Sports Pharmacy

DECODING THE SCIENCE OF ELITE HUMAN PERFORMANCE

ISSUE 12 | JULY 2024

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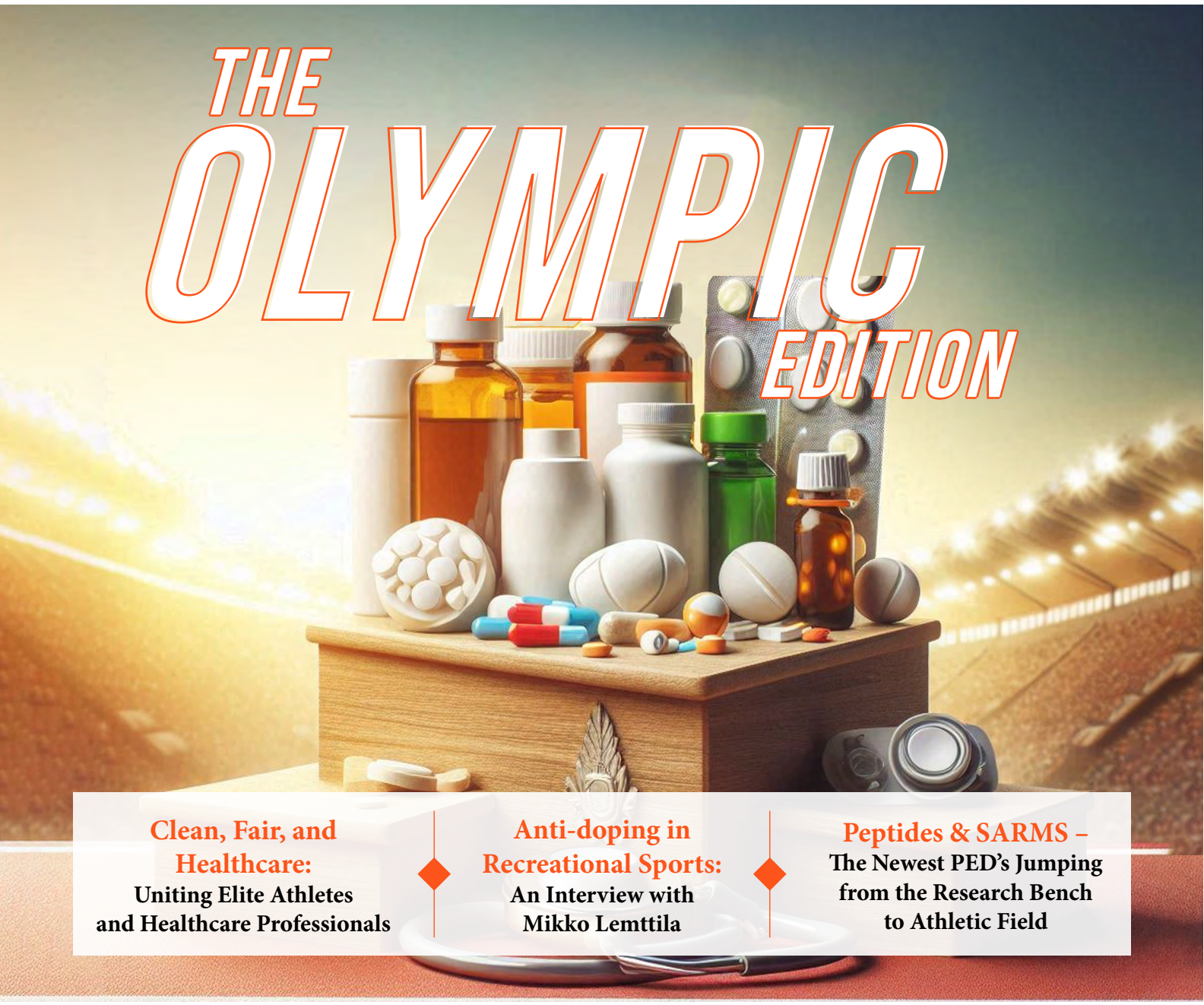

THE OLYMPIC EDITION

Clean, Fair, and Healthcare:
Uniting Elite Athletes and Healthcare Professionals

Anti-doping in Recreational Sports:
An Interview with Mikko Lemttila

Peptides & SARMS –
The Newest PED's Jumping from the Research Bench to Athletic Field

Letter From the President

Dear Sports Pharmacy Magazine Subscribers,

As the Paris 2024 Olympic Games commence, it is with great pride and enthusiasm that I write this message on behalf of the Sports Pharmacy Network (SPN). These games, held in the heart of Paris, symbolize not just the pinnacle of athletic achievement, but also the enduring spirit of global unity and cooperation. We extend our gratitude to the people of France for their warm hospitality and their commitment to hosting a safe and memorable Olympics.

The Olympics have always been a beacon of hope and inspiration, showcasing the best of humanity through the universal language of sport. Athletes from every corner of the globe have gathered for this event, each representing their nations with pride and determination, embodying the values of excellence, respect, and friendship. SPN is delighted to be another added resource to help protect the health and safety of an athlete's career.

To the young people watching these Games, I hope you are inspired by the incredible feats of athleticism and the stories of determination you will witness. Let these Olympics ignite your passion, encourage your dreams, and remind you that with hard work and dedication, anything is possible.

As we cheer for our athletes, let us also remember the true essence of the Olympics – celebrating diversity, fostering mutual understanding, and promoting peace. Let us be champions of these ideals in our daily lives, striving to create a world where everyone has the opportunity to reach their full potential.

In closing, I wish all the athletes the very best in their competitions. May these Games be a source of joy, inspiration, and unity for all. Together, let us make the Paris 2024 Olympics an unforgettable celebration of the human spirit.

Thank you, and may God bless the United States of America and the global Olympic community.

In health and performance,

Brandon Welch, PharmD, CPh, CWC
President, Sports Pharmacy Network
Clinical Sports Pharmacist

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DISPENSING THE SCIENCE OF ELITE HUMAN PERFORMANCE

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Peptides & SARMS – The Newest PED's Jumping from the Research Bench to Athletic Field

My Experience as the First Team Pharmacist for the US Olympic Medical Team: Athens 2004

By Robert Nickell

AUTHOR BIO:

Dr. Robert P. Nickell is the founder and current CEO of Nubratori Inc, dba Nubratori RX, a startup 503B FDA Outsourcing Facility, registered in Torrance, California. He is a licensed pharmacist in multiple states and a graduate of the University of Pacific School of Pharmacy in 1981. He is a past president of the California Pharmacists Association, former Pharmacist of the Year, and Innovative Pharmacist of the Year. From 2002 to 2008, Robert was the first pharmacist to serve as the official sports pharmacist for the US Olympic Training facilities as well as the Olympic games. He was designated the first pharmacist to serve on the USA Medical Team for the 2004 games in Athens.

Twenty years ago, I had the unique opportunity to serve as the first team pharmacist for the US Olympic medical team during the Athens 2004 Olympic Games. This experience was not only a professional milestone but also a deeply personal and memorable adventure.

Arrival in Athens

I embarked on this journey alone, flying from Los Angeles to Athens. Upon arrival, I felt a mixture of excitement and nervousness as I searched for someone holding a "USA Olympic" sign. After finding my escort, I was taken to the Athens University campus, which served as the USA training center for the Games. The campus was heavily secured with barricades, a guard shack, and armed personnel to protect the athletes and the team.

Credentialing and Setup

The first step was credentialing, where my picture and fingerprints were taken. I received a lanyard and name tag, which granted me access to various facilities, including the Olympic Village. Our main operations were based in an athletic building on campus, which we transformed into the temporary headquarters for the USA Olympic medical team. Alongside a primary physician, chiropractor, massage therapist, and me as the pharmacist, we set up treatment tables, training room equipment, and other necessary items needed to assess and keep our athletes healthy.

I was assigned a room to set up the dispensary. After arranging cabinets, setting up a computer, and organizing the medication, we were ready to support the athletes. The medications I had shipped from California were crucial for treating various ailments the athletes might encounter.

Accommodation and Daily Routine

We stayed in nearby apartment buildings,

> *Those 30 days in Athens, 20 years ago, remain a highlight of my life, filled with unforgettable moments and invaluable lessons.*

sharing space with other members of the US Olympic administration, directors, and some athletes. My roommate was a chiropractor, and we quickly learned to adapt to our small room and the challenging air conditioning system.

Each day, we commuted by van to the training facility, where we treated athletes for blisters, skin infections, rashes, and occasional coughs and colds. It was my responsibility to review Therapeutic Use Exemptions (TUEs) and ensure all substances were compliant with regulations. Additionally, I managed a satellite dispensary at the Olympic Village for athletes in competition.

Life in the Olympic Village

The Olympic Village was a fascinating place, bustling with athletes from all over the world. Each athlete was a perfect representation of their sport, and seeing them together was inspiring. The Village had a massive cafeteria offering every type of food imaginable to cater to the high caloric needs of these elite athletes.

At our USA headquarters, I implemented a system using blister packs with barcodes and scanners to manage medication distribution efficiently. This ensured that team physicians had the necessary medications, even for competitions held far from the main site.

Watching athletes from diverse countries compete with such passion was both thrilling and humbling.

USOC Medical Staff
Games of the XXVIII Olympiad
Athens, Greece

Supplies and Logistics

Maintaining an adequate supply of medications was a constant challenge. I coordinated with our pharmacy in California to have medications shipped regularly through the Olympic service provider. Despite the time difference, this system worked smoothly, ensuring that our athletes had everything they needed.

Memorable Moments and Friendships

One of the highlights was receiving the official team outfit, identical to what the athletes wore. These items, from hats to luggage, remain cherished mementos of my time in Athens. Over the weeks, I became more comfortable navigating the city and even picked up some basic Greek to communicate with taxi drivers.

The friendships I forged during this time are lasting and continue to enrich my life. The security measures were stringent, with snipers and lookouts protecting us around the clock. High-profile visits, such as from the US Secretary of State and the Ambassador of Greece, added to the significance of our mission.

Compounding and Treatments

I prepared several compounds on-site, including a blister rub for treating heat and humidity-related blisters, a WasabiRub, for warming up muscles, and a ketoprofen-based anti-inflammatory topical, KetoRub. These formulations were essential for the athletes' preparation and recovery.

The Olympic Experience

Attending the games was an exhilarating experience. The energy in the stadiums was indescribable, far surpassing even the most intense college or professional sports events. Watching athletes from diverse countries compete with such passion was both thrilling and humbling.

Reflection

Looking back, I never imagined such an opportunity would come my way. Being part of the US Olympic medical team was a chance I didn't seek but gladly embraced. It was a once-in-a-lifetime experience that I will always cherish. Those 30 days in Athens, 20 years ago, remain a highlight of my life, filled with unforgettable moments and invaluable lessons.

This extraordinary experience reinforced my belief in being open to unexpected opportunities and the incredible places they can lead.

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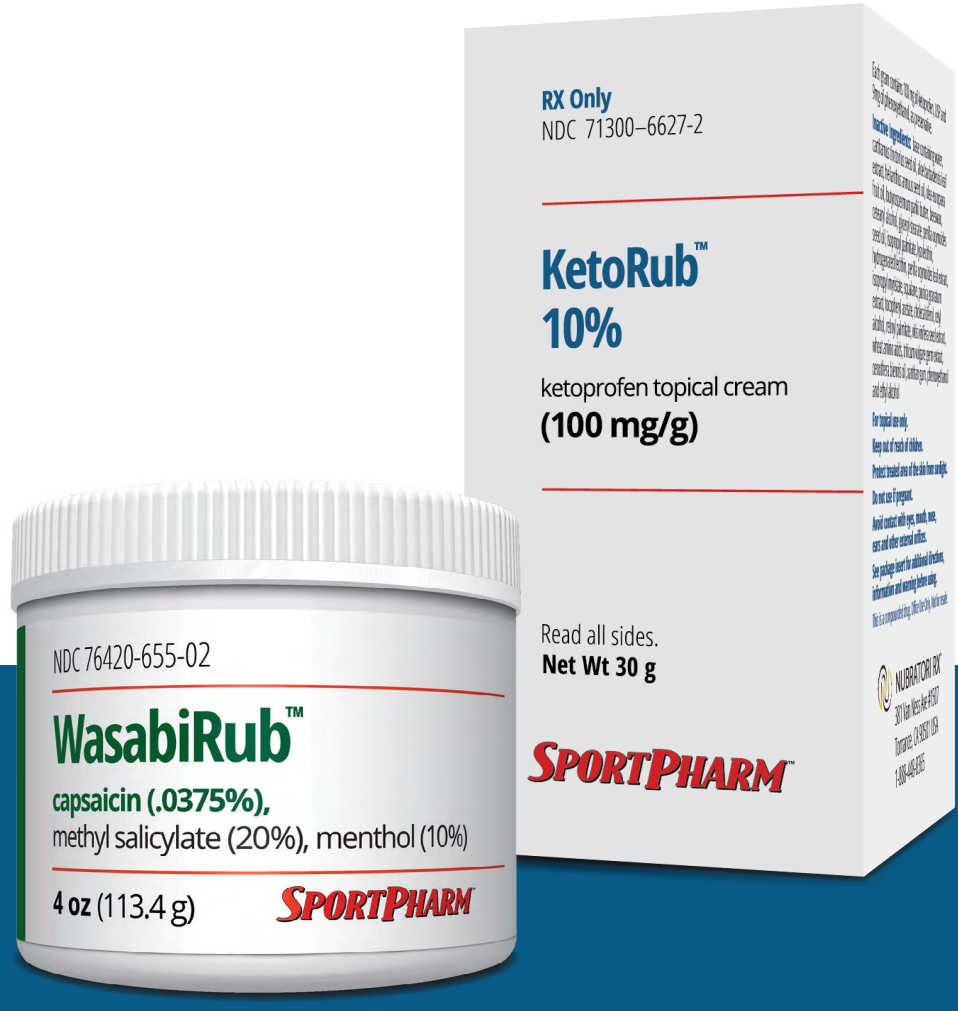

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Clean, Fair, and Healthcare:

Uniting Elite Athletes and Healthcare Professionals

By United States Anti-Doping Agency (USADA)

AUTHOR BIO:

The U.S. Anti-Doping Agency (USADA) is recognized by the United States Congress as the official anti-doping organization for all Olympic, Paralympic, Pan American, and Parapan American sports in the United States. USADA began operations on October 1, 2000, as an independent, non-profit organization governed by a Board of Directors. USADA was given full authority to execute a comprehensive national anti-doping program encompassing testing, results management, education, and research while also developing programs, policies, and procedures in each area.

Setting the Stage

Over the years, USADA has allocated millions of dollars for cutting-edge scientific research aimed at understanding and effectively combating the use of performance-enhancing drugs. USADA has also collected and managed the results of thousands of anti-doping tests utilizing independent World Anti-Doping Agency (WADA)-accredited laboratories that provide the most sophisticated analysis. USADA's efforts to protect clean athletes have been instrumental in numerous international investigations, including the steroid bust, Operation Raw Deal, and the BALCO laboratory conspiracy in San Francisco. USADA also led the investigation into systemic doping in the sport of cycling, primarily through its investigation of the US Postal Service Pro-Cycling Team doping conspiracy. USADA continues to aspire to be a leader in the global anti-doping community to protect the rights of clean athletes and the integrity of competition worldwide.

Who Makes the Rules?

As a signatory to the World Anti-Doping Code (the Code), USADA complies with all the International Standards developed by WADA in order to harmonize anti-doping efforts worldwide. The Code was first implemented in 2004 and is amended approximately every six years (2009, 2015, and 2021). The latest version of the Code has been in effect since January 1, 2021.

WADA reviews and publishes the Prohibited List (the List) each year following an extensive consultation process. A substance or method is included on the List if it meets at least two of the following three criteria:

- It has the potential to enhance or enhances sport performance;
- It represents an actual or potential health risk to the athlete; or
- It violates the spirit of sport.

Athlete Responsibilities

Athletes must comply with USADA policies and the WADA Code, which means they are subject to testing 365 days a year, allowing athletes to be selected for testing both at a competition (in-competition testing), or out-of-competition without any advance notice and at any time and any location. Athletes in the testing pool must submit and update their Whereabouts information, which includes details such as overnight location, training schedules, and competitions.

Under the Code, athletes are strictly liable, meaning they are responsible for what is found in their system regardless of their intent or how it got there. To ensure compliance with the anti-doping rules, athletes are responsible for checking the prohibited status of over-the-counter (OTC) and prescription substances and methods before use. This can be done independently and/or with their healthcare professional using the Global Drug Reference Online, or Global DRO,

resource (GlobalDRO.com). This database allows users to search prohibited methods, substances, or active ingredients found in prescription and OTC medications.

If, after checking Global DRO an athlete finds that a needed substance or method is prohibited, they must check with USADA to determine if a Therapeutic Use Exemption (TUE) is needed. Athletes should work with their treating healthcare professional to apply for a TUE and ensure this plan best meets their needs. With guidance and support from healthcare professionals, athletes can feel confident about operating under the Code, while prioritizing their medical needs.

Why Athletes Need Trained Healthcare Professionals

Healthcare professionals working with athletes play an important role in preserving the integrity of competition and ensuring compliance with anti-doping rules. In addition to helping athletes uphold clean sport, healthcare professionals who treat recreational and/or elite athletes governed by WADA rules are also subject to anti-doping policies. Failure to adhere to these policies can result in anti-doping rule violations and sanctions for the athlete and healthcare professional(s) treating the athlete.

USADA wants to remind an athlete's healthcare team of their great responsibilities when treating this demographic. Because athletes are strictly liable for everything that enters their body, they can receive a sanction for any prohibited substances and methods declared or detected in a blood and/or urine sample. The WADA Prohibited List identifies more than 300 substances and methods, including but not limited to steroids, diuretics, inhalers, stimulants, intravenous infusions, injections, and common cold and allergy medications. A healthcare provider's prescription alone is insufficient justification for an athlete to use a prohibited medication in the context of sport.

Dietary supplements also pose a risk to athletes. Supplements are not regulated like prescription medications and can be contaminated with ingredients not listed on the label. Because athletes are strictly liable for everything that enters their system, athletes can still receive anti-doping rule violations for unknowingly using contaminated supplements.

How to Learn and Succeed

USADA wants to equip healthcare professionals with tools and resources to ensure they, and the athletes they support, are aware of their anti-doping responsibilities. Some of the most beneficial resources include HealthPro Advantage, the USADA Drug Reference Team, and Supplement Connect.

HealthPro Advantage

HealthPro Advantage was created as a resource for any healthcare provider or professionals in all fields, from orthopedics to sports medicine, interacting with athletes. The course is particularly valuable to medical professionals because they are on the front line treating and advising elite and/or recreational athletes governed by the Code and are similarly subject to those anti-doping policies and rules. HealthPro Advantage is free for all healthcare professionals, and participants can earn a certificate for successfully completing the course modules, tests, and evaluations. The course covers six key areas of anti-doping knowledge:

- Anti-Doping Roles and Responsibilities
- The WADA Prohibited List
- Therapeutic Use Exemptions (TUEs)
- Dietary Supplements
- The Sample Collection Process
- Major Games Anti-Doping Specific Information

USADA's Drug Reference Team

USADA's Drug Reference Line provides a personal resource for understanding prohibited substances and methods based on the List. An expert is available to answer questions about a substance or method's status, when a Therapeutic Use Exemption (TUE) is needed, and how that process can be started and carried out. USADA also encourages healthcare professionals to check the status of those medications or methods on GlobalDRO.com.

Supplement Connect

Supplement Connect is USADA's dietary supplement safety education and awareness resource. While USADA has a long history of working to improve dietary supplement safety, the reality is that the use of dietary supplements can be risky, and that awareness and caution must be exercised when considering their use.

If athletes choose to use supplements despite the known risks, USADA recommends that athletes use only dietary supplements evaluated by a third-party program that tests for substances prohibited in sport. Visit Supplement Connect on USADA.org to better understand the dietary supplement industry and learn about which third-party certification USADA currently recognizes. Supplement Connect is designed to help you:

- Realize there are safety issues with dietary supplements.
- Recognize risk when you see it.
- Reduce your risk of testing positive and experiencing health problems by taking concrete steps.

> *USADA continues to aspire to be a leader in the global anti-doping community to protect the rights of clean athletes and the integrity of competition worldwide.*

Road to Paris

With the Paris 2024 Olympic and Paralympic Games approaching in July, the importance of clean and true sport is even more prominent on the world stage. USADA hopes that Team USA athletes and athlete support persons can act as informed advocates for clean sport in the global setting.

During the Games, the International Olympic Committee (IOC) has delegated the anti-doping testing authority to the International Testing Agency (ITA) for the Olympic Games. The International Paralympic Committee (IPC) will have an anti-doping testing authority for the Paralympic Games. Between April 18, 2024, and July 17, 2024, the IOC, or the ITA on its behalf, can begin pre-Games testing of the athletes. This means, in addition to USADA's standard testing protocol, an athlete can be tested by USADA on behalf of the ITA, in the United States, during this time.

Athletes and healthcare professionals alike should also be aware of specific rules on volume limits for injections/infusions, as well as specific Game rules on the banning of hypoxic tents/devices from the Athletes' Village and a no-needles policy during the Olympic Games (not applicable during the Paralympic Games).

An athlete's health and well-being remain a top priority. In the event an athlete is required to ingest a prohibited substance or method for an emergency, a TUE will be granted during the period of the Games. However, if an athlete has an existing TUE on file for an existing medical condition, they must ensure it is approved, up to date, and recognized by USADA or an International Federation before the period of the Games. USADA will work with the appropriate organizations (ITA for the Olympics and the IPC for the Paralympics) to ensure the documentation is valid.

Ultimately, it remains the athlete's responsibility to ensure compliance with the anti-doping rules leading up to and during the Games.

Why it all matters

Doping is both a health issue and an ethics issue. Performance-enhancing drugs can be extremely dangerous and even deadly. In addition to endangering their own health, athletes who dope seek to gain an unfair advantage over their competitors, thereby undermining their competitors' hard work and threatening the credibility of their sport. This win-at-all-costs attitude violates the underlying values that make sport meaningful to society. Clean sport is worth fighting for at every level of competition, and we are all responsible for creating a culture of clean sport.

USADA continues to aspire to be a leader in the global anti-doping community to protect the rights of clean athletes and the integrity of competition worldwide. Our mission is to stand with athletes to champion their right to clean sport, inspire true and healthy sport, and promote the integrity of sport. USADA truly believes every athlete has a right to fair competition and deserves an opportunity to learn the life lessons and values taught by sport. With an educated healthcare team, we are all one step closer to a fair, level, and safe playing field.

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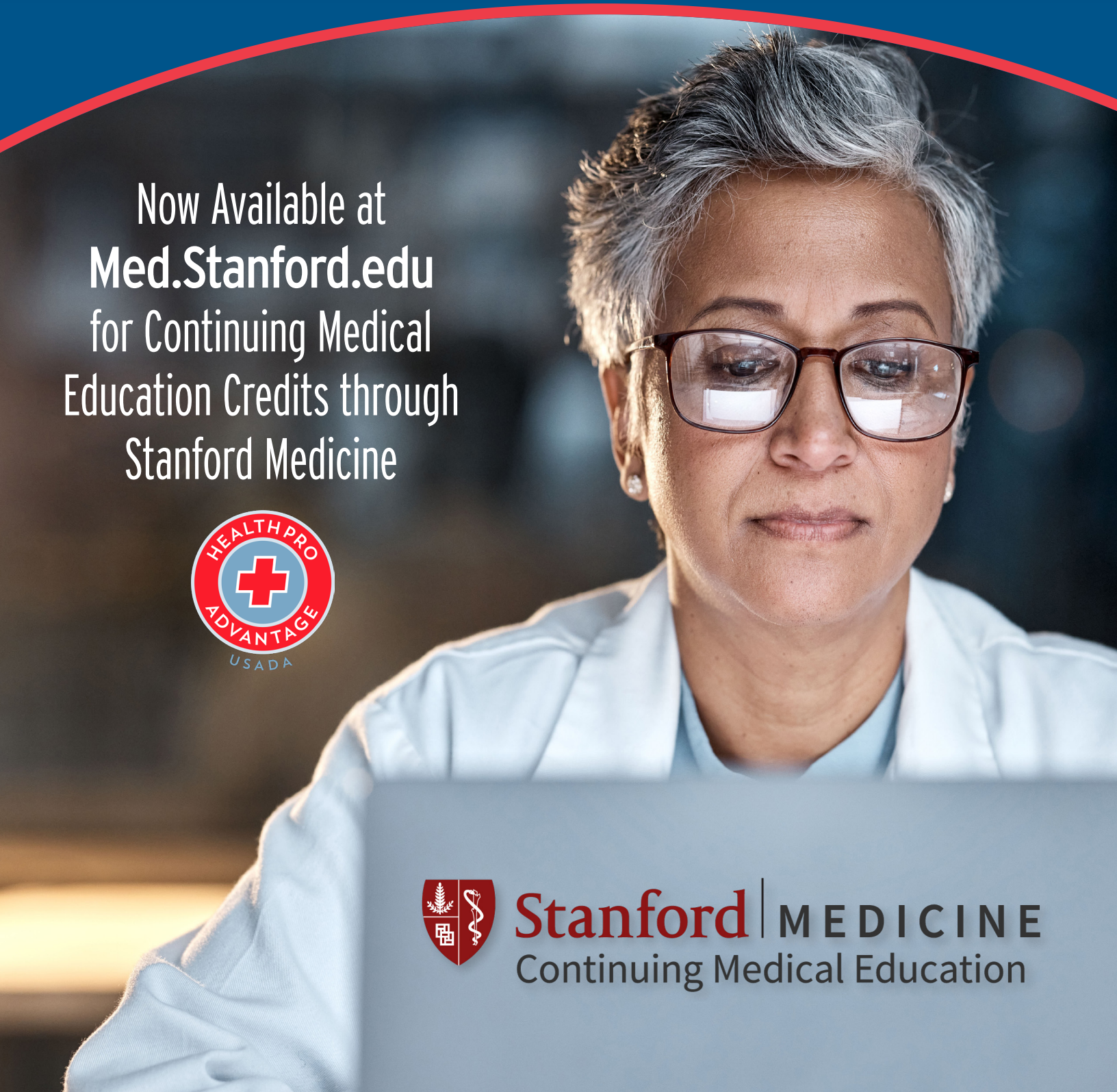

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Understanding and Navigating the Therapeutic Use Exemptions (TUEs)

By Jessica Beal-Stahl, PharmD.

As an athlete, you are solely responsible for whatever is in your body at all times.

AUTHOR BIO:

Jessica Beal-Stahl, PharmD, is the dynamic force behind The Athlete's Pharmacist, a pioneering clinical sports pharmacy venture. Passionately intertwining her love for athletics, holistic wellness, and pharmaceutical expertise, Jessica collaborates with athletes privately while providing consultancy services to teams and organizations. A proud alumna of Mercer University, she earned her Doctor of Pharmacy in 2009 and has since served as the Director of Clinical Services at Hobbs Pharmacy in Merritt Island. She oversees a thriving compounding department and spearheads comprehensive health and wellness initiatives there. With a rich athletic background spanning from D1 Volleyball to international accolades and medals in Olympic Weightlifting, Jessica brings a unique understanding of elite sports performance. Her extensive qualifications include certifications in women's health, compounding, integrative medicine, sports nutrition, and nutrigenomics, reflecting her commitment to holistic athlete care.

Understanding Therapeutic Use Exemptions (TUEs) is crucial for athletes and healthcare providers to ensure fair play and athlete health. TUEs allow athletes with legitimate medical conditions to use otherwise prohibited substances and ensure they receive necessary treatments without violating anti-doping regulations. Awareness and proper management of TUEs are essential to protect athlete health, uphold the integrity of sport, and prevent potential sanctions that could arise from unintentional rule violations. This article aims to explain the importance of TUEs, outline the basic process, and highlight the roles of healthcare providers in safeguarding athletes' health while adhering to anti-doping policies.

TUEs have been available to Olympic athletes since the 1980s. The need arose when the International Olympic Committee (IOC) prohibited several classes of drugs used in common medicines, such as diuretics, beta-blockers and corticosteroids. Initially, the mechanism was kept relatively quiet and was not included in the Medical Code of the Olympic Movement until 1991.

Some critics claim the TUE process is easily abused by athletes, and the legitimacy of these exemptions has been questioned at all levels. However, it's important to note that the TUE process is designed to be fair and transparent, with strict criteria that must be met. According to a Danish study that surveyed 645 Danish athletes, 51% felt that their teammates who held a TUE did not have a legitimate medical need. [1]

World Anti-Doping Agency (WADA) conducted a study to determine if there was a connection between having a TUE and the increased likelihood of winning a medal. The study examined the prevalence of TUEs at five different summer and winter games between 2010 and 2018. According to the study, athletes with TUEs were no more likely to win a medal than those without.[2]

Please note that while WADA will be referenced in this article, it's important to understand that some athletes may fall under a different governing body's anti-doping program and/or drug list. This means that the rules and regulations they need to follow may be different. All organizations don't follow the WADA Prohibited List and use a different agency to curate their own prohibited list. As an athlete and/or healthcare professional, it's crucial to refer to the athlete's governing body's specific guidelines. In some cases, athletes may have two different governing bodies that need to be consulted/applied, such as an athlete competing under Team USA and NCAA.

What is a Therapeutic Use Exemption?

A TUE is a certificate granted by an anti-doping organization. An application is

submitted, reviewed, and then if approved by a TUE committee, gives an athlete permission to take a medication or use a method to treat a legitimate condition in which no equal or alternative is available and that is ordinarily prohibited. A TUE can be for a specific prohibited substance, in certain dosages, with a limited period of validity permitting the athlete to take the defined medication while competing without registering a doping offense. Not only can TUEs be granted for using prohibited substances, but prohibited methods may be medically necessary for some athletes. Some examples of prohibited methods include the manipulation of blood and blood components, chemical and physical manipulation, and gene and cell doping. The use of TUEs is carefully monitored to avoid any abuse or manipulation. A healthcare professional's prescription alone is insufficient justification for an athlete to use a prohibited medication or method in the context of sport.

What are the criteria for granting a TUE?

All of the four following criteria must be met:

1. The athlete has a clear diagnosed medical condition, that requires treatment using a prohibited substance or method;
2. The therapeutic use of the substance will not, on the balance of probabilities, produce significant enhancement of performance beyond the athlete's normal state of health;
3. The prohibited substance or method is an indicated treatment for the medical condition, and there is no reasonable permitted therapeutic alternative;
4. The necessity to use that substance or method is not the consequence of the prior use (without a TUE), of a substance or method which was prohibited at the time of use.

For more details, please refer to the WADA International Standard for Therapeutic Use Exemptions (ISTUE) Article 4.2.

What is the Prohibited List?

The Prohibited List (the List) is a document listing all substances and methods prohibited in sport. It is produced by the World Anti-Doping Agency (WADA) and updated at least annually. The new List is published in October of each year and comes into effect on January 1 of the following year.

The List contains many unexpected medications, such as insulin, a necessary peptide hormone that Type 1 diabetics do not produce on their own.

The List also contains a list of banned performance-enhancing techniques, often referred to as methods. An example of this would be found in the historic case of Lance Armstrong and the use of blood transfusions.

Athletes and their support personnel must check the List regularly –specifically when it is updated and before the athlete takes any new medication.

Athletes and their support personnel must understand what substances are permitted, their dosage amounts, and under which conditions. Some medications are prohibited in certain doses and by certain routes of administration. For example, an asthma inhaler may be allowed, but in limited dosage and for a fixed time period.

The List is divided into three categories:

- Substances and methods that are always prohibited, both in-competition and out-of-competition
- Substances and methods that are prohibited only during the in-competition period
- Substances and methods that are prohibited only in certain sports

WADA will consider the following questions when determining whether a substance or method should be added to the List:

1. Does the substance or method have the potential to enhance sports performance?
2. Does the substance or method represent an actual or potential health risk to athletes?
3. Does the substance or method violate the spirit of sport?

Who needs a TUE?

Athletes subject to anti-doping rules would need a TUE if they must take a prohibited substance or use a prohibited method for therapeutic purposes.

As a rule of thumb, athletes should also assume that most healthcare professionals do not fully understand anti-doping-related matters pertaining to their level of competition, anti-doping organization, or the specifics of banned substances or methods.

When should athletes apply for a TUE?

Athletes should apply for a TUE as soon as they are prescribed the medication and, before using it, unless medically necessary, start immediately.

For substances prohibited in-competition only, a TUE Application should be submitted at least thirty (30) days before the next competition, unless it is an emergency or exceptional situation.

Should an athlete need to continue using the prohibited substance or method, they must submit a new application with updated medical information before the expiry date.

We recommend consulting a professional familiar with the Prohibited List and the Anti-Doping Rules first. This can be a team doctor or sports pharmacist.

How can athletes check medications?

Suppose an athlete needs to take medication or use a treatment method. In that case, Global DRO is an easy-to-use online and mobile-enabled resource for searching the

prohibited status of specific medications based on the current List.

Follow these steps:

1. Visit GlobalDRO.com and select your nationality
2. Select your user type, sport, nation of purchase
3. Type in a drug's brand name or active ingredient
4. Read and accept the terms and conditions
5. Select the exact drug or active ingredients from the search results
6. View the status of the drug in and out of competition

This site is also helpful for healthcare providers to see which alternative medications may be available that do not contain a prohibited substance.

On the WADA site, there are links to a common checklist to guide the athlete and their healthcare professionals on the requirements for a TUE application for certain conditions that will allow the TUE Committee to assess whether the relevant International Standards for TUE criteria are met. It also gives the healthcare provider insight into required documentation and criteria that must be met.

WADA Checklist: www.wada-ama.org/en/resources/therapeutic-use-exemption

How to apply?

We encourage athletes to consider their health first and athletic competition second. Human first, athlete second. If you have a medical condition for which you have been prescribed a prohibited substance, medication, or method, consult your healthcare professional.

Depending on your competition level and the prohibited status of the substance, medication, or method, if you compete without a TUE, are tested, and your sample is positive for the prohibited substance, you could risk committing an anti-doping rule violation (ADRV). An ADRV may result in a sanction and public announcement. However, receiving a retroactive TUE may also be possible, depending on the circumstances.

All healthcare professionals and/or athletes that submit a TUE should keep a complete copy of the TUE application form, all medical information submitted, and proof that it has been sent.

What is a retroactive TUE?

In limited circumstances, it may be possible for a TUE to be granted retroactively.

Some examples of when to submit retroactive TUE:

- Emergency or urgent treatment of a medical condition was necessary.
- Insufficient time, opportunity, or other exceptional circumstances prevented you from submitting it.
- You tested positive after using a substance out-of-competition that is only prohibited in-competition.

What about supplements?

Despite the risks, many athletes take supplements—a recent study suggests that 40-100% of athletes typically use supplements, depending on the type of sport, level of competition, and the definition of supplements.[3] Using supplements is risky as no guarantee can be given that they are free from prohibited substances. Supplements are one of the main causes of inadvertent doping.

We always recommend that before taking supplements, you consider implementing a good diet and a "food-first" approach to meet your training and recovery needs. This strategy not only supports overall health but also minimizes the risk of unintentional doping.

The International Association of Athletics Federations Consensus Statement and the International Olympic Committee Consensus Statement acknowledge that a food-first approach may not always be practical. Dietary supplements may be necessary for athletes to meet their nutritional needs when whole-food consumption is impractical due to training schedules, preparation and storage issues, and gut comfort.[4]

TUEs cannot be approved for supplements but only for approved substances.

For more information on dietary supplements, visit Supplement Connect, USADA's education hub for dietary supplements.

Link: www.usada.org/athletes/substances/supplement-connect/

Helpful resources to learn more about Prohibited Substances and Methods or TUEs:

1. WADA The Prohibited List: https://www.wada-ama.org/en/prohibited-list
2. WADA Anti-Doping Education and Learning platform (ADEL): https://adel.wada-ama.org/learn
3. USAD Healthcare Professional Anti-Doping Education and Learning (HealthPro Advantage): www.usada.org/resources/healthpro/

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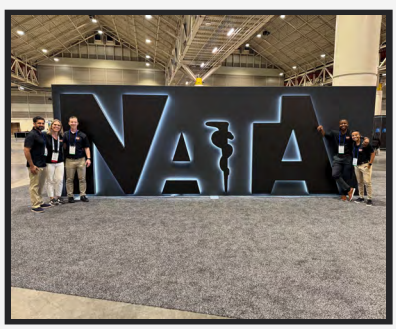
NATA 2024

One of the main focuses of the Sports Pharmacy Network (SPN) is collaboration with the entire sports medicine community. We believe in a "law of abundance" and "better together" approach in athletic care and wellness pursuits. The opportunity for SPN to not only attend but speak at the **National Athletic Trainers' Association (NATA) 75th Clinical Symposia & Athletic Trainers Expo** in New Orleans this past June helped solidify our commitment to supporting and collaborating with the entire sports medicine community.

Our SPN team enjoyed meeting many passionate sports medicine professionals during this two-day event, discussing ways in which sports pharmacy can support athletic trainers in creating comprehensive care for athletes. SPN co-founders, **Brandon Welch, PharmD**. and **Jessica Beal-Stahl PharmD**., presented a well received lecture titled "Revive and Thrive: Unlocking Recovery with Evidence-Based Supplements," moderated by **Robert Nickell, RPh**. This presentation was a highlight, showcasing how evidence-based supplements can enhance recovery.



Additionally, the SPN team engaged in numerous insightful conversations with athletic trainers throughout the event. We discussed our supplement protocol sheets, drug-induced nutrient depletion charts, sports nutrition, pharmaco-genomics, biomarker analysis and clinical services that sports pharmacists can offer. An on-site survey of attendees (N=41 athletic trainers) revealed significant insights:

SURVEY HIGHLIGHTS

51.2% of athletic trainers reported they were likely to receive questions about medications

9.8% of athletic trainers said they would likely engage with a pharmacist regarding these questions

59% of athletic trainers said that both OTC and prescription medications are stored in their training rooms

MOST MEDICATION-RELATED QUESTIONS INVOLVE: NSAIDs, inhalers, antibiotics, pain medications, cough/cold medications, and antidepressants

Our SPN team also enjoyed working a booth side-by-side with our partner company, SportPharm™, discussing how OTC and prescription rubs/creams can improve efficacy versus oral medications.

THANK YOU NATIONAL ATHLETIC TRAINERS' ASSOCIATION

The Sports Pharmacy Network would like to thank the National Athletic Trainers' Association for hosting an excellent event and providing us the opportunity to present. We'd also like to thank all the attendees who engaged with us; your enthusiasm and openness to explore collaborative initiatives motivates us to take the field of sports pharmacy to the next level! Working together, we can truly enhance the comprehensive care provided to athletes.

Anti-doping in Recreational Sports

An Interview from the The Performance Prescription Lab Podcast with **Mikko Lemettilä, BPharm, MSc**

Hosted by: **Jessica Beal-Stahl, PharmD** & **Nilhan Uzman, BPharm, MSc**

AUTHOR BIO:

The Performance Prescription Lab Podcast is hosted by Sports Pharmacy Network Board Members Jessica-Beal Stahl, PharmD and Nilhan Uzman, BPharm, MSc. On Episode 11, Jess and Nilhan hosted Mikko Lemettilä, an anti doping expert from Finland where they explored anti-doping strategies for elite professional sports versus recreational sports to understand the motives behind why people use banned substances. Mikko explained the Finnish model in doping prevention as a good practice, provided practical ways for athletes and health care professionals to fight doping, and talked about the future outlook in the anti-doping scene.

Mikko Lemettilä, BPharm, MSc

Jessica Beal-Stahl, PharmD: This is the Performance Prescription Lab Podcast, and we welcome, Mikko. So, Mikko, I can you give us a little background about yourself. What you do and who you are, where you're from?

Mikko Lemettila: Absolutely, Jess. About me, I'm a specialist in anti doping and recreational sports. I work in a organization called A-Clinic Foundation and more specifically in a project called The Clean Exercise Commitment. Outside of that, I'm also a masters student in pharmaceutical research, development and safety. And as a side job, I'm also an outdoor cross training coach and enthusiastic rock climber.

Jess: When I heard your story of how you got into the field of drug and sport, I found your background really fascinating. Can you give us a little more insight into kind of your journey into the field of drugs and sport?

Mikko: I think the best thing is to summarize my recent 10 years. So it's certainly been interesting, and I've been kinda lost here and there, grasping on the doping information also from here and there. But a short summary - in high school, I was certain that I would pursue a degree in psychology.

Eventually, I didn't because like every other every Finnish man, they go to the army, and the army kinda mixed my thoughts up, but maybe in a positive manner, I think. So I got interested in sports and exercise back then and wanted to combine it with helping people. So I applied to study physical therapy and eventually graduated from there. But, then I wanted more opportunities to progress in my career, so I started studying natural sciences more. So I read the basics of natural sciences, biology, physics, chemistry, because I didn't do that in high school.

And after that, I applied for pharmacy studies. And the fun thing is that, eventually I did a bachelor's thesis in anti-doping counseling in pharmacies. And it eventually led to two scientific publications. But then I shifted to master of sports and exercise medicine, and then back to master of pharmacy studies. So it's it's been an interesting journey.

Jess: I do feel like you kind of actually took it back to your your high school dream of doing psychology in a way, because as we know and we'll dive into this in the episode, anti-doping does have a lot of underlying psychology, and why people are choosing to use banned substances. So maybe you really actually made your dream come true as a kid.

Mikko: I thought about the same thing.

Nilhan: We are going to speak about anti-doping in recreational sports. But around

I think these substances (Image and Performance Enhancing Drugs) are usually associated with the noncompetitive or competitive fitness and bodybuilding, but I want to address that they also are used in other populations as well to meet the needs of a society like body image ideas or other social performance pressures such as study or work related pressures.

the world, people witnessed high profile doping scandals up until now. Names like Lance Armstrong, the infamous BALCO case, along with the state sponsored doping saga in Russia, in the Sochi Olympics have been front and center in the global professional sports arena. I think most of the people have heard about these, but these are from the professional sports context.

We are gonna shift our focus, to a different area, anti-doping in recreational sports. That's where your expertise lies in Mikko. These individuals are driven by the same passion, dreams, societal expectations, as professionals athletes. Mikko, in our podcast episodes, we usually love to start with a crash course. In every topic we cover, we try to give a 101 class to our listeners.

And today, you're going to be our instructor of the anti-doping in recreational sports 101 class. Can we start with describing the difference between anti-doping in elite and professional sports versus recreational sports?

Mikko: I think, the primary differences are in the competitive activities, regulations, and the given resources in elite sports and compared to recreational sports. If we look at elite sports, it's mainly based on the regulations of World Anti Doping Agency and the World Anti Doping Code. And The Code also includes, many standards like, international standards for education, doping testing and control, and related therapeutic use exemptions.

And then these WADA standards are usually followed by International Sports Federations, National Anti-Doping Organizations, National Sports Federations. And I think this is a significant resource for organized sports to conduct testing, implement education programs, research on performance enhancements, substances, and, to include more substances on the prohibited list as well. And then, of course, these regulations also require athletes and maybe athlete support personnel to follow these rules. If the athlete doesn't follow these rules, there are various sanctions he or she may face, including, of course, suspension, loss of medals or titles, and then damage to the reputation through media.

Then there are recreational sports, which are not regulated by WADA. And this brings a lot of variation to anti-doping activities. For example, recreational athletes are rarely tested or not at all. In Finland, they are not tested. And, also, about anti doping education, I think it depends more on the school systems or health care or professional choice of study track or career choices. And then, of course, your own interest and motivation to have anti-doping education as an athlete. And then it also varies that if national anti doping agencies or other organizations have any public health initiatives. Whether they provide education about anti-doping to public.

Nilhan: Mikko, from what you explained to my understanding is that the main difference is regulation. I want to understand, how common is the use of these substances? Image and performance enhancing drugs, IPEDss, are very commonly used. So how common is the use, and can we also define what IPEDs are for our audience so they understand the context a little bit more?

Mikko: I think it's important to define, if we talk about image and performance enhancing drugs, I think we can consider a diverse group of substances that people use, for example, to enhance physical appearance, performance, or social status, or maybe all of them. And, well, I think these substances are usually associated with the noncompetitive or competitive fitness and bodybuilding, but I want to address that they also are used in other populations as well to meet the needs of a society like body image ideas or other social performance pressures such as study or work related pressures. So this is a group of various drugs, supplements, hormones. You asked how common the use is, and this is also always a problem due to the fact that regular exercises are not tested, we don't receive any testing data.

There isn't any standardized research method on estimating the prevalence. But still, there are some publications which estimate the lifetime prevalence.

So for example, anabolic steroid use in the general population is estimated to be around 1 to 5%. And I can tell you about the Finnish prevalence. We get national data every 4 years from our National Institute of Health and Welfare Research on substances used by the public and the recent publication was from last year, 2022. And from there, the 1.3% of our 15 to 69 year old population reported that they tried doping substances at some point in their life.

Jess: So it is in line with the, you know, the worldwide estimate. Very interesting.And this group who mentioned that they have tried these substances. What are their motivation?

Mikko: If we compare to elite sports, why they use doping is because of victory and the fame that comes because of it. And this is not the case in recreational sports because you're not competing in anything. So maybe the motives are more, you know, enhancing athletic performance or just performance reasons in your everyday life. You want to improve your physical appearance. You want faster recovery, maybe to meet some social pressures or expectations given by the society.

Jess: Could you give a little bit more insight into our listener as to what are the risk of the IPEDs?

Mikko: If we're talking about anabolic steroids - they are unselective, which means they have a lot of systemic effects on our body. So we can talk about cardiovascular risks, liver damage, hormonal imbalances. They have psychological effects, effects to our endocrine system, and they cause joint and tendon damage, kidney damage. There is also the addiction and dependence side of anabolic steroids as well as they may cause addiction in the users. It's one for, I think, who experience dependency on these substances. And then there's also steroids being a gateway to other addictions.

Nilhan: Let's start focusing on the solutions now. We try to define the risks than the underlying issue, and we really wanted to understand the Finnish model, which worked well. Can you tell us a little bit about the Finnish doping prevention model? What makes it so successful? And also the initiatives, supporting that, the ones that you're involved, A-clinic Foundation, and the Clean Exercise Commitment. Can you tell us a little bit more about these initiatives?

Mikko: Thank you for all the complete compliments on Finland. So in Finland, anti doping activities are divided to 2 organizations, and we work in cooperation, of course. So our national anti doping agency called Finnish Centre For Intellectually in Sports is responsible for anti doping activities in organized sports.

So they actively build, participate in building an ethically sustainable sports culture, and it includes fair play and, you know, following the regulations. But then the government has also put resources on the public health aspect, and we are responsible for that. So, A-Clinic Foundation and the Clean Exercise Commitment is responsible for the public health approach of anti-doping. Our anti-doping activities include, providing evidence based information on our website or anti doping in recreational sports education for different professions. Then we have anti-doping communication, which I mostly think is a true clean exercise commitment. And we have an anti doping agreement with the fitness industry, municipalities, individual entrepreneurs such as personal trainers, and we try to make them communicate clean sport values. And we just did the sports pharmacy course for a university.

Jess: Congratulations on these great achievements! We've talked about the amazing programs that you're involved in and the initiatives. One thing that I think we need to also pivot and look at is educating the health care provider. And that may be the trainer, the pharmacist, the physician, the PT, the athletic trainer, whoever's involved in, even coaches that are involved in the care or working with athletes. And as a health care provider, we have the primary responsibility to safeguard, obviously, the health and well-being of our patient athletes. And for most of us, I know when I was in pharmacy school in the United States, we received little to very no education on anti-doping and clean sport.

And I haven't gone through a physical therapist program. They may receive more, slightly more. Physicians, I believe, are in the same boat that they receive very little. And so I think it's a very sensitive topic and something that our health care system is missing. And so can you talk a little bit about how why it's important that we as health care providers receive more education on antidoping?

Mikko: I share your perspective on that. Health care professionals don't get education on anti-doping or they get very little.

There will be events where an athlete is under doping control, and the health care professional should be aware of the prohibited list and the medicines that are included in this list. Also a health care professional might need to give guidance about the therapeutic use exemption protocol.

If we focus on the recreational sports - I've heard from many colleagues that steroid users come to pharmacy to seek help, or maybe to buy needles, or talk about use. So in the case of anabolic steroid uses, pharmacists should have basic knowledge on how to seek help for

> *(In Finland)... we have an anti doping agreement with the fitness industry, municipalities, individual entrepreneurs such as personal trainers, and we try to make them communicate clean sport values.*

the cessation of use and also maybe develop some harm reduction strategies in their own pharmacies or maybe even consider needle exchange.

Jess: I love that approach. I'm working in a community pharmacy, obviously, we are super accessible. I get questions like "Can I take this? Can I take that? What about this?" Because of being involved in sports and pharmacy, I know some athletes are tested. And I'm like, wait a second. No! You can't take that! It's also nutritional supplements. You should be aware of the risks that comes with them.

If you're a health care provider and you have an athlete that you believe may be going down the path of abuse or misusing or considering it. How do you recommend having that conversation or starting the conversation of concern and giving them direction or guidance of where they may be able to get a resource.?

Mikko: I really would like to address this really good resource for every health care professional, or pharmacist, and it's developed by Sydney North Health Network.

They developed this kind of quick reference guide for harm minimization, anabolic androgenic steroids, and other IPEDs. And I think all of us professionals should look in detail to that because it has actual questions to help start the conversation, like motivational interview tips. And I have one listed here. It's: "Do you use or take anything to help with your workout or muscle gain?" And then if you want to go more specific, can you tell me more about supplements you are using, including any use of pills, powders, injectables?"

Jess: So this might be a way that the user actually admits to using. I think that's a very non-confrontational way of saying, I suspect you're using. And, obviously, you're gonna get a wall put up, and they're not going to trust you moving forward. But I think starting that discussion in a very, like you said, motivational way with them is going to be more impactful than just coming out and saying, hey - I'm concerned about your steroid use.

Mikko: Yes. And then the health care professional can respond with I just need to be aware of this when I do health counseling or focus on your health related issues.

Jess: Is there a way that health care professionals can participate or contribute to a doping free environment in their communities?

Mikko: I think we should just engage actively promoting a more ethically sustainable environment for sports.

For example, our National Olympic Committee has a sustainability program, and it addresses good governance, safe space, and safe environment, equality and equal opportunity, environment and climate, anti doping, and fair play. So by promoting all these activities, everyone would feel that they're exercising a safe environment.

Jess: I love that. And if you are a healthcare professional and you're not quite sure where to start, work on changing the narrative of why health and exercise is beneficial in a broader sense than just losing weight.

To listen the full episode check out Episode 11 of the **Performance Prescription Lab Podcast** to learn more about anti-doping in recreational sports. Subscribe and listen on Spotify, Apple Podcasts or whever you get your podcasts.

This transcript is based on a podcast episode and has been edited for readability and conciseness. While we have made every effort to accurately capture the essence of the conversation, certain sections have been modified or condensed to enhance clarity and flow. Some filler words, pauses, and non-verbal cues have been omitted. The views and opinions expressed in this interview are those of the speakers and do not necessarily reflect the official policy or position of the podcast producers or the Sports Pharmacy Magazine.

Peptides & SARMS

The Newest PED's Jumping from the Research Bench to Athletic Field

By Sean Casey, RD, CSCS

AUTHOR BIO:

Sean Casey is a registered dietitian and physical preparation coach who works with everyone from middle/high school athletes to Olympians, including an Olympic Gold Medalist. His expertise is sought after on the international level, where he has traveled to 15 countries, helping clients reach their athletic potential through nutrition, physical training, and recovery techniques. Additionally, Sean heads up the science team for Hometown Pharmacy of Wisconsin, a group of 65 independent pharmacies focused on helping people reduce the need for medications through lifestyle intervention.

A Tainted Upset

April 20th, 2024 - A sold-out crowd of boxing fans gathers at the Barclays Center in Brooklyn, New York. On this night, underdog challenger Ryan Garcia prepares to fight the favorite, Devin Haney.[1] As the night unfolds, the crowd watches in disbelief as Ryan Garcia pulls off a wild upset, knocking the WBC Super Lightweight champion Haney down three times to win the judges' scorecards.

However, the excitement proves fleeting as word soon comes out that Ryan Garcia's urine samples tested positive for enobosarm, or Ostarine, as it's often referred to. This molecule belongs to a class of compounds referred to as selective androgen receptor modulators (SARM), which are banned by the World Antidoping Agency (WADA) due to their effects on lean body mass.[2,3] In protest, Garcia's team issues a response, claiming he unknowingly took supplements spiked with Ostarine.[2] They provide testing results showing that both his amino acid and carbohydrate supplement powders contained Ostarine.

However, whether Ryan Garcia knowingly or unknowingly consumed Ostarine becomes less clear as details of the supplement testing emerge. Reports indicate that Garcia's team sent in bottles of the two supplements that had already been opened instead of sealed containers.[2] By sending in already opened vs. sealed bottles to be tested, Garcia's team may have spiked the containers after the fact to make it appear as if he had inadvertently consumed Ostanine.

Thus, the question remains: Did Ryan Garcia unknowingly consume the Ostarine from tainted supplements, or did his team add it into the containers before sending them off for testing? We may never know, but regardless of whether the SARM use was intentional or not, one thing holds true. According to WADA, if an athlete tests positive for a banned substance, it is considered a doping violation whether the athlete took the substance intentionally or unintentionally. At the time of the writing of this article, the New York State Athletic Commission suspended Garcia for one year and forfeited the boxer's $1.1 million official contract purse.

Ryan Garcia isn't the only professional athlete to have tested positive with a SARM in his system in 2024. In January, NBA athlete Tristan Thompson was suspended for 25 games after testing positive with a SARM known as Ligandrol (LGD-4033) in his system.[4]

As the above two examples show, whether intentional or not, the use of SARMS is making its way into the sporting world. SARMS are not the only "new age" Performance-enhancing Drugs (PEDs) that have slipped from lab benches into the crosshairs of WADA. There are also peptides. All peptides that enhance growth hormone release, such as sermorelin, or potentially speed up the healing process, such as BPC-157 are banned. Others, such as the weight loss peptide semaglutide, are on the WADA monitoring list for its potential implications on health and athletic performance in athletes.

In this article, we'll cover SARMS and peptides more in-depth, highlighting their therapeutic use, impacts on athletic performance when abused, and WADA's current clean sport stance on them.

What are SARMS?

SARMS are chemical agents that were developed as favorable alternatives to anabolic steroids due to their ability to selectively bind to androgen receptors in a tissue-specific fashion.[5] SARMS can exert anabolic effects (producing male characteristics) in specific tissues (e.g., skeletal muscle, bones) while minimizing adrenergic side effects commonly associated with steroids within the prostate, testes, seminal vesicles, and accessory tissue. These characteristics have made them attractive amongst athletes for enhancing performance.

What does the research say about SARMS?

On the clinical side, research has focused on their ability to potentially treat osteoporosis, hypogonadism, cancer cachexia, and sarcopenia.[5] SARMS such as Ostarine, have also been studied as a potential avenue for slowing tumor growth in certain types of breast cancer.[6]

As it relates to age-related decreases in muscle mass and health function, Dalton et al. had 120 healthy elderly men and postmenopausal women assigned to one of five groups in a 12 week double-blind clinical trial: placebo, 0.1 mg, 0.3 mg, 1 mg, or 3 mg of Ostarine daily.[7] Researchers found that those consuming 3mg of Ostarine daily had a statistically significant average 1.3 kg gain of lean body mass coinciding with a 0.6 kg loss of fat mass. This coincided with improvements in muscular power, as measured by stair climbing performance and improvements in blood sugar levels.

What are the safety concerns regarding SARMS?

The safety of SARMS has been questioned, especially outside of a clinical setting. In their 2023 literature review, which included 15 case reports/series along with 18 clinical trials totaling 2136 healthy adults, 1447 of whom took a SARM, Vignali et al. examined occurrences of adverse effects while using these molecules.[8]

The primary finding observed in the clinical trials was elevations in alanine aminotransferase (ALT), with the mean occurrence coming in at 7.1%.[8] Generally, higher SARM doses were associated with a greater risk of developing elevated ALT levels. Additionally, the case studies/series showed 15 case reports of drug-induced liver injury, 1 case of Achilles tendon rupture, and 1 case of rhabdomyolysis. Of note, individuals within these case studies were often using multiple SARMS at once in doses 4-10 times that used in clinical trials.

An additional concern about SARM use stem from the lack of long-term studies to truly elucidate what the potential side effects of chronic use. It appears SARMS may negatively impact HDL (high-density lipoprotein) levels in addition to potentially elevating ALT levels.[8] However, more research needs to be completed on SARMS to determine safe dosing protocols.

Despite the uncertainty surrounding SARMS, it is not hard to find websites that sell them. It's important to realize that the quality and safety of these products is highly suspect and abuse of SARMs outside of its therapeutic use is highly risky. In a 2024 publication, Gaudiano et al. purchased 13 supplements that claimed to contain SARMs; all through various online websites accessible in Italy.[9] After analyzing the contents, quantitative analysis revealed that in 23% of containers the expected SARM was not present; rather they contained a different SARM than advertised. Additionally, 30% of the tested products had other undeclared pharmaceuticals (tamoxifen, clomiphene, testosterone, epimethandienone, or tadalafil). Lastly, SARM content ranged from 30-90% of label claims. In other words – buyer beware!

What are peptides?

Peptides are strings of amino acids. For instance, the popular weight loss peptide, semaglutide, contains 31 amino acids.[10] Peptides are responsible for a whole host of physiological activities throughout the body including appetite regulation, hormone release, processes related to muscle recovery and more.

The first peptide approved for therapeutic use was the 51 amino acid hormone known as insulin.[11] With improving technology and advancements in science, the use of peptides for pharmaceutical purposes has risen dramatically; especially within the last 50 years. As reported by D'Aloisio et al., more than 100 pharmaceutical peptides have been approved for use in major markets (North America, Europe, Japan) as of 2020. Additionally, there were 4859 clinical studies, and 468 were Phase III trials in progress.

Due to their potential for performance enhancement and abuse, WADA has banned the use of many peptides. In other instances, peptides, such as insulin, are placed on the therapeutic use exemption (TUE) list. (Please refer to Jessica Beal Stahl's article regarding Therapeutic Use Exemptions) As of 2024, some peptides, such as semaglutide, are not banned but listed on the WADA Monitoring Program.[12] Substances on the WADA Monitoring Program are those that may enhance performance or pose health risks to users; however more research is needed to confirm.

One peptide that is commonly abused in the sports world is Gastric Pentadecapeptide BPC 157. This compound, often referred to as BPC 157 is thought to enhance the body's healing capabilities. This often leads to BPC-157 being referred to as the "Wolverine Peptide" after the Marvel comic book hero.

A closer look at BPC 157

BPC 157 is a 15 amino acid peptide naturally found in human gastric juice. One characteristic is its ability to withstand the acidic nature of the stomach for durations > 24 hours (vs. standard growth factors which usually last ~ 15 minutes at these pH's).[13] Within the stomach, BPC 157 is thought to play a cytoprotective role, preventing gastric and intestinal injury brought about by stomach acid

Its exact mechanism of action is still being elucidated. The same cytoprotective effect in the stomach has been hypothesized to speed up connective and soft tissue injury throughout the entire body.

With respect to human clinical outcome studies to support the BPC157 'Wolverine' healing hypothesis are limited. A small retrospective study involving 16 patients indicated that BPC 157 may improve knee-related pain .[14]

More research on BPC157 can be found in animal-based in-vivo and in-vitro. To date, BPC157 has been shown to improve healing in various rat studies following transection of their Achilles tendon, medial collateral ligaments, and quadriceps, and enhance tendon-to-bone recovery.[13,15]

BPC157 may also support optimal neurotransmitter activity and gut-brain axis function in addition to its potential musculoskeletal benefits .[16,17] More research is needed to better understand and substantiate its potential role in neurotransmitter function.

Due to it's potential for abuse, WADA banned the use of BPC-157 in 2022.[18]

Wrapping things up

The controversy surrounding Ryan Garcia's victory over Devin Haney highlights the ongoing struggle in professional sports to maintain fair play amidst the temptation and prevalence of performance-enhancing drugs (PEDs).

The broader context of SARMs and other new-age performance enhancers, like peptides, further complicates the landscape, as athletes seek any edge they can get. As WADA continues to adapt to these evolving challenges and continuously update their Prohibited Substance list, it's imperative that sports medicine professionals educate athletes on the potential health risks and career-related consequences of using banned substances.

As seen in the case of Ryan Garcia, simply saying a banned SARM or peptide came from a "tainted" supplement is not enough to absolve an athlete from a doping violation. An athlete is responsible for all they put into their body. This underscores the importance of using supplements that are NSF, Informed Choice, or BSCG clean sport certified . Additionally, they should not buy medications off websites.

However, SARMs and peptides do hold great promise in treating clinical conditions. As discussed, we recommend athletes not to abuse any substance beyond their therapeutic use, seek a TUE when needed, and steer clear of PEDs.

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