Drug Testing and Analysis

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Editorial: Special issue on the 7th Symposium of the EWDTS on Workplace Drug Testing

Workplace drug testing (WDT) is an interdisciplinary topic thus concerning not only people directly involved with the testing, i.e. laboratory personnel and collectors, but also employees and their representatives, human resources personnel, occupational physicians, risk assessors, compliance officers, lawyers (for the company and for the employees), drug counselling and treatment providers and policy-makers. The situation becomes more challenging when WDT needs to be performed in a heterogeneous continent as Europe is, with its different cultures, trade unions' influence, health and safety policies, languages and laws. This was realized as early as 1998, when the EWDTS was founded primarily to ensure that WDT in Europe is performed according to a defined quality standard and in a legally secured way and secondly to provide an independent forum for all aspects of WDT. The first aim is fulfilled via the formulation of drug and alcohol testing guidelines for urine,[1] hair,[2,3] and oral fluid.[4,5] The former two are already accepted by the European Co-operation for Accreditation, (EA) as advisory documents.[6] The oral fluid guidelines have been submitted to the EA and are waiting to be accepted. The second EWDTS goal is mainly achieved through the Society's biannual international symposia: in Huddinge, Sweden (1998), in Rimini, Italy (2000), in Barcelona, Spain (2003), in Dublin, Ireland (2005), in Stockholm, Sweden (2007), in Copenhagen, Denmark (2009), and the last one, held in Edinburgh, Scotland (2011). Thanks to John Wiley & Sons Ltd, this special issue contains 7 of the 21 sessions presented at this last meeting. The latter are briefly outlined below and can be grouped in the following sections.

Introduction: New trends in drug supply and use in Europe

Ms L. Vandam from the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA, Lisbon) opened the symposium with an overview of the changes in drug supply and use in Europe as reported by the EMCDDA for 2010. The increasingly sophisticated techniques used to conceal and smuggle cocaine into Europe were reviewed, such as that involving the incorporation of cocaine base or hydrochloride into carrier materials such as beeswax prior to export, followed by its extraction in clandestine laboratories at the EU borders. While the use of amphetamines was reported to remain generally lower than that of cocaine in Europe, the use of cannabis appears to be rising in eastern Europe. As much as 24 new psychoactive substances were reported to the EMCDDA and Europol via the EU early-warning system in 2009 and 41 in 2010.[7] Such an input is very relevant for policy-makers in helping them to update the country-specific drug profiles to be screened for.

Legal basis and WDT policy

In a perspective, Ms A. Pierce (PPM Consultants, Ireland) points out that WDT in Europe is very heterogeneous, includes alcohol testing, and is performed generally as part of a Health and Safety policy.[8] It is not unusual that in the same country a company has a WDT policy and another has not. While in the USA, Australia, and New Zealand, WDT is very rigidly regulated, European countries and companies are more adaptable to alternative testing matrices, namely oral fluid and hair. Ms A. Pierce concludes this perspective by remarking that special care needs to be given to the growing range of available intoxicants and both the European countries and the USA will possibly need to update its WDT screening profiles.[8] In his oral presentation, Mr J. O'Sullivan (Claymon-Biomnis, Ireland) précised that many European countries allow testing when there is a health, safety, or security risk, or when it is deemed 'necessary' or 'proportionate', or is 'justified' or 'reasonable', or when there is a 'reasonable suspicion' that an employee is under the influence of an intoxicant (whether legal or illegal). In many countries, the occupational health physician can only inform the employer whether an employee is 'fit for work' or 'unfit for work' rather than revealing the full results. There are wide differences in practice between countries on the issue of pre-employment testing in comparison with the testing of existing members of the workforce. A number of countries have specific legislation on drug testing in the workplace while, in others, indirect legislation exists in the areas of privacy and data protection that regulates to some extent the type of testing that can take place. Several court cases have examined different aspects of WDT in Europe and in general the outcome was favourable to its practice. In nearly all cases discussed, dismissals of employees because of a positive drug test were confirmed by the courts.[9] Ms L. Hadfield (Concateno, UK) outlined the key elements of a workplace policy: (1) a clearly worded policy, developed through consultation, including who and when to test, the test method, and the consequences of a positive result; (2) education around the issues of drugs and alcohol; (3) support for those who may need it; and (4) monitoring compliance with the policy, including the use of testing, thus providing rules and solutions that address both impairment and dependency.[10] Finally once the policy is written, it is important to revise it from time to time.

WDT case studies from Germany, Ireland, Italy, and Turkey

Even though no regulated WDT exists in Germany, drug testing for re-licensing is very rigorous. Since 1955, as part of their rehabilitation, drivers under the influence of drugs or alcohol must pass a medical and psychological test in order to regain a revoked driving license.[11,12] Prof. B. Dufaux (Labor Krone,

Germany) compared the positivity rate of drugs of abuse including benzodiazepines and alcohol tested in 20 000 urine samples to 5400 hair samples analyzed during the 18 months following the revised guidelines for driver license re-granting.[13] Compared to the other WDT international guidelines, the latter [14] use extremely low cut-offs such as 25 ng/ml opiates in urine, 0.02 ng/mg cannabis in hair, and 0.007 ng/mg ethyl glucuronide in hair (EtGH). Impressive was the reported six-fold increased detection of EtGH compared to urine in 2010 and 10-fold increased EtGH detection in 2009.[15] Generally, for abstinence monitoring, hair testing is more efficient than urine and well accepted by clients. It avoids the necessity for the client to be available for several months at short notice and supervised urine collection. Remarkable was the case presented by the General Secretary of the Irish Technical, Engineering, and Electrical Union, Mr E. Devoy, involving a worker who was suspended from the job due to the detection of 8.6 ng/ml cannabis metabolite in urine! The importance of the EWDTS guidelines as advisory documents was highlighted as useful for the negotiation of WDT policies and to protect the workers in court litigations. Four enthusiastic presentations showed the different facets, experiences, and constructive criticism of the newly adopted WDT regulations in Italy.[16] WDT was introduced in Italy on 30 October 2007 through a law regulating the procedures for the investigation of the use of drugs of abuse in safety sensitive jobs. Dr C. Stramesi (Department of Legal Medicine, University of Pavia, Italy), reported that WDT in Italy is done at two levels: the first level involves a screen for opiates, cocaine, amphetamines, cannabinoids, methadone and buprenorphine in urine; this is followed by the second level (in case of a positive screen) which involves a test for the same drugs in both urine and hair to diagnose if there is a drug dependence. Dr De Nardis (Institute of Occupational Medicine, Rome, Italy) critically interpreted the unexpectedly low number of positive samples (at least when compared to the recent prevalence drug use data[17]) to possibly the present non-random mode of testing.[18] A corresponding letter by Dr Fucci (Institute of Legal Medicine, Catholic University, Rome) focuses on the false positive cannabis results and stresses that confirmation of the screening results with chromatographic methods is a must for such medico-legal cases.[19] This was confirmed by Ms Vignali (Department of Legal Medicine, University of Pavia, Italy) who stated that the necessary confirmation analysis after a positive on-site drug testing occurs either very late or not at all. In fact, in the period from 2008 to 2010, only a third of the workers who were screened positive for drugs of abuse (56 of 177) were referred to an Addiction Treatment Unit to proceed with the second level testing. Moreover, hair analysis was not prescribed in 20% of the cases, although it was meant to be obligatory. Another critic, which may account for the generally reported high rate of negatives, is the fact that the samples are also sent for confirmation to unauthorized laboratories often lacking experience on drug analysis. Such critical reports will hopefully help to assess the effectiveness of the current drug-free workplace programme and legislation in Italy. In a corresponding letter, Akgür *et al*. open a window into the Turkish legislation and new recent developments regarding WDT in Turkey.[20] The Turkish Labour Law indicates the prohibitions of using alcoholic beverages and narcotics at work but does not contain any information about drug testing; occupational physicians are expected to recognize the employees with drug problems in a pre-employment clinical evaluation and eventually educate them about the hazards related to substance abuse at the workplace. Pre-employment drug testing was introduced in 2008 at İzmir as part of the clinical examination for professional drivers; in 2011, in a new legislation, drug testing for marijuana, cocaine, amphetamines, and opiates was added to the routine tests to obtain the Sailor's Health Report.[20] In both tests, drugs are screened for and eventually confirmed in urine according to the EWDTS guidelines.[1]

Pre-analytical aspects, marketing and sample collection

Ms K. Miller (Immunalysis Corporation, USA) clearly illustrated that marketing campaigns must clearly outline the targeted advantages and benefits for an organization and its employees and that the strengths and weaknesses of the different matrices should be well explained. Implementation strategies including collector training programmes and logistics protocol must be developed to ensure specimens are collected properly, shipped in a timely manner, and that the chain of custody remains intact. Mr C. Woods (DISA, USA) discussed the current best practices for managing contractor compliance through employee screening and opportunities for programme expansion internationally, particularly for the petrochemical industry. Specimen collection is one of the key stages of the WDT process which can present challenges, as indicated by Mr Björklöv (Drugtest Scandinavia, Sweden), particularly when involving collections for multinational companies in which different WDT guidelines apply. Dr C. George (Concateno, UK) gave an overview of some of the many possible ways in which a sample can be adulterated. Consequently, collectors, laboratory analysts, and medical review officers (MROs) need to understand the possible mechanisms for sample adulteration and its consequences on the final drug test result. A well-defined and thorough collection protocol should minimize or prevent the opportunity for sample adulteration. Guidelines, particularly from the EWDTS, UKWDTF, and SAMHSA, can be very useful also in this issue, as they include criteria to minimize specimen adulteration or substitution.[21]

Alcohol and drug testing in different matrices

In a research article, Dr P. Marques (Pacific Institute for Research and Evaluation, USA) focuses on the potential of the alcohol biomarkers phosphatidylethanol (PEth), percent carbohydrate deficient transferrin (%CDT), gammaglutamyltransferase (GGT), gamma %CDT (γ%CDT), and EtGH for workplace screening in estimating worker fitness.[22] Testing for alcohol is a very relevant issue in Europe, it being the most common toxicological finding, both in seriously and fatally injured drivers as revealed by a three-year survey conducted in nine European countries.[23] As reported in a perspective byDr Tsanaclis[24] (Cansford Laboratories Limited, UK), the advantages of hair testing is attributed to its much longer detection window include the fact that (1) a negative hair test is a stronger indicator of a non-drug user than a negative urine test; (2) hair testing can detect as much as ten times more drug users compared to urine testing; and (3) hair analysis, unlike urinalysis, can indicate the frequency of drug use.[24] On the other hand, impairment can be shown by the analysis of drugs in blood or oral fluid, not by using urine or hair. Apart from this advantage, in a short communication,[25] Dr C. Moore (Immunalysis Corporation, USA) explains that drug testing in oral fluid often detects more offenders than urine does. Oral fluid is experiencing increasing popularity in many areas of drug analysis, particularly because of its ease of observed collection, difficulty of adulteration, and

reflection of recent drug intake. The cut-offs for drug testing in oral fluid proposed by the EWDTS[4,5] can easily be reached with the existing standard technology, thus making the implementation of oral fluid testing programmes easily adaptable. Moreover, immunoassays for the detection of the drug classes at recommended levels have been developed using cost-effective enzyme-linked immunosorbent assay (ELISA) platforms which provide faster turnaround than mass spectral methods.[25]

The role of the Medical Review Officer (MRO)

In her presentation entitled *Do we really need an MRO?* Ms Vangikar (Toxicology Consultant, UK) attempted to define the role of the MRO and the competencies necessary for the tasks and to answer fundamental questions from the American and UK/European approach as: (1) how they serve both employer and employee; (2) what the recommended information flow is between an employee, the company, other healthcare professionals and the MRO; and (3) what happens in a medical review.[26] Current practice and common problems concerning substance abuse testing in the UK offshore oil and gas industry were discussed by Dr G. Furnace (Oil & Gas UK). The MRO session was concluded by Dr B. Guest (Caritas Limited, UK) who skillfully 'confessed' some of his decisions as an MRO following drug positive result cases from rail, construction, and off-shore industries.

Conclusion: Combining legal basis and toxicology

The Symposium was concluded by a roundtable discussion concerning the EWDTS urine, hair, and oral fluid guidelines represented by Dr L. J. Mostert (Van Weel-Bethesda Hospital, the Netherlands), Dr R. Agius (Labor Krone, Germany), and Dr G. Cooper (University of Glasgow, UK) respectively. Ms J. Eccles from the United Kingdom Accreditation Service gave an overview of ISO17025[27] accreditation in relation to toxicology laboratories and explained how accreditation can improve robustness in laboratory operations thus raising customers' confidence in analytical results.

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