

# 2021 Anti-Doping Testing Figures

## **EXECUTIVE SUMMARY**

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This Executive Summary is intended to assist stakeholders in navigating the data outlined within the 2021 Testing Figures Report (2021 Report) and to highlight overall trends.

The 2021 Report summarizes the results of all the samples WADA-accredited Laboratories analyzed and reported into WADA's Anti-Doping Administration and Management System (ADAMS) in 2021. This is the first set of global testing figures under the version of the World Anti-Doping Code (Code) that came into effect in January 2021. The 2021 Report – which includes this Executive Summary and sub-reports by Laboratory, Sport, Testing Authority (TA) and Athlete Biological Passport (ABP) Blood Analysis – includes in- and out-of-competition urine samples; blood and ABP blood data; and the resulting Adverse Analytical Findings (AAFs) and Atypical Findings (ATFs).

The 2021 Testing Figures Report only focuses on anti-doping data that is reported into ADAMS and no longer includes data that is not reported into ADAMS but provided by certain Laboratories in aggregate.

It should be noted when comparing the figures from the 2021 Report to the 2020 Report, that the COVID-19 pandemic significantly impacted the total number of samples collected in 2020.

## REPORT HIGHLIGHTS

- A **61.2% increase in the number of samples** (both urine and non-ABP blood samples) analyzed and reported into ADAMS: 149,758 in 2020 to 241,430 in 2021.
- An **increase in the total number of samples analyzed and reported by nearly all** WADA-accredited laboratories and WADA-approved laboratories into ADAMS in 2021 compared to 2020.
- An **increase in the total number and percentage of non-ABP blood samples** analyzed: 7.3% (10,940 of 149,758 samples) in 2020 to 9.3% (22,398 Blood + DBS samples out of 241,430).
- An **increase of 36% in the number of ABP blood samples** analyzed: 22,666 in 2020 to 30,821 in 2021.
- A **decrease in the total percentage of AAFs**: 0.67% in 2020 (1,009 AAFs from 149,758 samples) to 0.65% (1,560 AAFs from 241,430 samples).
- An **increase in the total number of AAFs for growth hormone (GH)**: 1 in 2020 to 7 in 2021, including the first reported AAF for a [GH biomarker](#).

## USE OF ADAMS

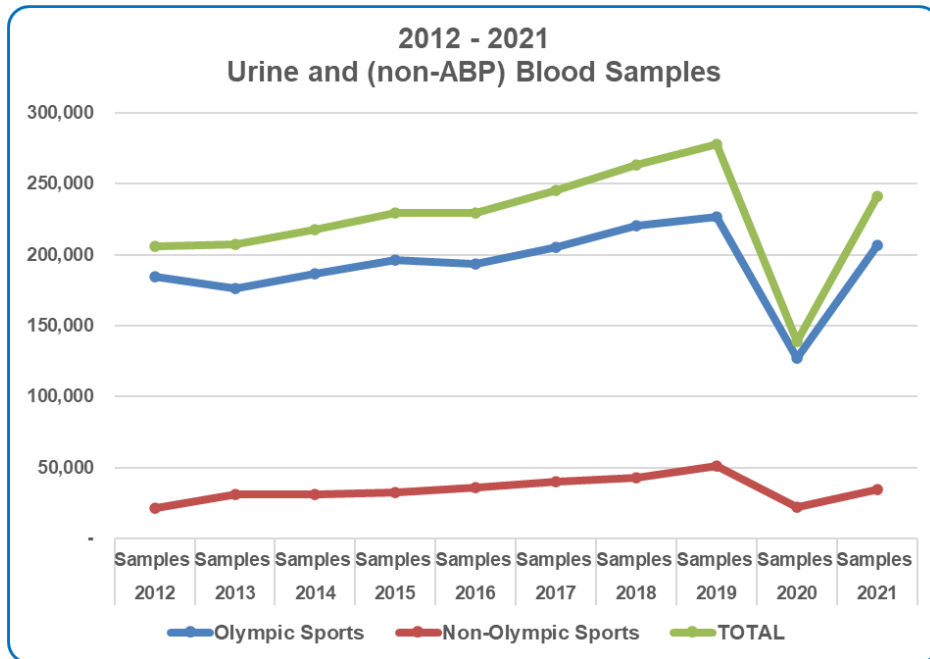
ADAMS continues to be a critical data-gathering tool for the anti-doping community.

The figures of urine, blood, dried blood spot (DBS) and ABP samples were compiled according to the 'Sample Collection Date' (and not the WADA-accredited Laboratory's 'Sample Reception Date'). This is a result of the efforts made by the WADA-accredited Laboratories to incorporate the collection date into their ADAMS reporting. The data was compiled using sample collection dates between 1 January and 31 December 2021.

In addition, in 2021, WADA adjusted Anti-Doping Organization (ADO) and Delegated Third Party (DTP) accounts to ensure the ADAMS account structure reflects the 2021 Code. Under the 2021 Code, only a Signatory can act as the Testing Authority (TA) or Results Management Authority (RMA). Therefore, changes were incorporated into the ADAMS reporting process to ensure that only laboratory results that fall under the World Anti-Doping Program (e.g., only tests where a Signatory ADO is the Testing Authority) were reported in ADAMS. The results from laboratory testing of samples from non-signatories are no longer reported in ADAMS.

## OVERALL FINDINGS

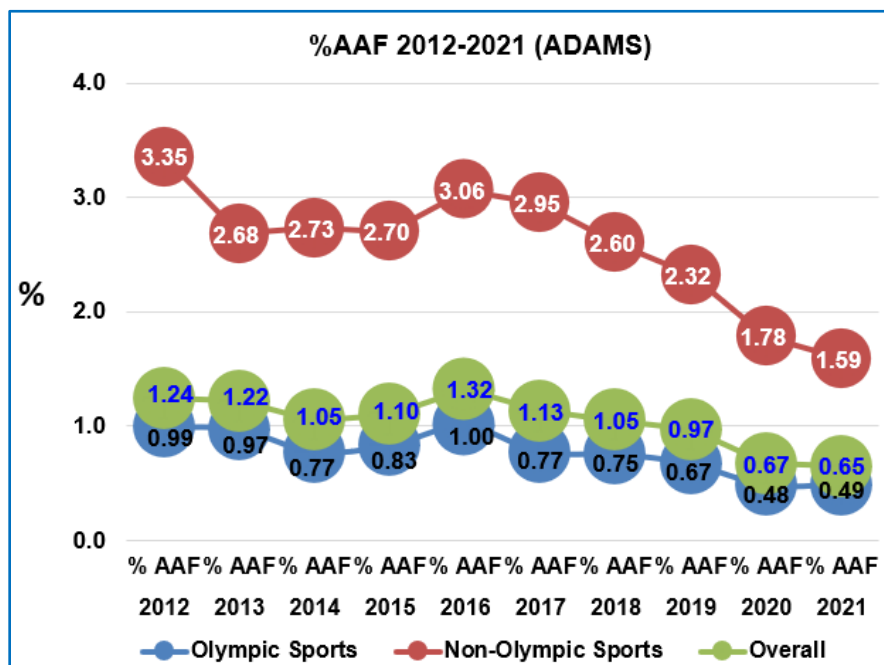
The 2021 data shows an increase of 46.1% in the number of overall samples analyzed from 149,758 in 2020 to 241,430 in 2021.



There was a decrease in the percentage of total findings (AAFs and ATFs - combined) from 0.82% in 2020 to 0.77% in 2021.

In addition, the data shows a decrease in the percentage of AAFs – more commonly known as positive tests – from 0.67% in 2020 to 0.65% in 2021.

In 2021, the proportion of ATFs reported (312 ATFs in 241,430 samples) decreased relative to 2020 (217 ATFs in 149,758 samples).



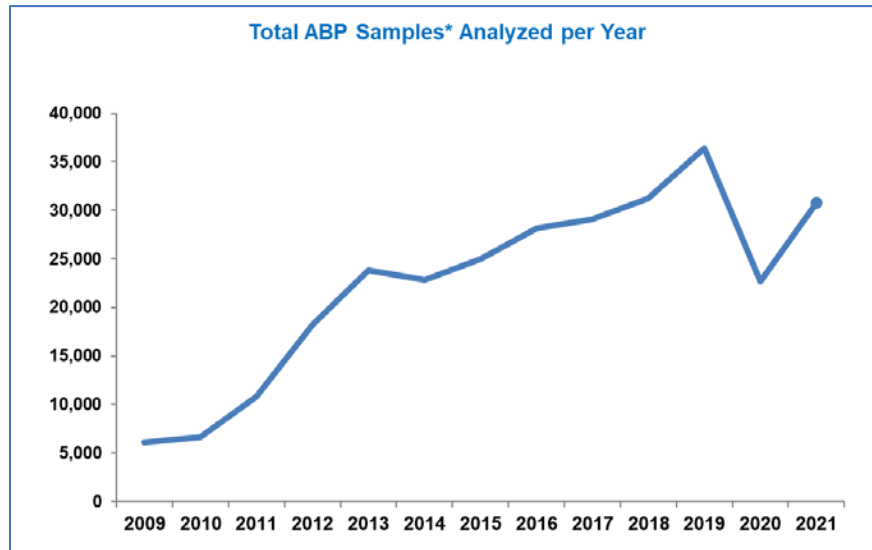
The results also show an increase in the number of (non-ABP) blood samples analyzed from 10,940 in 2020 to 22,398 (blood + DBS samples) in 2021.

## IMPLEMENTATION OF ABP

### Blood ABP

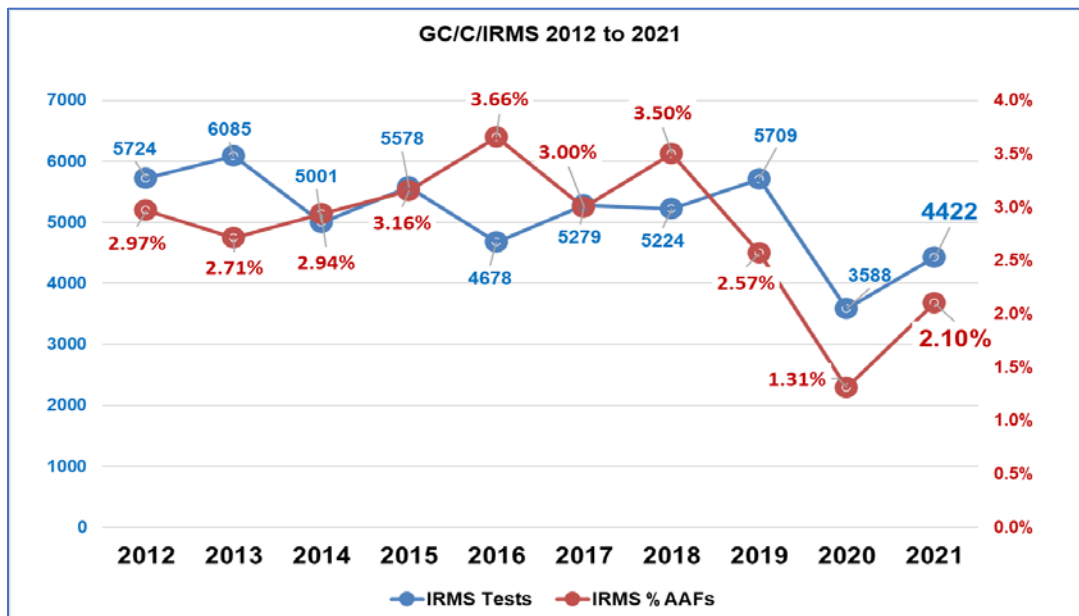
The number of International Federations (IFs) that included ABP blood testing was 26 in 2021 (compared to 24 in 2020) while the number of National Anti-Doping Organizations (NADOs) increased from 60 in 2020 to 72 in 2021.

The total number of ABP samples increased by 36% compared to 2020 (22,666 in 2020 to 30,821 in 2021).



### Steroidal ABP

The gas chromatography combustion isotope ratio mass spectrometry (GC/C/IRMS) analytical method is an important test connected to the steroidal module of the ABP for urine samples. IRMS can be triggered by the ABP or requested by the Testing Authority (TA) based on other information. The number of AAFs from the application of this method has increased compared to 2020 (47 in 2020 and 93 in 2021) while the number of tests has increased in 2021 by 23% (3,588 tests in 2020 versus 4,422 in 2021). Based on the relative percentage of AAFs in comparison to other methods, the application of the GC/C/IRMS test continues, at 2.10% AAF, to be the analytical method with the highest proportion of AAFs.



## COMPLIANCE WITH THE TDSSA

The 2021 Report marks the seventh year that Anti-Doping Organizations (ADOs) were required to incorporate the [Technical Document for Sport Specific Analysis](#) (TDSSA) into their testing programs. The TDSSA is intended to ensure that three groups of prohibited substances (Erythropoietin Stimulating Agents (ESAs), Growth Hormone (GH) and GH Releasing Factors (GHRFs)), which are deemed to be at risk of abuse in certain sports/disciplines, are subject to an appropriate and consistent Minimum Level of Analysis by all ADOs.

The findings of the 2021 Report highlight an increase in testing compared to 2020 in which the impact of the COVID-19 pandemic on ADOs' testing was evident for these three groups of prohibited substances. In addition, from 2015 to 2021, there has been an overall increase in testing when compared to 2014 (the year prior to TDSSA implementation) including:

- An increase in the recording of TDSSA compliant sports/disciplines in ADAMS.
- An increase in ESAs analysis, AAFs reported, and percentage of ESA AAFs (0.08% versus 0.10% in urine tests and 0.2% versus 0.3% in blood tests from 2020 to 2021).
- An increase in GH analysis between 2020 and 2021 (both Isoforms and Biomarkers tests) and an increase in the number of GH AAFs reported (1 AAF in 2020 versus 7 cases in 2021 including one GH biomarker AAF).
- An increase in GHRFs analysis between 2020 and 2021 but a decrease in the number of AAFs.

### Erythropoiesis Stimulating Agents (ESAs)

| Year | ESAs Urine Tests | ESAs Blood Tests | AAFs Urine | AAFs Blood | AAFs Total | # of Sports | # of TAs |
|------|------------------|------------------|------------|------------|------------|-------------|----------|
| 2021 | 50,940           | 4,953            | 52         | 14         | 66         | 100         | 217      |
| 2020 | 35,963           | 1,845            | 29         | 3          | 32         | 102         | 197      |
| 2019 | 51,929           | 3,757            | 78         | 14         | 92         | 120         | 243      |
| 2018 | 47,955           | 4792             | 61         | 16         | 77         | 118         | 229      |
| 2017 | 44,322           | 4531             | 56         | 29         | 85         | 116         | 220      |
| 2016 | 43,246           | 3464             | 44         | 22         | 66         | 108         | 212      |
| 2015 | 32,999           | 3219             | 45         | 1          | 46         | 94          | 183      |

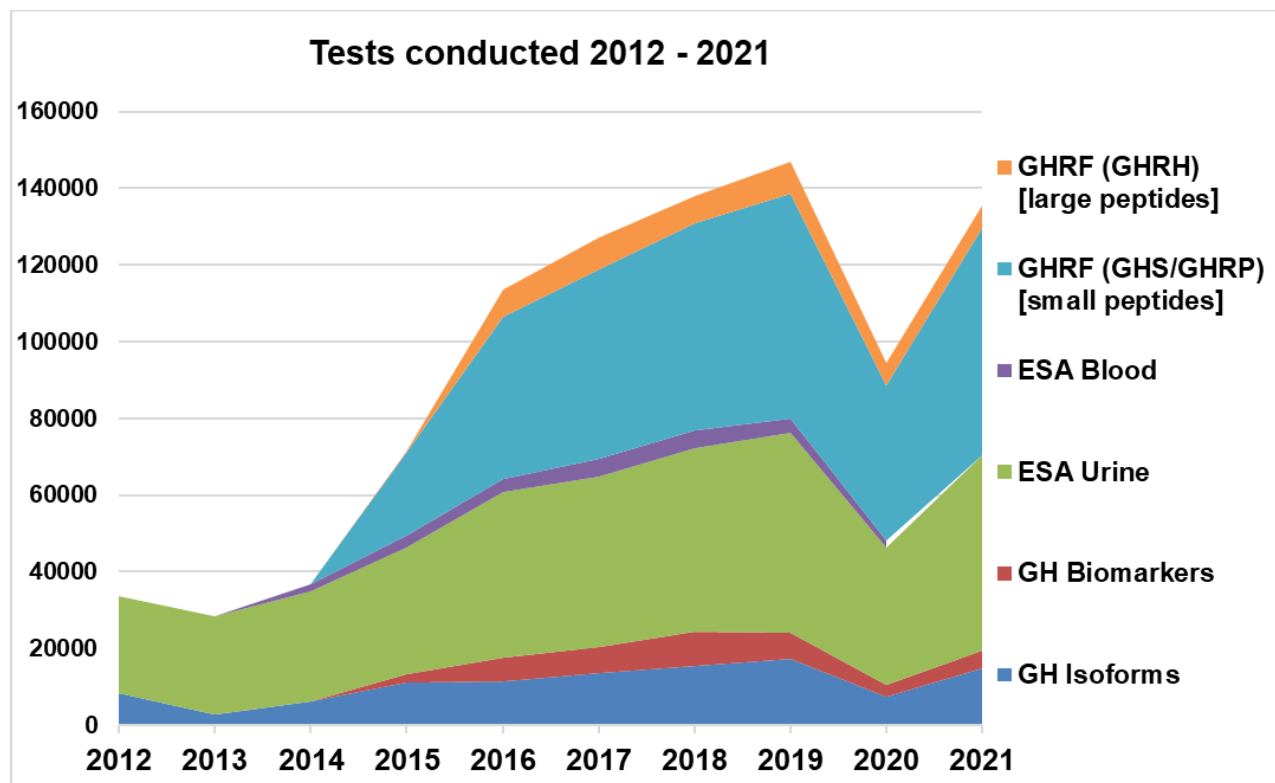
### Growth Hormone (GH)

| Year | GH Isoforms Tests | GH Biomarkers Tests | AAFs Total | # of Sports | # of TAs |
|------|-------------------|---------------------|------------|-------------|----------|
| 2021 | 14,734            | 4,720               | 7*         | 84          | 130      |
| 2020 | 7,509             | 2,855               | 1          | 82          | 114      |
| 2019 | 17,393            | 6,790               | 6          | 103         | 156      |
| 2018 | 15,487            | 8755                | 2          | 99          | 137      |
| 2017 | 13,474            | 7008                | 0          | 90          | 124      |
| 2016 | 11,555            | 5983                | 6          | 68          | 111      |
| 2015 | 11,082            | 2182                | 4          | 74          | 103      |

\* One AAF from GH Biomarker Test

### Growth Hormone Releasing Factors (GHRFs)

| Year | GHRFs Urine Tests | AAFs Total | # of Sports | # of TAs |
|------|-------------------|------------|-------------|----------|
| 2021 | 65,170            | 7          | 104         | 222      |
| 2020 | 46,341            | 13         | 102         | 199      |
| 2019 | 66,990            | 26         | 126         | 234      |
| 2018 | 60,964            | 21         | 124         | 231      |
| 2017 | 57,869            | 19         | 119         | 218      |
| 2016 | 42,730            | 15         | 111         | 207      |
| 2015 | 21,654            | 14         | 88          | 145      |



The Sport segment of the 2021 Report includes more samples in ADAMS that are assigned to specified sport disciplines than in 2020, which suggests that TAs continue to incorporate the TDSSA-defined sport disciplines into their sample collection procedures and documentation and thereby enhances the ability to analyze such figures accurately.

### ADVERSE ANALYTICAL FINDINGS

The 2021 Report does not detail statistics on Anti-Doping Rule Violations (ADRVs). These results are included in a separate ADRVs Report, which details analytical and non-analytical cases and the outcomes of results management. The 2021 ADRVs Report will be published in 2023.

The figures include all analyses conducted in 2021 by the WADA-accredited Laboratories and by the WADA-approved Laboratories (approved by WADA to conduct blood analysis exclusively for the purposes of the ABP blood module).

In reading the 2021 Report, it is important to note that:

- One single result does not necessarily correspond to one athlete. Results may correspond to multiple findings regarding the same athlete or measurements performed on the same athlete, such as in the case of longitudinal studies of testosterone.
- The number of AAFs in the Report may not correspond with the number of ADRVs reported by ADOs. This is because all results are subject to a results management process conducted by ADOs, which includes matching results with Therapeutic Use Exemptions (TUEs) and/or longitudinal studies, which can result in no sanction.
- To help with the interpretation of the 2021 Report, a comprehensive [Question and Answer document](#) is available on WADA's website.

**Table 1: Total Samples Analyzed (All Sports) \***

**A Samples Analyzed**

| <b>Sport</b>                           | <b>Analyzed</b> | <b>AAFs<sup>1</sup></b> | <b>(%)</b>   | <b>ATFs<sup>2</sup></b> | <b>(%)</b>   | <b>Total Findings<sup>3</sup></b> | <b>(%)</b>   |
|--|-----------------|-------------------------|--------------|-------------------------|--------------|-----------------------------------|--------------|
| <b>Olympic Sports <sup>4</sup></b>     | 207,008         | 1,013                   | 0.49%        | 222                     | 0.11%        | 1,235                             | 0.60%        |
| <b>Non-Olympic Sports <sup>5</sup></b> | 34,422          | 547                     | 1.59%        | 90                      | 0.26%        | 637                               | 1.85%        |
| <b>TOTAL</b>                           | <b>241,430</b>  | <b>1,560</b>            | <b>0.65%</b> | <b>312</b>              | <b>0.13%</b> | <b>1,872</b>                      | <b>0.77%</b> |

<sup>1</sup> The Adverse Analytical Findings (AAFs) in this report are not to be confused with adjudicated or sanctioned Anti-Doping Rule Violations (ADRVs). "Adverse Analytical Finding" is defined in the World Anti-Doping Code as "A report from a WADA-accredited Laboratory or other WADA-approved Laboratory that, consistent with the International Standard for Laboratories and related Technical Documents, identifies in a Sample the presence of a Prohibited Substance or its Metabolites or Markers (including elevated quantities of endogenous substances) or evidence of the use of a Prohibited Method." These figures may not be identical to sanctioned cases (number of ADRVs), as the figures given in this report may contain findings that underwent the Therapeutic Use Exemption (TUE) approval process for example.

<sup>2</sup> The Atypical Findings (ATFs) in this report are not to be confused with adjudicated or sanctioned Anti-Doping Rule Violations (ADRVs). "Atypical Finding" is defined in the World Anti-Doping Code as "A report from a WADA-accredited Laboratory or other WADA-approved Laboratory which requires further investigation as provided by the International Standard for Laboratories or related Technical Documents prior to the determination of an Adverse Analytical Finding." ATFs may correspond to multiple measurements performed on the same Athlete, such as in cases of longitudinal studies on testosterone.

<sup>3</sup> Includes AAFs and ATFs.

<sup>4</sup> Olympic sports in this table include sports reported into ADAMS and classified under ASOIF and AIOWF.

<sup>5</sup> Non-Olympic sports in this table includes sports reported into ADAMS and classified as ARISF, AIMS, IPC, Sports for Athletes with an Impairment, other Sports from Code Signatories and Other Sports.

\* These figures do not include blood samples taken for the ABP. Blood samples taken for the ABP can be found in the 2021 Anti-Doping Testing Figures - Athlete Biological Passport (ABP) Report - Blood Analysis.

**Table 2: Comparison of Years 2016 to 2021 - Olympic and Non-Olympic Figures reported in ADAMS**

|                             | 2016<br>A<br>Samples<br>Analyzed         | 2017<br>A<br>Samples<br>Analyzed         | 2018<br>A<br>Samples<br>Analyzed         | 2019<br>A<br>Samples<br>Analyzed         | 2020<br>A<br>Samples<br>Analyzed         | 2021<br>A<br>Samples<br>Analyzed         | 2021 vs 2020<br>(% change) |
|-----------------------------|--|--|--|--|--|--|----------------------------|
| <b>Olympic Sports*</b>      | 193,345                                  | 205,405                                  | 220,659                                  | 227,032                                  | 127,483                                  | <b>207,008</b>                           | 62.4%                      |
| <b>Non-Olympic Sports**</b> | 36,169                                   | 39,827                                   | 42,860                                   | 51,015                                   | 22,275                                   | <b>34,422</b>                            | 54.5%                      |
| <b>TOTAL</b>                | <b>229,514</b>                           | <b>245,232</b>                           | <b>263,519</b>                           | <b>278,047</b>                           | <b>149,758</b>                           | <b>241,430</b>                           | <b>61.2%</b>               |
|                             | 2016<br>AAFs <sup>1</sup>                | 2017<br>AAFs <sup>1</sup>                | 2018<br>AAFs <sup>1</sup>                | 2019<br>AAFs <sup>1</sup>                | 2020<br>AAFs <sup>1</sup>                | 2021<br>AAFs <sup>1</sup>                | 2021 vs 2021<br>(% change) |
| <b>Olympic Sports*</b>      | 1,927                                    | 1,575                                    | 1,659                                    | 1,519                                    | 612                                      | <b>1,013</b>                             | 65.5%                      |
| <b>Non-Olympic Sports**</b> | 1,105                                    | 1,174                                    | 1,115                                    | 1,183                                    | 397                                      | <b>547</b>                               | 37.8%                      |
| <b>TOTAL</b>                | <b>3,032</b>                             | <b>2,749</b>                             | <b>2,774</b>                             | <b>2,702</b>                             | <b>1,009</b>                             | <b>1,560</b>                             | <b>54.6%</b>               |
|                             | 2016<br>% AAFs <sup>1</sup>              | 2017<br>% AAFs <sup>1</sup>              | 2018<br>% AAFs <sup>1</sup>              | 2019<br>% AAFs <sup>1</sup>              | 2020<br>% AAFs <sup>1</sup>              | 2021<br>% AAFs <sup>1</sup>              | 2020 vs 2019<br>(% change) |
| <b>Olympic Sports*</b>      | 1.00                                     | 0.77                                     | 0.75                                     | 0.67                                     | 0.48                                     | <b>0.49</b>                              | 1.9%                       |
| <b>Non-Olympic Sports**</b> | 3.06                                     | 2.95                                     | 2.60                                     | 2.32                                     | 1.78                                     | <b>1.59</b>                              | -10.8%                     |
| <b>Overall</b>              | <b>1.32</b>                              | <b>1.12</b>                              | <b>1.05</b>                              | <b>0.97</b>                              | <b>0.67</b>                              | <b>0.65</b>                              | <b>-4.1%</b>               |
|                             | 2016<br>% Total<br>Findings <sup>2</sup> | 2017<br>% Total<br>Findings <sup>2</sup> | 2018<br>% Total<br>Findings <sup>2</sup> | 2019<br>% Total<br>Findings <sup>2</sup> | 2020<br>% Total<br>Findings <sup>2</sup> | 2021<br>% Total<br>Findings <sup>2</sup> | 2020 vs 2019<br>(% change) |
| <b>Olympic Sports*</b>      | 1.26                                     | 0.82                                     | 0.82                                     | 0.79                                     | 0.61                                     | <b>0.60</b>                              | -1.9%                      |
| <b>Non-Olympic Sports**</b> | 3.29                                     | 3.02                                     | 2.74                                     | 2.53                                     | 2.00                                     | <b>1.81</b>                              | -9.6%                      |
| <b>Overall</b>              | <b>1.58</b>                              | <b>1.18</b>                              | <b>1.13</b>                              | <b>1.07</b>                              | <b>0.82</b>                              | <b>0.77</b>                              | <b>-5.9%</b>               |

**Table 3: Summary - Total Samples Analyzed (ADAMS)**

|                              | Samples        | ATF        | AAF          |
|------------------------------|----------------|------------|--------------|
| <b>ADAMS Urine Total</b>     | 219,122        | 294        | 1,530        |
| <b>ADAMS Blood Total</b>     | 21,340         | 18         | 28           |
| <b>ADAMS DBS Total</b>       | 968            | -          | 2            |
| <b>ABP Total<sup>1</sup></b> | 30,821         | -          | -            |
|                              | <b>272,251</b> | <b>312</b> | <b>1,560</b> |

<sup>1</sup> ABP total in Table 3 also includes ABP samples analyzed by WADA-approved Laboratories in Nairobi (Kenya) and Cairo (Egypt) - please refer to the ABP Report.