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## **Doping Control analysis during the 1<sup>st</sup> Singapore Youth Olympic Games at National Dope Testing Laboratory, India**

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### ***1.0 Introduction***

The 1<sup>st</sup> Singapore Youth Olympic Games (SYOG) was held at Singapore from August 14-26, 2010 with the participation of 3,600 young athletes from 14-18 years of age. The games featured 26 different sports disciplines. The National Dope Testing Laboratory (NDTL), India performed the doping control analysis of urine and blood samples of athletes. Thirty five percent of the athletes were selected to go through the doping control. These Games were the first international major event realized independently by the lab after WADA accreditation.

### ***2.0 Methodology and analytical procedures***

#### ***2.1 Tender and contract for SYOG dope testing***

After receiving the formal invitation for submission of tender, the contract was filled through Government Electronic Business (GeBiz). The same was duly awarded for SYOG2010 to NDTL and thereafter a contract was signed by the SYOGC & NDTL to conduct doping control analysis ensuring quality as per WADA ISL version 6.0

#### ***2.2 Accreditation, quality control and scope of NDTL***

All analytical and managerial procedures of NDTL were accredited by National Accreditation Board of Laboratories, India (as per ISO/IEC 17025: 2005) and WADA International Standard for Laboratories (Ver. 6) <sup>[1,2]</sup>. The Quality Policy of NDTL as described in its quality manual, defines all elements and objectives of the quality management system and organization. Target analytes were defined according to the list of prohibited substances 2010, issued by WADA <sup>[3]</sup>. Prior to the SYOG-2010 games, quality assurance activities, such as the optimization and validation of analytical procedures, training of personnel, reference material traceability and overall organization were ensured. Testing of Erythropoietin (EPO) and various tests of blood viz. Blood Parameters, Human Growth Hormone (hGH), Continuous Erythropoietin Receptor Activator (CERA), Hemoglobin Based Oxygen Carriers (HBOCs) were included in the scope of NDTL just prior to the games. To ensure quality assurance, negative and positive Quality Controls (QCs) were included in all batches and were treated in the same way as the test samples.

### ***2.3 Logistics and Personnel***

The security arrangement at NDTL was controlled by the security staff on duty for 24 hour basis. The access control system, using electronic cards and an electronic database was used for the controlled entry of each individual in three levels of access: reception, operational and controlled zones. To avoid interruptions, all supporting infrastructure had back-ups. The whole laboratory was on centralized uninterrupted power system (UPS).

For all major equipment service personnel in the laboratory were available for 24 hours during the games. All the supplies were kept in stock locally. The NDTL personnel for the SYOG was divided into scientific staff (28 persons) and the administrative and support personnel (09 persons).

### ***2.4 Sample reception***

The delivery of the samples to the laboratory was made by DHL. The samples were received on daily basis for 16 days. The sample receiving time varied between 9:40 am to 11:40 am.. The number of samples from 15 different sports discipline sent to the laboratory per day ranged from 05-129 for urine samples (Total 1168 urine samples) and 01-19 blood samples (Total 125 blood samples) (Figure 1). pH measurements of urine samples ranged from 5-6 in 57 samples, 6-7 in 1006 samples and 7-8 in 223 samples. The specific gravity of urine samples was found to be less than 1.010 in 469 samples and greater than 1.010 in 717 samples. Usage of medication was declared on 82% of the doping control forms with the highest usage of Vitamins and electrolytes followed by anti-inflammatory agents. A total of 10 non-conformances were observed in sample reception of the games viz. name of the athlete mentioned on the doping control form (03), cracked seal (03) and empty sample "A" bottle (04).

### ***2.5 Pre-analysis and aliquoting***

The handling of samples, preparation of aliquots for testing, pre-analysis, screening and confirmation procedures, result management, documentation and reporting process were in accordance with the WADA ISL <sup>[1]</sup>. The pre-analysis consisted of the checking of integrity of the sample and measurement of pH and specific gravity. The samples (blood and urine) were distributed in aliquots to the analysts for different screening procedures. Each suspicious sample was re-prepared and confirmed before release of an Adverse Analytical finding (AAF).

### ***2.6 Sample Preparation & Analytical procedures***

All urine samples were imposed into five parallel analytical procedures. The laboratory equipment used for chromatographic immunological and blood analysis is described in

Table -1 Blood samples were analyzed for specific tests as requested viz. blood transfusion (13), human growth hormone (hGh) (41), hemoglobin based oxygen carriers (HBOCs) (14), continuous erythropoietin receptor activator (CERA) (54). Erythropoietin (EPO) analysis was done for 45 samples.

### ***3.0 Results and Discussion***

#### ***3.1 Screening Analysis***

It was desired by the International Olympic Commission (IOC) to submit the report two weeks after completion of games. In general, no major problems were encountered during the games, in terms of the quality/quantity of sample processing and the time commitment from sample receipt to result reporting. The results were reported in a stipulated time frame as desired by the SYOGC. During SYOG, 616 (Six hundred and sixteen) samples were tested for hCG and LH. Out of 616, 03 (Three) were tested for the confirmation of nandrolone.

#### ***3.2 Blood Transfusion testing***

Out of 125 blood samples received, 31 samples (16 Male & 15 Female) were for blood transfusion test. As a part of the blood transfusion test, all the blood samples were tested for complete blood count (CBC) and reticulocytes. All samples tested were found negative.

#### ***3.3 Therapeutic Use exemptions***

The prohibited substances that may be permitted for use through a certain formal process, named as therapeutic use exemption (TUE), were strictly followed as per the International Standard for Therapeutic Use Exemption and WADA, ISL Ver.6.0 [2,4]. Two samples showed presence of the banned glucocorticosteroids viz. fluticasone and dexamethasone at 11 and 15 ng/ml, respectively. Since the estimated concentration was much below the Minimum Required Performance Limit (MRPL) of 30 ug/ml, hence the samples were reported as negative.

#### ***3.4 Confirmation Analysis***

T/E ratio of 09 samples were found greater than  $> 4$ , but were later reported as negative after the confirmatory analysis by GC-C-IRMS. Two samples were confirmed for the presence of the diuretic furosemide.

#### ***3.5 Adverse Analytical Findings***

Two Adverse Analytical Findings were reported for furosemide (diuretic). The information relevant to support the adverse analytical findings was produced before the SYOGC in the form of documentation package as per the WADA ISL requirements. B samples analysis was not performed for the positive samples as no information was received for the same.

### ***3.6 Re-patriation of samples***

As desired by the SYOGOC, the samples were sent to Lausanne Anti Doping Laboratory in a time-bound manner following proper documentation and guidelines. The terms and condition for repatriation of samples included resealing of A sample, pre-conditioning of sample, registration and listing, sample storage in plastic box, proper temperature maintenance, shipment of documentation with chain of custody and doping control forms.

### ***4.0 Conclusion***

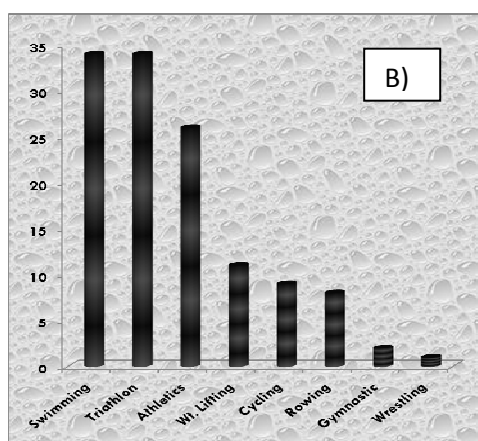
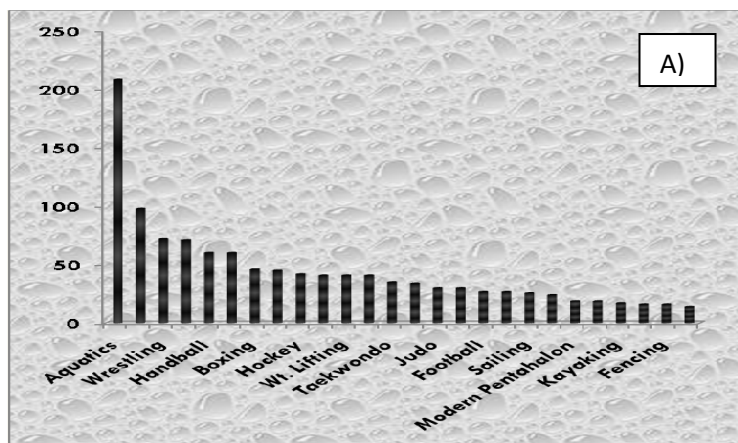
Overall the drug testing for the SYOG was accomplished successfully as per the terms and conditions of the contract with the organizing committee. The doping control analysis during the SYOG imposed a significantly increased daily analytical capacity on the laboratory which proved to be good stress test for handling Commonwealth Games, 2010 testing and has proven to be a tremendous step towards the fight against doping.

### ***5.0 Acknowledgement***

We extend our gratitude to Dr. Patrick Schamasch, IOC Medical Director and SYOGC for considering NDTL, India for testing of samples of SYOG. The funding from Ministry of Youth Affairs and Sports, Govt. of India is also acknowledged.

### ***6.0 References***

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**Figure 1:** Event-wise distribution of A) urine samples and B) blood samples received during SYOG 2010.

**Table 1:** List of Analytical equipment and procedures used during SYOG.

Screening Procedure	Instrument	No. of equipment	Tested for	Sample
Screening I	GC-NPD/MSD	02	Stimulant and Narcotics	Urine
Screening III	GC-MSD	02	HES & Dextran	Urine
Screening IV A	GC-MSD	04	Anabolic Steroids & few other drugs	Urine
Screening IV B	GC-MS/MS	02	Anabolic Agent (Low)	Urine
Screening VII	ELISA	02	hCG & LH	Urine
Screening VII	LC-MS/MS	04	Corticosteroids, Diuretics, Beta Blockers and other heat labile drugs	Urine
Screening IX	GC-C-IRMS	02	Endogenous steroids	Urine
	GC-MSD	01		
Screening X	Luminometer	01	Human Growth Hormone	Blood
Screening XI	Symex XT	01	Blood Parameters	Blood
Screening XII	Multiphor II	02	Erythropoietin (EPO)/ CERA	Urine/Blood
	Fuji Camera	01		
Screening XIII	Flow Cytometer	01	Blood Transfusion	Blood
Screening XIV	LCMS/MS		HBOCs	Blood