

## INTRODUCTION

The number of individuals reporting the use of LSD in the UK, and the number of LSD related visits to Emergency Departments in the US have shown a dramatic decline in recent years (1,2). However, despite this apparent downturn in the use of LSD, there are still considerable quantities of LSD seized by law enforcement agencies (3).

Because LSD continues to be seized, and due to its current link to the dance and rave scenes, there remains a requirement to be able to identify LSD abuse for both clinical and occupational monitoring purposes.

Owing to the small doses taken, the concentrations that are achieved, and the short half-life of the drug, very specific and sensitive techniques need to be employed to detect LSD use. The use of the 2-oxo-3-hydroxy-metabolite of LSD (OH-LSD) has proved to be a better method of detection of LSD use due to its larger concentration and resultant longer detection window (4).

## METHODS

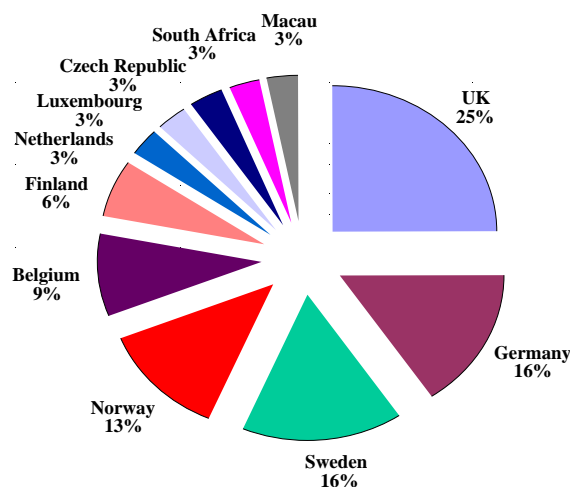
There are several laboratories that offer both screening and confirmatory testing for LSD using immunological, chromatographic, or a combination of both techniques. As part of its remit, The United Kingdom National External Quality Assessment Scheme (UKNEQAS) for Drugs of Abuse in urine has evaluated the analytical performance of such laboratories. The evaluation was performed by review of the results that participants returned following their analysis for the presence of LSD.

A total of 7 specimens containing LSD and/or OH-LSD were distributed to scheme participants as part of routine surveys between November 2003 and August 2004. Samples were prepared by spiking weighed-in concentrations of the drugs to urine specimens often in combination with other abused drugs and metabolites. The concentration of LSD spiked ranged between 3 and 10 µg/L with only a single concentration of 160 µg/L being used for OH-LSD.

Laboratories were asked to analyse the samples as per their normal practice (for either clinical or workplace drug testing) and to report accordingly. In addition, they were asked to provide details of the techniques and test results that they had used to generate the overall report.

## RESULTS

There are currently around 200 laboratories enrolled in the UKNEQAS drugs of abuse EQA scheme. Subsequent to the review of the analytical returns, it was found that a mean of only 16% of participants (32 laboratories) analysed for LSD. The origin of the 32 laboratories that reported for LSD for EQA sample code number 195 is illustrated below: -



Of this scheme cohort of 32 participants, 29 (91%) could correctly identify the presence of LSD in spiked specimens. However, it was also found that on average, 13 laboratories (46% of participants) reported the presence of LSD for specimens spiked with only OH-LSD, and that 12 laboratories (43%) reported LSD as 'not found'. Further analysis of the data submitted for the two EQA samples that contained only OH-LSD (samples numbered 191 and 195), found the following: -

- 1) HPLC was used by two laboratories, and on one occasion this technique gave rise to a false positive LSD result.
- 2) GCMS was used by two laboratories, but OH-LSD was only reported as present by one (1 false negative result).
- 3) LCMS was the predominant confirmatory technique used for LSD analysis.
- 4) Of the 14 laboratories using chromatography for LSD confirmations, only 6 used immunoassay screening assays.
- 5) For both samples 191 and 195, seven laboratories using chromatography reported LSD as negative but gave no report for OH-LSD

## DISCUSSION

The EQA samples spiked with LSD were generally detected well using either screening immunoassay or chromatographic techniques. However, when OH-LSD was added to samples, the screening techniques reported LSD as present with 7 chromatographers reporting LSD as absent, but failing to identify OH-LSD.

Laboratories generally screened samples using immunological methods prior to confirmation hence immunoassay cross-reactivity accounts for the detection of LSD and OH-LSD when either or both were added to the samples. However, the chromatographic methods used for confirmation appeared to be selective for LSD only.

Reports based solely on immunoassay are thus for 'LSD-use' and not necessarily the presence of LSD. For those taking the chromatographic-only approach to analysis, it could be inferred that the 7 laboratories who reported LSD as not found, but who gave no report on OH-LSD, may be failing to detect previous use of LSD.

## REFERENCES

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