



Performances of drugs of abuse tests with urine samples Nine years of EQA results

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Introduction

The CSCQ - which organises external quality assessment (EQA) programmes - carried out a retrospective analysis of the qualitative results reported by the participants to assess the performances of POC tests and analysers for the drugs of abuse urine screening in field conditions. Indeed, few studies are available on that topic.

Material and methods

The qualitative EQA results provided between 2008 and 2016 by medical offices (using POC tests) as well as private and hospital laboratories (using POC tests and analysers) were analysed.

Four urine samples, each containing 0 to 8 drugs each (5 on average), were sent annually to the participants.

If positive, the drug concentration was clearly above the cut-off of all analysers and POC tests: no borderline concentration was used.

We first calculated the percentages of false positive and false negative results for 17 different drugs, and then the sensitivity and specificity.

Results

We received a total of 50444 EQA results during the nine-year period. 67% of the results were obtained with POC tests (both in laboratories and medical offices) and 33% by analysers.

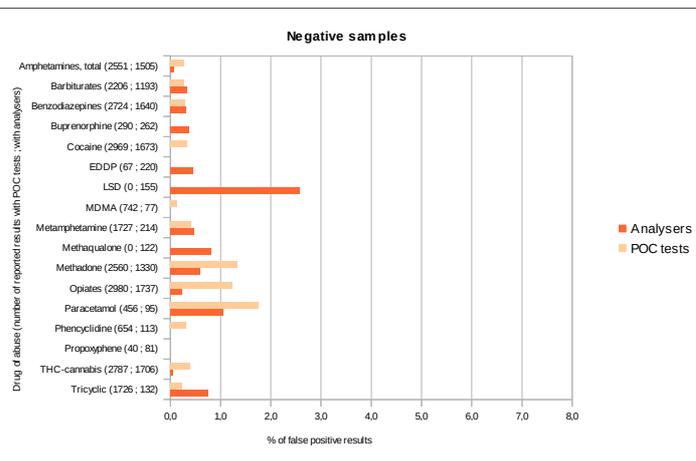
All drugs were tested by both methods, i. e. POC tests and analysers: however, analysers only were used to test for LSD and Methaqualone.

The percentages of false positive and false negative results are illustrated in the graphs on the right.

For POC tests, the sensitivity ranges from 94.7 to 100%, and the specificity is between 98.2 and 100%.

For the analysers, we have a sensitivity from 92.9 to 100%, and a specificity from 97.4 to 100%.

Errors are randomly distributed among the different users, POC tests, and analysers.



Discussion

Participating in EQA surveys allows monitoring most analytical phases.

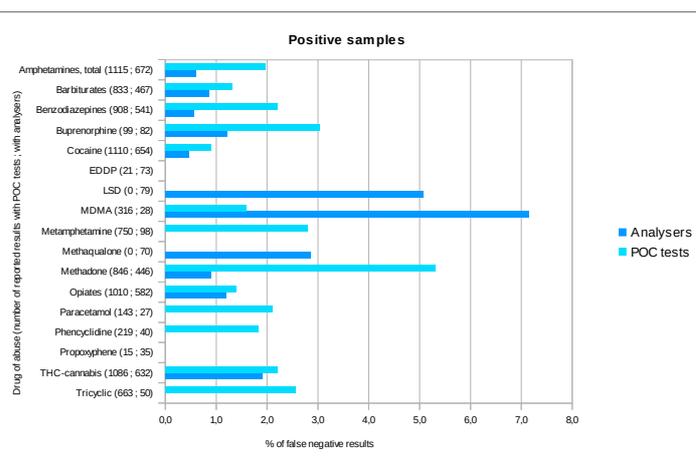
With negative samples, false positive results are below 1% for most methods and drugs. We can therefore assume that random errors (e.g. samples exchange, kit misuse, transcription error) are expected to be around 1%.

However, for the LSD, the percentage of false positive errors is higher (2.6%).

On the one hand, the low percentages of false positive results reveal the low cross reactions rate and are thus quite encouraging.

On the other hand, there could be specificity issues for positive samples since the percentages of false negative results are above 1% for some drugs, especially for the Methadone (POC test), and also for the LSD and the MDMA (analysers). This could be due to the use of expired or near to the expiration date tests.

It is interesting to notice that the drugs that obtained the lowest specificity are not the same for POC tests and for analysers.



Conclusions

EQA results show the high sensitivity and specificity of POC tests and analysers for the urine screening of drug of abuse. However, for a few drugs, there could be sensitivity and specificity issues, with relatively high percentages of false positive and false negative results.

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