New technique enables drug tests via exhaled breath

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A new study from the Swedish medical university Karolinska Institutet presents a new technique that makes drug testing possible through exhaled air for the first time. By examining people who had received emergency care for an amphetamine overdose, the researchers found that in all cases there were traces of amphetamine and metamphetamine in the exhaled breath.

"Traditionally, drugs tests have been carried out using urine and blood samples," says Professor Olof Beck, who led the study. "In recent years we've been trying to find simpler alternatives using saliva, which, unfortunately, has proved difficult. Our results open the way for a new kind of drugs test, which is simple and safe to conduct and that requires no integrity-violating monitoring or medical staff."

Drug abuse is a huge social problem and drugs tests are used widely and comprehensively by the healthcare and social services, the legal system, at workplaces and schools. Reliable drugs tests are important for making correct diagnoses and for keeping tabs on drug users to ensure that they are following their prescribed treatment. Alcohol use can easily be checked in a breathalyser, and the technology is available for conducting measurements in a way that does not violate a person's integrity. Measurements of other substances in the exhaled breath are also available for diagnosing diseases such as cancer, asthma and diabetes.

In this present study, which is published in the latest issue of the *Journal of Analytical Toxicology*, scientists at Karolinska Institutet have

developed a new and unique method for collecting narcotic substances from the exhaled breath. This they did by asking subjects to breathe into a specially designed mask for ten minutes, whereupon the exhaled air was collected and passed through a filter, which trapped the narcotic substances. These filters were then analysed using combined liquid chromatography and tandem mass-spectrometry, techniques that are highly sensitive and reliable.

The researchers took samples from 12 patients who had been admitted into emergency care with toxic symptoms after having taken amphetamines. The samples were taken after the effects of the drug had worn off and with the permission of the regional ethical review board in Stockholm. The ingestion of the drug was confirmed in the patient group through urine and blood samples. In all cases, the researchers were able to ascertain the presence of amphetamine and metamphetamine (a narcotics-classed central-stimulating substance similar to amphetamine) in the exhaled breath as well. The measured excretion rate was between 0.2 and 139 pg/min, which is very low compared to the blood and urine. No amphetamine or metamphetamine were detected in samples from healthy controls.

"The results are convincing and very promising," says Professor Beck. "The study is the first to report the possibility of measuring drugs in the exhaled breath, and represents a unique, unexpected finding. We now have to move on to other drugs that are of interest for this type of breath test, and to develop the sampling and analysis methods. An instrument like a breathalyser for drugs would be the optimal solution for the efficient control of drug use by motorists, for example."

More information: 'Amphetamines Detected in Exhaled Breath from Drug Addicts: A New Possible Method for Drugs-of-Abuse Testing', Olof Beck, Kathinka Leine, Göran Palmskog & Johan Franck, Journal of Analytical Toxicology, June 2010, Volume 34, Number 5, pages

233-237, online 18 May 2010.

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