



September 11, 2014

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# The Steroidal Module: Creating a Stronger Athlete Biological Passport



*In a special feature for PlayTrue magazine, WADA Director of Medical Dr. Alan Vernec explores the benefits the Steroidal Module will bring to the Athlete Biological Passport.*

## Background

Longitudinal profiling of an athlete's biological variables (or biomarkers of doping), has existed since before WADA was created. Although the foundations for both the Haematological and Steroidal modules had been around for many years, it was following the 2006 Winter Olympic Games in Turin when WADA recognized the need to create a robust scientific and legal framework for the longitudinal analyses. WADA, with the participation of International Federations, brought together a group of experts, and it was this which culminated in the publication of the first WADA Athlete Biological Passport (ABP) Operating Guidelines in 2009. This first version of the guidelines included only the Haematological Module.

## Haematological Module

There are now more than 40 Anti-Doping Organizations running the Haematological Module of the Athlete Biological Passport program, and the sport community is beginning to see the results. There has been a 240% increase in blood doping cases, with a total of more than 300 athletes sanctioned in the period from 2008 – 2013, compared to the period prior to the introduction of the ABP. This is a step forward in current anti-doping practice.

## Arrival of the Steroidal Module

With the increasing success we were beginning to see with the Haematological Module, the next step was for WADA to look at introducing a new module to detect the use of exogenous steroids. The same basic principles and processes that already existed in the ABP Guidelines were applied to the evaluation of the steroidal profiles. This Steroidal Module was launched at the start of this year.

### **How it works**

As with its haematological (blood) equivalent, the Steroidal Module is based on the premise that samples collected over time will demonstrate an athlete's normal physiological levels which are unmodified by any doping practice. The Module works by analyzing an athlete's steroidal variables which are collected over a period of time through traditional urine testing. The longitudinal profile is then analyzed to determine if any atypical patterns are present. The ABP uses the athlete's own values rather than population values as a basis for evaluation. Most people have a Testosterone: Epitestosterone (T:E) ratio of 1:1, although there is some variation. If this T:E ratio was greater than 4:1, then the laboratory would have performed an Isotope Ratio Mass Spectrometry (IRMS) analysis to detect the use of exogenous (from outside the body) steroids. With this 'population reference' approach, only high values would result in IRMS testing. Now, however, the WADA ABP's intra-individual approach can distinguish between when the IRMS test should and should not be performed. Overall, this allows for a more refined, efficient and ultimately less costly evaluation. Laboratories will enter the data, the Adaptive Model (the algorithm inside WADA's ABP in ADAMS) will then analyze this data, and if there is an atypical pattern based on the athlete's own expected values, then a notification will be sent for the laboratory to automatically conduct the IRMS.

### **Benefits**

This more personalized approach avoids excessive IRMS for athletes with naturally high T:E ratios, cutting out any waste and reducing costs, and also ensures that those athletes with abnormally low T:E ratios, who could previously stay under the radar of the testers, are on notice that they too will be under scrutiny for possible doping.

The Steroidal Module differs from the Haematological Module in that the former does not need to be 'adopted' by ADOs. The Steroidal Module operates through existing urine testing. There is no need for additional tests or administrative work, and the cost therefore is the same as the cost of traditional testing. However, there may be occasions where the IRMS is negative even though the pattern is atypical.'. This would require extra evaluation by experts, whether by the ADO or via an Athlete Passport Management Unit (APMU) associated with WADA laboratories.

Both modules of the ABP should complement each other and be integrated into an ADO's overall anti-doping program. The ABP allows the anti-doping community to identify and target athletes for specific analytical testing by interpreting the data in an intelligent and timely fashion, but can also be used to directly pursue rule violations as stated in the Code.

The efficient function of the ABP – both Steroidal and Haematological Modules – is predicated on the use of the Anti-Doping Administration Management System (ADAMS), which is used by the majority of ADOs. The introduction of the Steroidal Module will allow organizations to strengthen their programs by a simple and automated use of data already collected in urine samples. The Module offers a strategic way to fight doping in sport, and will act as a strong deterrent to doping as the anti-doping community moves forward.