

Wastewater-based epidemiology: a practical application of sewage analysis to back-calculate heroin consumption in Switzerland

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Wastewater analysis was used as a part of an interdisciplinary study about the local opioids market in the canton of Vaud, Switzerland. One of the main objectives of sewage analysis was to estimate the volume of heroin that is consumed in that region, which population size is approximately 750,000 inhabitants.

The estimate was based on samples collected over a period of nearly 3 years (from 2014 to mid-2016) in the wastewater treatment plant of the main city of the canton. Back-calculations of heroin consumption were computed from morphine loads, implying the subtraction of legal morphine. The latter was estimated through all morphine deliveries in the canton over that period. Results showed that morphine loads in wastewater have increased during the monitoring period as did prescriptions of legal morphine.

Since no significant differences have been observed between week days and weekends, the mean morphine concentration of every samples was used to back-calculate the consumed heroin volume in the main city. The result was then extrapolated to the region based on the number of people receiving a substitution treatment in the catchment compared to the whole canton, assuming that this proportion also reflects the distribution of the number of heroin users.

Based on wastewater analysis, 205 kg of street purity heroin (14%) would be consumed every year in the canton of Vaud, which is a bit more than the 145 kg of a demand-based estimate. Triangulation of distinct data sources has enabled the comparison of different estimates between them and will be discussed.

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