

An exploration of pain through wastewater



Pain is known to afflict a large portion of the population worldwide. Increasing resources are dedicated to pain management, especially at the individual patient level. However, better tools for understanding pain medications at a large population level would allow for better planning and resource allocation from a public health perspective.

Now, Andrew Kannan and colleagues have shown how wastewater-based epidemiology (WBE) can be used to monitor the widespread use of pain medication over an extended period and over a relatively large geographic area. WBE consists of the analysis of sewage water before it reaches a treatment plant. It has helped monitor the spread of the COVID-19 virus, but it can also be used for a variety of substances, like pharmaceuticals, agrochemicals and drugs.

Kannan and colleagues used WBE to examine the presence of a variety of painkillers in the sewage water of two wastewater treatment plants, namely the one near the commuter town of Keynsham and the one near the city of Bath, both in the southwest of England. Importantly,

the populations served by the two plants are different in size by about a factor of 6, and in age, with Bath's population being much younger due to a large university student population. The observations lasted for 13 months (November 2018 to December 2019). Although a clear increase in the presence of non-steroidal anti-inflammatory drugs (like ibuprofen and naproxen) emerged in the winter months, a more stable consumption of pharmaceuticals was used in chronic pain (e.g. morphine).

Aside from variations in trace amounts of individual drugs in wastewater, the work highlighted the potential of WBE in combination with prescription data to monitor pain at a population level. The study also shows that variations in the excretion of a drug, its topical versus oral use, and the potential disposal of unused painkillers need to be taken into account for a more accurate overview.

Fabio Pulizzi

Nature Water

Original reference: *Water Res.* **229**, 119391 (2023)