

Substance census

WASTEWATER ANALYSIS MADE HEADLINES EARLIER THIS YEAR FOR ITS CONTRIBUTION TO THE FIGHT AGAINST SUBSTANCE ABUSE. ARE THESE METHODS OF COLLECTING DEMOGRAPHIC DATA GENERATING INTEREST? OR JUST SCEPTICISM?

By Chelsea Wallis



Earlier this year, water utilities stepped into the political limelight when Coalition Treasurer Scott Morrison announced that data collected from Australian wastewater treatment plants would help inform policy decisions in areas of high drug use.

The report that will inform the policy, the National Wastewater Drug Mapping Program (NWDMP), is the first of a series of nine reports to be released over the next three years.

While the reports are intended to direct decision-making in law enforcement, health, education and the not-for-profit sector, utilities are starting to find that sampling demographic data in a similar fashion is to their benefit as well.

IDENTIFYING CHARACTERISTICS

Tracking illicit substances in wastewater in Australia dates back to 2005, though the concept was first introduced in the 1990s. We aren't the only country doing this, either – wastewater analysis is already standard practice for drug monitoring in Europe.

What's different about this most recent sampling effort is its breadth and depth. The Australian Criminal Intelligence Commission (ACIC) contracted the University of Queensland and the University of South Australia to collect wastewater samples from 51 participating utilities around Australia.

The sample areas stretch right across the country, and include a mix of capital cities and regional sites encompassing almost 14 million people, or 58% of the population.

“AGENCIES USE A WHOLE SUITE OF STRATEGIES TO REDUCE DRUG-RELATED HARM, AND KNOWING WHAT EFFECT THOSE STRATEGIES ARE HAVING, IF ANY, DEPENDS ON THE EVIDENCE WE CAN MARSHAL.”

**JEREMY PRICHARD,
UNIVERSITY OF TASMANIA**

The goal was to establish a baseline measure of the consumption of 13 drugs by Australians, including tobacco and alcohol.

Researchers began by measuring parent chemicals – traces of the original drug that pass unchanged through the body into the wastewater system – and metabolites, which are a modified version of the chemical.

The concentration of that chemical is multiplied by the volume of wastewater in the sample, and then measured against an estimate of the catchment population to determine how much of the initial drug has been consumed within a chosen time frame.

Current methods for pulling demographic information from wastewater don't gather data on individuals, and consequently it poses few ethical risks. However, this new field does raise some novel concerns.

One is the accuracy of testing methods. Professor Jochen Mueller, a fellow at the University of Queensland who worked on the NWDMP, said there are four notable uncertainties in calculating this type of measurement: the concentration, the quality of the sample, the definitive population count and the excretion factor.

“We have calculated the uncertainties, and for some chemicals the method works incredibly well, but for others it does not,” Mueller said.

For this reason the NWDMP does not cover marijuana or heroin because researchers decided the technical difficulties were too great to produce reliable data for year-on-year trend comparison.

“For the specific purpose of the NWDMP, based on current testing methods, it was decided that the results [for heroin and marijuana] are not that useful and might rather lend themselves to misinterpretation,” he said.

How the findings are represented is another area of concern. University of Tasmania Senior Lecturer Dr Jeremy Prichard was part of the team that ▶

authored the Ethical Research Guidelines for Wastewater-Based Epidemiology and Related Fields in 2016, which serves as the international guideline in this space.

He said the main concern is that communities – especially in disadvantaged settings – could be negatively affected by media reports about the findings of studies. And it's not much of a leap before misinformation makes its way into political discourse.

"It's better not to report the catchments from which your samples were taken because of the risk that the media will not report these well, not understand the findings or deliberately misrepresent them," Prichard said.

"It can stigmatise communities, which could lead to politically motivated decisions rather than evidence-based decisions about law enforcement."

The best way to protect communities is to anonymise the data in public reports and publications, he concluded.

The NWDMP does this by coding the sites by number, but the question of how data will be reported is one utilities should ask before agreeing to participate in similar sampling projects.

ANONYMITY AS AN ASSET

It turns out these wide swathes of anonymous data fill a knowledge gap in current monitoring methods.

Prichard pointed out that although monitoring systems are incredibly effective in assessing individual data, there are shortcomings to current methods.

Recruiting for surveys is difficult because people are generally unwilling to talk about their substance use. It's also time consuming to conduct one-on-one interviews, and researchers are dependent on the quality of information a person volunteers.

Although wastewater studies can never deliver individualised information, they can deliver efficient, reliable data that can identify emerging trends in large populations.

"Wastewater analysis is proven to be reasonably or very accurate with key drugs of concern, including methylamphetamine [ice], ecstasy, cocaine, tobacco and alcohol," Prichard said.

"It gives useful temporal trends on what the drug market is doing because of the frequency in which testing can be conducted, from which you get a macro-level picture. Agencies use a whole suite of strategies to try to reduce drug-related

harm, and knowing what effect those strategies are having, if any, depends on the evidence we can marshal."

That information goes a long way to drawing the map of Australia's drug habits – the first step in the difficult journey to change behaviours. To have any chance of succeeding, you need a good evidence base, Prichard said.

WHAT'S IN IT FOR US?

Broadly speaking, that's the business that water utilities are in: creating benefit to society, more particularly community health.

Aside from the NWDMP, some utilities participate in other demographic data projects within the confines of their own policies regarding research and collaboration. From an economic perspective, it is in their best interests to use the data available to provide value to customers.

Sydney Water, for instance, doesn't routinely collect demographic data, but it actively collaborates with other parties where studies are in the public interest, within privacy guidelines.

Sydney Water Manager of Research Direction and Value Dr Michael Storey said that where the collection of data leads to better or more targeted products or services, there is an appetite to obtain demographic data.

"We are always keen to better understand what customers value, and how we can better meet customer expectations and provide value for money," he said.

Mueller has seen a surge in utilities showing interest in participating in his 'sewer census' studies. He is currently looking at testing for biomarkers for health impacts due to high temperatures, exposure to harmful pollutants, and more.

"We were hoping to get 30 wastewater plants, but word got out about what we were doing and in the end we got more than 100; since then we've had many more call," he said.

"The uptake in the industry was mindboggling."

The next step? To prove the data have a direct benefit to society. Mueller and his colleagues are already working on a project to see if drug studies on wastewater can help communities in the fight against the drug ice.

And with the opportunity to become better acquainted with their customers and to actively contribute to the research on community health, the water industry has already begun to embrace the benefits of these cross-disciplinary alliances. ♦



FROM WATER TO POWER NETWORKS, ALL MANAGED BY A SINGLE SOFTWARE SOLUTION.

THAT'S THE POWER OF ONE.

TechnologyOne has established a firm foothold in Australasian infrastructure, developing proven software that is applicable to a wide variety of asset-intensive sectors, and is easily accessible from any device. Simple, effective solutions. Exactly why TechnologyOne has experienced 30 years of success and 99% customer retention.

[TechnologyOneCorp.com/assets](https://www.technologyonecorp.com/assets)



REGIONAL TASTES

This first report of the National Wastewater Drug Mapping Program revealed Australians' drugs of choice. Here's a snapshot of some key findings:

- Methylamphetamine was the highest illicit drug consumed across all regions of Australia.
- Cocaine use was the highest in urban NSW sites, while NT rates of use were the lowest.
- MDMA is not a popular choice apart from one regional site in TAS and a city site in NT.
- Alcohol and tobacco use were the highest consumed across all states and territories.
- Oxycodone showed up most often in regional VIC and QLD.
- Fentanyl use in regional NSW, SA and WA was higher than the national average.
- Psychoactive substances appeal to a niche market.