-lifetime-ban-for-second-doping-violation/

USADA. Cycling athlete accepts two-year suspension for doping violation. 2006 Feb 16. Retrieved from http://www.usada.org/cycling-athlete-accepts-two-year-suspension-for-doping-violation/

USADA. U.S. cyclist Bergman accepts provisional suspension from U.S. anti-doping agency. 2004 Jul 28. Retrieved from http://www.usada.org/u-s-cyclist-bergman-accepts-provisional-suspension-from-u-s-anti-doping-agency/

USADA. U.S. Mountain Biker Krause Receives Suspension From U.S. Anti-Doping Agency. 2003a Nov 22. Retrieved from http://www.usada.org/u-s-mountain-biker-krause-receives-suspension-from-u-s-anti-doping-agency/

USADA. U.S. cyclist Neben receives suspension from U.S. anti-doping agency for doping violation. 2003b Oct 6. Retrieved from http://www.usada.org/u-s-cyclist-neben-receives-suspension-from-u-s-anti-doping-agency-for-doping-violation/

World Anti-Doping Agency (WADAa). List of Prohibited Substances and Methods. 2015. Retrieved from https://www.wada-ama.org/en/resources/science-medicine/prohibited-list

World Anti-Doping Agency (WADAb). World Anti-Doping Code. 2015. Retrieved from https://www.wada-ama.org/en/resources/the-code/world-anti-doping-code

Highlights

- There is a range of doping case types within U.S. cycling.
- Cases among amateurs differ from those of high-profile professional cyclists.
- We identify and discuss six case types.
- Cases vary considerably across specific characteristics (age, substance).
- Current anti-doping policies are unsuitable to meet the needs of amateurs.

Table 1

Age of cyclist at time of ban

Range	n
16–20	7
20–30	18
30–40	23
40–50	14
50–60	2
60+	2
Total cases	66

Table 2

Number of ARDVs by year (double counted in cases of multiple violations)

Year	n
2001	1
2002	5
2003	4
2004	5
2005	2
2006	6
2007	2
2008	4
2009	8
2010	6
2011	11
2012	6
2013	7

Table 3

Reason/context for sanction

	n
Tested and caught for PED	50
Sanctioned for other reasons (i.e. missed tests, self-admission)	4
Recreational	12
Total cases	66