Le Tour and Failure of Zero Tolerance: Time to Relax Doping Controls

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Ten years from now, 2007 will be remembered as the year in which the Tour de France died. Race leader and likely eventual winner, Michael Rasmussen, was sacked a few stages from the end on an allegation of doping (without evidence). Pre-race favourite Vinokourov expelled after blood doping and his team Astana withdraw. The Cofidis team withdraw from the Tour de France following the news that their Italian rider Cristian Moreni tested positive for testosterone. Even the eventual winner had to fend off questions about the legality of his victory. The winner's team, which once was home to the Tour legend Lance Armstrong, is disbanding because it cannot secure sponsorship. By all accounts, drug scandals have ripped the sport of professional cycling to shreds. The Tour moved from being the greatest test of human endurance to a petty media-fest of allegations, recriminations and scandals, with the world's best athletes being expelled like shabby contestants in Big Brother.

For the competitors, doping is a part of the spirit of Le Tour. Since it began in 1903, riders have invariably used performance-enhancing substances in an attempt get through the gruelling 21 day test of human endurance. They have taken alcohol, caffeine, cocaine, amphetamines, steroids, growth hormone, EPO and blood doping. Fausto Coppi, who won the golden jersey in 1949 and 1952, summed it up when he was asked whether he ever used amphetamines, or 'La Bomba', and replied, "Only when absolutely necessary." When asked how often that was, he said, "Most of the time." The 1967 Tour saw a rider collapse and die during the competition with amphetamines in his pocket.[1]

The Tour requires a superhuman effort. Bjarne Riis, 1996 Tour winner, admitted taking EPO.[2] The 1997 winner, Jan Ulrich, was later alleged to be taking drugs. Floyd Landis, 2006 winner, was disqualified testing positive for testosterone. The only recent winner of the Tour not to be found taking drugs is Lance Armstrong, but after winning his seventh

[1] Wheatcroft, G. Le Tour.: A History of the Tour de France, London: Simon and Schuster, 2007

[2] Associated Press. (2007)German Team Doctor Admits He Gave Cyclists Testosterone. New York Times. (Late Edition (East Coast)). New York, N.Y.: May 27, 2007. pg. 8.5

Tour, he faced allegations that a frozen sample from his first tour victory had now been found to contain EPO.

Since the 1960s, the idealistic drug crusaders have been on a mission to reverse the course of history, and eliminate drugs from the sport. But this "zero tolerance" strategy to drugs has failed, as this year's tour spectacularly shows. And it is bound to fail. Only around 10-15% of professional athletes are drug tested. There are enormous pressures to win. And the development of new drugs is clearly outstripping our capacity to develop effective tests.

Many modern doping agents like EPO and growth hormone mimic natural hormones and are extremely difficult to detect. If these agents are developed in secret, either by underground labs or by government-funded researchers, there is no way to detect them until samples are discovered by the authorities. The Bay Area Laboratory Cooperative (BALCO) secretly developed the 'designer' steroid THG, and marketed it to elite sportspeople like baseball legend Barry Bonds and athletics superstar Marion Jones. The drug was a well-kept secret, and a test was only developed after a sample was anonymously mailed to the authorities by Jones' coach, Trevor Graham.[3]

As gene doping becomes more efficient, it is likely to offer great opportunities for doping in sport and is likely to be very difficult to detect, whether samples are discovered or not. For example, Insulin-like growth factor injected into the muscles of mice increases strength. Direct injection into the muscles of athletes would be simple and very difficult to detect as DNA would be taken into muscle DNA, requiring muscle biopsy (which is dangerous and difficult) to detect it. Vascular endothelial growth factor stimulates the development of new blood vessels and could also be of use to athletes in the future. EPO genes could be directly integrated into host DNA. Since such gene therapy works in animals, and there is no reason why it could not be attempted by athletes now.

Some people claim that these recent positive tests show we are winning the war on drugs. All prohibitionist policies – on alcohol, prostitution, recreational drugs - will fail because they involve "victimless crimes" and the financial incentives in these activities is so strong. And there is no evidence that the current policy is picking up competent cheaters. Riis was never detected – he confessed. Alexander Vinokourov was ejected from Le Tour this year for blood doping, causing his entire team to withdraw. But it is alleged that he was only picked up because he was using someone else's blood.[4] He would not have been caught if he had used his own blood. Landis is alleged to have used testosterone to win a stage after an appalling performance the day before. But testosterone takes weeks to increase a rider's muscle mass – it does not confer any instantaneous performance enhancement. If it is true that he was using testosterone, a much plausible explanation was that he donated some of his own blood months before, while training but on

[3] Hersh, P. (2006) Graham indicted in BALCO scandal; Track coach who turned in the syringe that led to the doping case is accused of lying to federal agents, becoming the sixth indictment. Los Angeles Times. Los Angeles, Calif.: Nov 3, 2006. pg. D.7

[4] Wyatt, E. (2007) Tour Is Hit With Another Blow as a Favorite Fails a Drug Test. New York Times. (Late Edition (East Coast)). New York, N.Y.: Jul 25, 2007. pg. D.1

testosterone, and that testosterone remained in the blood that was given back during the Tour. He was caught, in that case, because of incompetence. It is likely that many riders in the Tour are doping in one way or another.

There are only two options. We can vainly try to ratchet up our war on doping. Or we can take a rational approach to the use of performance enhancers: allow drugs which are safe and do not corrupt the spirit of a sport, as a display of human physical excellence. How would such a policy have helped the Tour?

Le Tour, Blood Doping and EPO

The ability to perform well in endurance sporting events is determined by the ability to deliver oxygen to muscles. The more red blood cells you have, the more oxygen you can carry. Erythropoietin (EPO) is a natural hormone that stimulates red blood cell production, raising the haematocrit (HCT) -- the percentage of the blood made up by red blood cells. EPO is produced in response to anaemia, haemorrhage, pregnancy, or living at high altitude. At sea level, the average person has an HCT of 40-50 percent. HCT naturally varies – 2.5 per cent of all men have a HCT above 50 percent.[5]

Raising the HCT too high can cause health problems. Your risk of harm rapidly rises as HCT gets above 50 per cent, especially if you also have high blood pressure.[6] When your HCT is over 56 per cent, you are at high risk of stroke, heart and lung failure. In the four years after EPO became available in Europe, twenty cyclists died of sudden and unexpected cardiac problems.[7] Use of EPO is endemic in cycling and many other sports. EPO is extremely hard to detect and its use has continued despite sophisticated testing.

Athletes have also moved back to blood doping, where they donate a unit of their own blood months before and have it retransfused during the race, after their own levels have been replenished. This increases the concentration of red blood cells in the body without leaving any chemical trace, and no physical trace other than, perhaps, a puncture mark, though riders are routinely on intravenous nutrition and hydraion because they cannot eat or drink enough naturally to cope with the demans of today's Tour.

Partly due to the existence of undetectable blood doping, the International Cycling Union requires that athletes to have a HCT no higher than 50 per cent. This criterion casts a net which ensnares those who use inject too much EPO, perform too much blood doping, and those who are born with a naturally elevated haematocrit. Athletes with a naturally elevated level of HCT cannot race unless doctors can prove their HCT is natural. Charles Wegelius was a British rider who was banned and then cleared in 2003. He had had his spleen removed in 1998 following an accident -- since the spleen removes red blood

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[5] Lichtman, M.A. (2006) Williams Hematology. New York: McGraw-Hill Professional. 12

[6] O'Toole, M.L., Douglas, P.S., Hiller, D.B., Laird, R.H. (1999). Hematocrits of triathletes: is monitoring useful? Medicine and Science in Sports and Exercise 31(3): 372-7

[7] Eichner, E.R. (2007) Blood Doping: Infusions, Erythropoietin and Artificial Blood. Sports Medicine. 37(4-5):389-391

cells, this increased his HCT.[8] Finnish cross country skier Eoro Maentyranta won two Olympic gold medals in 1964. Subsequently, it was found he had a genetic mutation that meant that he "naturally" had 40-50 per cent more red blood cells than the average competitor.[9]

There are other ways to increase the number of red blood cells which are legal. Altitude training can push the HCT to dangerous, even fatal, levels. More recently, hypoxic air machines simulate altitude training. The body responds by releasing natural EPO and growing more blood cells, so that the body may absorb more oxygen with every breath. The results of a haematocrit test show no difference whether you elevating your blood count by altitude training, by using a hypoxic air machine, by having an elective splenectomy, or by taking EPO.

At present, the authorities use haematocrit tests to identify people who are cheating, and make special allowances for those who are born different, or who like Wegelius have become different through some medical procedure. In practice, these tests are only capable of catching those who are incompetent at cheating, and even then there is only a small chance that each incompetent cheater will be caught. The present situation is inherently unfair. It is unfair to those riders who have not had their spleen removed. It is unfair to those riders who cheated like all the others, but who were unlucky enough to be tested at the wrong time. And it is unfair to those who cannot afford hypoxic training facilities. The current system rewards the competent cheaters.

A fairer, more effective option would be to forget about finding the cheaters, to forget about making special allowances, and simply measure every cyclist's haematocrit. This would not catch many cheaters, but it would entirely solve the cheating problem. The test is simple, cheap and reliable, and could be done at the beginning of a race. We could pick a safe level for competition. The International Cycling Union currently sets this at 50% but we could revise that. If that is the safe limit, we should let people dope to that limit.

Currently, it is illegal to use EPO or blood doping to move your haematocrit from 48 to 49% (though it is legal to do it by using a hypoxic air machine or altitude training) even though some people will have a normal level of 49%. But if 50% is the safe limit, anyone should be allowed to raise their red cell count to that level and all those above should be excluded for health reasons, even if it is natural (or these people's red cell count could be lowered to safe levels by diluting their blood).

Athletes do not cheat when they take legal performance enhancers like caffeine or creatine. Under blanket haematocrit limits, every blood-based performance enhancer would be like these legal drugs.

A similar strategy could be adopted for anabolic steroids. While we test athletes for unsafe levels of HCT, we could test every athlete for the *symptoms* of dangerous steroid

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[8] Anonymous. (2003)British rider Wegelius cleared of doping. Agence France Presse - English, December 2, 2003 Tuesday, Sports

[9] Roush, W. (1995). An `off switch' for red blood cells. Science 268:27-28.

overuse. This would mean regularly testing each athlete for liver damage, cholesterol, blood pressure and left-ventricle hypertrophy, which increases the risk of heart attack and sudden cardiac death.[10]

It makes no moral difference whether an athlete has liver damage or high cholesterol from steroids or from poor diet. If their cholesterol level puts them at risk of death during intense athletic competition, they should be excluded for safety reasons. Conversely, if their use of steroids has not produced symptoms of harm, they ought to be allowed to compete, regardless of whether or not they are clean.

A regulated permissive policy would paradoxically reduce risk to athletes. The present system creates an environment of risk to the athlete. Since nearly all doping is illegal, the pressure is to develop undetectable performance enhancers with no mind to safety. Furthermore, the penalties are the same no matter what dosage an athlete takes, and no matter how effective the drug is, so athletes are forced to take massive doses of the most effective drugs. Performance enhancers are produced on the black market and administered in a clandestine, uncontrolled way with no monitoring of the athlete's health. Allowing the use of safe performance enhancers would make sport safer as there would be less pressure on athletes to take unsafe enhancers. Blanket safety testing of every athlete would create a powerful incentive to limit the use of existing enhancements to safe doses. If the safe doses were ineffective at producing a performance benefit, it would create a powerful pressure to develop new performance enhancers which are effective at a safe dose.

Allowing the safe use of performance enhancers would not eliminate risk to athletes' health but it could reduce it to an arbitrarily low level. If we make sure to test *every* athlete for medical indications of risk, it will become more difficult for cheaters to endanger their health by using unsafe dosages or toxic enhancements. Such a system would be effective against most clandestine undetectable drugs.

Enhanced Recovery and Athlete Health

Sporting bodies, pundits and players often talk about what's good for their sport. Drugs are often said to be bad for a sport. But this is an oversimplification. Any change – whether technological, regulatory or pharmaceutical – can be good for players and bad for fans, or vice versa. Whether a drug is good for the fans or for the players depends on what kind of drug it is.

Sometimes, a technology or method of training appears which is good for both the players *and* the spectators. Ironically, the two best examples of such a win-win technology are the most infamous performance enhancements available – anabolic steroids and EPO.

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[10] Mottram, D.R. (1996) *Drugs in Sport, Second Edition*. London: Taylor and Francis.

One of the effects of steroid use is that it aids players in recovering from injury and training. Accelerated recovery is an artificial enhancement, but it is not the type of enhancement that makes anybody worse off. To the contrary, when an athlete takes a long time to recover from injury, it is bad for everyone – his fans, his teammates, and the athlete himself.

Players have often used steroids with this recuperative purpose in mind. Ben Johnson said in a radio interview that the human body was not designed to run the speeds it is called upon to run now, and steroids were necessary to recover from the gruelling training and injuries.

The American baseball player Chad Fox said this in 2003, in the midst of Major League Baseball's recent doping scandals:

> With all the injuries I've had, I could have taken steroids. But my family is too important. (Bloom 2003)[11]

When he made this statement, Fox was referring to the period before testing began, so he could not have meant that his family would suffer if he was banned for doping. He meant that his family would be put at grave risk by the side-effects steroids would have on his body. But this reflects a gross exaggeration of the dangers of steroid use. Doctors regularly prescribe anabolic steroids to 'civilians' who are recovering from injuries or surgery. Taken in clinical doses, anabolic steroids are extremely safe and effective at reducing recuperation time.[12] In order to elicit both the muscle-building effects of steroids and its famous health-endangering side-effects, an athlete must take very large quantities of the drug.

In other words, if Fox had taken the steroids in modest doses, it would have only lengthened his career and helped him to recover from injuries, which would have been good for the spectators, for Fox, and certainly it would have been good for his family.

EPO is medically beneficial in a similar way. To train in any professional athletic sport is very demanding – in fact, it could be compared to a medical pathology. Female athletes training in intense sports like cycling are at high risk of developing a dangerously low haematocrit, also known as anaemia.[13] Various unrelated complaints can also cause anaemia in male athletes. These athletes would be healthier and safer if their haematocrit was artificially buoyed with EPO. In both men and women, EPO would also be beneficial if their haematocrit were genetically or medically depressed. EPO also has a number of

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[11] Bloom, B. M. (2003). "Many players applaud testing." MLB.com Retrieved August 13, 2007, from http://www.mlb.com/news/article.jsp?ymd=20031114&content_id=604197&vkey=news_mlb&fext=.jsp&c_id=mlb

[12] Evans, N. A. (2004). "Current concepts in anabolic-androgenic steroids." Am J Sports Med 32(2): 534-42.

[13] Ireland, M.L., Ott, S.M. (2004) Special concerns of the female athlete. Clinics in Sports Medicine 23(2):281-298

beneficial effects which are not related to its ability to increase HCT. For example, EPO has been shown to stimulate wound healing in mice.[14]

We need to acknowledge that training is very hard on the human body. Intense training for a sport like cycling causes traumatic injuries, stress injuries, inflammation and immunosuppression.[15] It is similar to a medical pathology. If we are serious about protecting the health of athletes, we need to make available the treatments which doctors would prescribe for a pathology of this nature. Like steroids and EPO.

The Spirit of Sport

Sport is the pursuit of human physical excellence (skill or strength) in a rule governed activity. The rules of sport are: (1) arbitrary; (2) define the nature of the activity to bring out the display of certain skills or strengths; (3) allow for meaningful comparison in competitive sport to determine who is better.

The central objection to doping is that taking performance enhancers is in itself cheating because it is against the spirit of sport. This is false. We already allow many technologies which significantly enhance performance. Caffeine is not illegal, even though it can strongly increase performance. In endurance sports, caffeine helps to mobilize the fat stores of an athlete.[16] It can make as much as a 20% difference in the time to exhaustion among competitive athletes, depending on how the trial is performed.[17] In the context of elite sport, that is a massive difference. The legal dietary supplement creatine is similar to the banned drugs EPO, growth hormone and testosterone, in that it supplements an endogenous substance. Creatine's other similarity to the banned drugs is that it is effective – it can increase an athlete's time to exhaustion in anaerobic exercise by over 10%.[18] [19] The reason that these performance enhancers are permitted is because they are safe. It is inconsistent not to allow other performance enhancers if they are safe enough.

Of course we do not wish to argue that athletes should employ any and every technology in order to gain a competitive advantage. If we allow cyclists to ride the Tour on motorcycles, they can win even if they are fat, old and unfit. But if we allow cyclists to ride the Tour on steroids or EPO, they will only win if they are strong, fit and fast. These drugs do not subvert the nature of the sport; indeed, they encourage athletes to become paragons of the sporting ideal: supermen.

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[14] Sayan H., Ozacmak VH., Guven A., Aktas RG., Ozamak ID. Erythropoietin stimulates wound healing and angiogenesis in mice. J Invest Surg. 19(3):163-73 2006

[15] O'Kennedy, R. (2000). The immune system in sport: getting the balance right. Br J Sports Med 34:161

[16] Costill, D., Dalsky, G., Fink, W. Effects of caffeine ingestion on metabolism and exercise performance. Med Sci Sports Exer 10:155-158, 1978

[17] Passman, W.J., van Baak, M.A., Jeukendrup, A.E., de Haan, A. (1995) The Effect of Different Dosages of Caffeine on Endurance Performance Time. Int J Sports Med. 16:225-230

[18] Bosco C and others. Effect of oral creatine supplementation on jumping and running performance. International Journal of Sports Medicine 18:369-372, 1997.

[19] Prevost MC, Nelson AG, Morris GS. Creatine supplementation enhances intermittent work performance. Research Quarterly for Exercise and Sport 68:233-240, 1997.

Cycling better than any other sport shows that drugs can be a part of the culture of that sport and not prevent the display of human physical excellence– doping is as old as human competition and the Tour, because of the superhuman demands it makes, is just a very vivid example of that.

A Rational Doping Policy

A rational policy on doping would allow safe performance enhancing interventions which are consistent with the spirit of a particular sport. Firstly, we should develop safer performance enhancing drugs or interventions. These need to be as effective as riskier options. Ideally, they need to be no more effective when taken in harmful megadose quantities. They need to be provided at a competitive price.

Secondly, we should focus detective efforts on those drugs and practices which detract from the athlete's project – enhancing his body's performance. Some changes, like allowing swimmers to use flippers, would reduce the importance of athleticism in a sport. But blood doping in cycling does not.

Thirdly, we should test *every* athlete to make sure they are fit to compete – regardless of whether or not they are using drugs It is far easier to test haematocrit (the amount of red blood cells in the blood), and set a safe level (such as 50%) and ban anyone who is above that level and at risk, than it is to detect the cause of that elevation, which could be natural, autotransfusion, use of hypoxic air tent, gene doping or exogenous EPO. It is also relatively easy to test for liver damage, blood pressure and cholesterol. We should test heart structure and function, not to see if athletes are guilty of taking steroids, but to make sure they aren't at risk of heart attack. We could also test immunocompetence, testosterone levels and joint structure and function – all of which can be influenced by steroid overuse or simply by training too hard.

In Australia, boxers are excluded from competition if they have measurable brain damage on magnetic resonance imaging. But recent results suggest that their brains could also be protected by prescribing EPO, which provides protection against traumatic brain injury.[20]

The question is: what risks should athletes be exposed to? It is not: what is the origin of that risk? Setting the acceptable risk level for performance enhancing drugs should be consistent with the magnitude of risk which athletes are allowed to entertain in elite sport. Elite sport can be extremely harmful. More riders die in crashes than from drugs. Even clean elite athletes have to accept serious harms to be competitive. There is nothing special about a drug-related risk which demands that we intervene, when we permit these unnecessary non-drug risks to exist.

Concern for athletic welfare should be paramount. But taking drugs is not necessarily cheating. The legalization of some drugs in sport may be fairer and safer. There is nothing wrong with an enhanced competition.

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[20] Verdonck, O., Lahrech, H., Francony, G., Carle, O., Farion, R. et al. Erythropoietin protects from post-traumatic edema in the rat brain. Journal of Cerebral Blood Flow and Metabolism. 27:1369-1376. 2007.

The limits to the use of drugs and other performance enhancers in sport should be on safety grounds, based on a consistent comparison with other risks taken in elite sport, and their use should not diminish the need for athleticism in the athlete (e.g. using flippers in swimming or motorcycles in cycling) and the spirit of a particular sport as a display of a human physical excellence.

We should redirect scarce resources away from the war on drugs to be used to protect athletes' health and be less concerned with whether some biological substance or intervention improves performance, per se. Zero tolerance to performance enhancement has failed and it is unfair, unsafe and ruining the sport.

Jacques Anquetil during a TV debate, asked a French politician if "they expect us to ride the Tour on mineral water."[21] But today we demonise the men who courageously push themselves to the human limit and beyond. We should admire them, rather than denigrate them. They give us the spectacle we want, and we complain when they push themselves to the limits we expect.

Cheating occurs when the rules are broken. But we set the rules. The rules should define the nature and spirit of a sport, protect athletes' health, provide a reasonable spectacle and be enforceable in a fair and reasonable way. The rules should allow athletes to access medicines which protect their livelihood and help them to recuperate. The current rules are not enforceable. They are ruining the spectacle of cycling and they are ruining the sport for the cyclists as well. We can achieve these goals better with a more regulated permissive approach to doping.

We have two choices: to vainly try to turn the clock back, or to rethink who we are and what sport is. Our crusade against drugs in sport has failed. Rather than fearing drugs in sport, we should embrace them. Performance enhancement is not against the spirit of sport; it is the spirit of sport. To choose to be better is to be human.

[21] Wheatcroft, G. (2005) Lance Boiled. Wall Street Journal (Eastern edition). New York, N.Y.: Aug 26, 2005. p. A.12