

Municipal Wastewater Provides Clues to Community Drug Use

A team of researchers from Oregon State University and the University of Washington has developed an automated monitoring method that makes it possible to detect traces of drugs, from cocaine to caffeine, in municipal wastewater and monitor the patterns of drug use in entire communities. Their findings were reported last August at the American Chemical Society meeting in Boston.

The presence of both pharmaceutical and illicit drugs in municipal wastewater has been known for several years, beginning with European studies that tracked drugs in sewage and river water. Oregon State University chemist Jennifer Field and her colleagues have developed new methods of analysis so that detection is possible from very small samples taken automatically over a 24-hour period from wastewater as it enters a treatment plant.

The analyses can detect the presence of a long list of illicit drugs, from methamphetamine to Ecstasy, and other markers of human presence such as caffeine and cotinine, a product of nicotine from cigarette smoke.

Although wastewater is often tested for contaminants after it is treated as a measure of potential environmental impact, this new approach tests sewage as it enters a wastewater treatment plant and before it is treated, to get a profile of the drugs being used in the community.

Finding patterns of drug consumption in the wastewater can alert municipalities to problems that occur in particular communities or at particular times. This may be useful for tracking such things as the geographic patterns of methamphetamine use.

The researchers tested wastewater from ten mid-sized (unnamed) municipalities, calculating the concentrations of individual drugs and using the volume of wastewater flowing into the treatment plant and the municipal population in order to estimate the community load of each drug.

Even in their preliminary study, the researchers found patterns over time of drug occurrence in wastewater, with higher concentrations of recreational drugs such as cocaine on weekends. They found no change in concentrations of either prescription drugs or methamphetamines in their samples over time, which suggests more consistent use of both.

The researchers' wastewater analysis demonstrates that the new methodology can be applied cost-effectively on a larger scale to collect data from communities across a region or state. And because the data can be collected daily, weekly, or monthly, they represent a real-time measure that provides communities with more opportunity for prevention and intervention.

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