Study tracks illicit drug use through Europe's sewage system

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Sewage epidemiology is a powerful tool for monitoring public health

(Medical Xpress)—The largest multi-city study using sewage to monitor drug usage across Europe has been published today in the scientific journal *Addiction*.

Scientists from the University of Bath are part of the Europe-wide SCORE network (Sewage analysis CORE group) that analysed waste water from over 40 European cities during a one-week period over consecutive years (2011-13) to explore how the drug-taking habits of

these populations has changed.

Its conclusions are taken up in the European Drug Report 2014, launched by the European Monitoring Centre for Drugs & Drug Addiction (EMCDDA) this week, as well as in an online interactive analysis by the agency dedicated to the issue (Perspectives on drugs).

From London to Nicosia and Stockholm to Lisbon, the study analysed daily waste water samples from waste water treatment plants over a one-week period in April 2012 and in March 2013. In 2012, the study involved 23 cities in 11 countries, while in 2013 it was broadened to 42 cities in 21 countries. Data from a 2011 study (19 cities, 11 countries) were used for comparison.

The scientists used highly sensitive mass spectroscopy techniques to look for tiny traces of biomarkers for cocaine, amphetamine, methamphetamine, ecstasy and cannabis in waste water from approximately 8 million people.

The results provide a valuable snapshot of the drug flow through the cities involved, revealing marked regional variations in drug use patterns.

Traces of cocaine, for example, were higher in western and some southern cities but lower in northern and eastern cities. Use of amphetamine, while relatively evenly distributed, showed the highest levels in the north and northwest of Europe. When weekly patterns of drug use were examined, cocaine and ecstasy levels rose sharply at weekends in most cities, while methamphetamine and cannabis use appeared to be more evenly distributed throughout the week.

Methamphetamine use, generally low and traditionally concentrated in the Czech Republic and Slovakia, now appears to be present in the east of Germany and northern Europe.

Lead investigator from the University of Bath, Dr Barbara Kasprzyk-Horden, said: "Analysing sewage for estimating drug use has huge potential for monitoring the health of populations. Traditional epidemiological methods rely on surveys, which are time consuming, expensive and can be inaccurate due to self-reporting bias.

"However waste water profiling is non-intrusive and can show changes in local populations in real time, with a large sample size and can be used alongside existing epidemiology methods to give important information on drug use and markets across Europe.

"This tool is exciting because it could also be used to identify the use of new dangerous 'legal highs' that have not yet been banned.

"It also has potential to be used to monitor biomarkers for diseases such as cancer or trace the spread of flu epidemics in real time and could be a really powerful tool for improving public health."

More information: Ort, C., van Nuijs, A. L. N., Berset, J.-D., Bijlsma, L., Castiglioni, S., Covaci, A., de Voogt, P., Emke, E., Fatta-Kassinos, D., Griffiths, P., Hernández, F., González-Mariño, I., Grabic, R., Kasprzyk-Hordern, B., Mastroianni, N., Meierjohann, A., Nefau, T., Östman, M., Pico, Y., Racamonde, I., Reid, M., Slobodnik, J., Terzic, S., Thomaidis, N. and Thomas, K. V. (2014), "Spatial differences and temporal changes in illicit drug use in Europe quantified by wastewater analysis." *Addiction*. doi: 10.1111/add.12570

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