Breath study brings roadside drug testing closer

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(Phys.org) —A group of researchers from Sweden have provided further evidence that illegal drugs can be detected in the breath, opening up the possibility of a roadside breathalyzer test to detect substances such as cocaine, amphetamines and *cannabis*.

Using a simple, commercially available breath sampler, the researchers have successfully identified a range of 12 substances in the breath of 40 patients recruited from a drug emergency clinic in Stockholm.

Their findings have been published today, 26 April, in IOP Publishing's *Journal of Breath Research*.

Blood, urine and saliva are the most popular methods for detecting illegal drugs and are already used by law enforcement in a number of countries; however, exhaled breath is seen as a promising alternative as it's easier to collect, non-invasive, less prone to adulteration and advantageous when location becomes an obstacle, such as at the roadside.

Exhaled breath contains very small particles that carry non-volatile substances from the airway lining fluid. Any compound that has been inhaled, or is present in the blood, may contaminate this fluid and pass into the breath when the airways open. The compounds will then be exhaled and can subsequently be detected.

In this study, researchers from the Karolinska Institute in Stockholm

collected breath, blood plasma and urine samples from 47 patients (38 males, 9 females) who had taken drugs in the previous 24 hours and were recovering at a drug addiction emergency clinic.

Interviews were also undertaken with each patient to assess their history of drug use.

The breath samples were taken using a commercially available sampling device – SensAbues – and then analysed using liquid chromatography and mass spectrometry.

The portable sampling device consists of a mouth piece and a micro-particle filter. When a patient breathes into the mouth piece, saliva and larger particles are separated from the micro-particles that need to be measured.

The micro-particles are able to pass through and deposit onto a filter, which can then be sealed and stored ready for analysis. Breath samples were analysed for twelve substances.

Alprazolam and benzoylecgonine were detected in exhaled breath for the first time, whereas for methadone, amphetamine, methamphetamine, cocaine, morphine, 6-acetylmorphine, tetrahydrocannabinol, buprenorphine, diazepam and oxazepam, the results confirmed previous observations.

"Considering the samples were taken 24 hours after the intake of drugs, we were surprised to find that there was still high detectability for most drugs," said lead author of the study Professor Olof Beck.

"In cases of suspected driving under the influence of drugs, blood samples could be taken in parallel with breath when back at a police station. Future studies should therefore test the correlation between

blood concentration of drugs of abuse and the concentrations in exhaled breath."

More information: "Detection of drugs of abuse in exhaled breath using a device for rapid collection: comparison with plasma, urine and self-reporting in 47 drug users" *J. Breath Res.* 7 026006 iopscience.iop.org/1752-7163/7/2/026006

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