UKNEQAS Pilot Surveys for Drugs of Abuse in Oral Fluid

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INTRODUCTION

A 2008 survey by the United Kingdom National External Quality Assessment Schemes (UKNEQAS) assessed the nature and quality of testing services for drugs in oral fluid.

SAMPLES

Ten 1ml volumes of undiluted human oral fluid spiked with weighed-in concentrations of various drugs and preserved with 0.05% bronidox, 0.1g/L gentamicin and 0.1g/L penicillin were distributed to participating laboratories on two occasions.

TESTING SITES

The samples were analysed by a total of 22 sites from various sectors, with several sites working in more than one sector (Fig. 1).

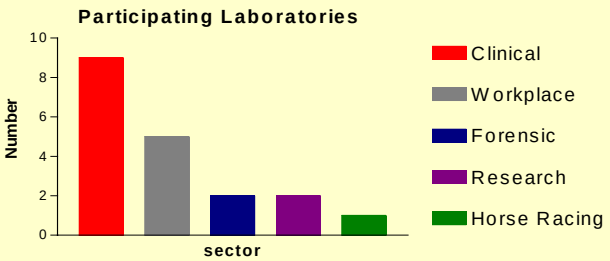

Figure 1

Annual workloads varied from zero (lab establishing a new service) to > 100,000 samples. The median workload was 500 samples per annum.

A variety of oral fluid collection devices were reported as being used; none, Cozart Oral Swab, Greiner Bio-One, Intercept, Oralab6, Quantisal, Salivette and Statsure. Dilution of collected samples was generally either none or 1 part oral fluid to 3 parts buffer.

THRESHOLDS

Thresholds reported by questionnaires that accompanied the surveys appeared to be those specified by the manufacturers of immuno-based methods, by the DRUID project, and from in-house chromatographic limits of detection (Table).

RECOVERY OF COLLECTION DEVICES

The first set of 6 samples tested recovery of oral fluid collection devices. Sites were asked to extract 3 samples containing drugs at relatively high concentration using their routine oral fluid collecting device before analysis. The next 3 randomised samples were 1 in 4 dilutions with blank oral fluid of the first 3 samples. Sites analysed the latter directly.

Devices showed no significant loss of performance in detection rate nor quantitative measurements for delta-9-tetrahydrocannabinol (THC 130% recovery), cocaine metabolite (BZE 103%), 6-monoacetylmorphine (6-MAM 112%) and morphine (87%) (Fig. 2).

ANALYTICAL THRESHOLDS

Median reported values adopted by UKNEQAS

Screening tests	µg/L	Single analytes	µg/L
Amfetamine group	35	Amfetamine	20
		Methyl-amfetamine	15
		MDMA / MDA / MDEA	15
Barbiturate group	50	Specific barbiturate	5
Benzodiazepine group	15	Specific benzodiazepine	3
Cannabinoid group	4	Delta-9-THC	1
Cocaine metabolites	20	Benzoylecgonine	6
		Cocaine	5
Methadone or metabolites	25	Methadone	9
		EDDP	12
Propoxyphene or metabolites	23	Propoxyphene or metabolite	35
Opiate group	40	Morphine	13
		6-monoacetylmorphine	4
		Codeine	15
		Dihydrocodeine	10
Buprenorphine or metabolites	1	Buprenorphine or metabolites	1
Phencyclidine	6	Phencyclidine	8
LSD or metabolites	1	LSD or metabolites	1

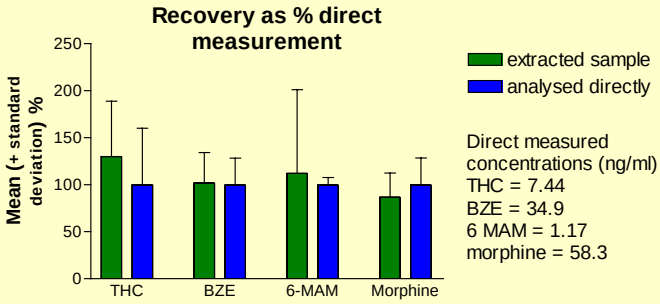

Figure 2

ANALYTICAL PERFORMANCE

The second survey tested analytical performance relative to the median reported cut-offs from survey 1. Five drugs were included at 2 concentrations over 4 samples. For each drug, concentrations were 1.5x the screening cut-off and 1.5x the single analyte threshold. Buprenorphine was the exception, both cut-off values being the same.

The main source of false negative reports derived from under performance by immunoassay products (Fig. 3).

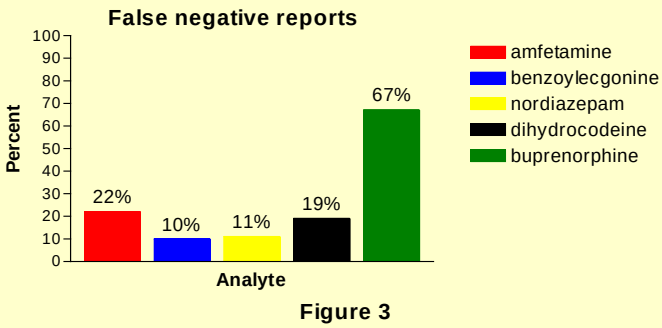

Figure 3

A further 38% of sites missed dihydrocodeine as it fell outside the fixed range of analytes on which they reported.

CONCLUSION

Laboratories are advised to use immunoassay kits with thresholds appropriate for use in oral fluid testing.