LONG TERM MONITORING OF CATHINONE USE USING WASTEWATER ANALYSIS IN AN URBAN CATCHMENT IN SOUTH EAST QUEENSLAND

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Introduction and Aims: Sewer epidemiology is becoming a more widely-used monitoring tool in drug epidemiology which can provide objective information about the levels/patterns of drug use of a community. It also has the potential to serve as an early warning system for the emergence of new psychoactive substances, and to investigate the effectiveness of intervention strategies. While the method has been widely used for traditional illicit drugs such as cocaine, amphetamines and cannabis, there are limited studies applying this method to monitor the use of novel psychoactive substances such as cathinones. We therefore assessed the ability of sewer epidemiology to monitor the use of two such cathinones, methylone and mephedrone, in Australia.

Design and Methods: Sampling was set up at the inlet of a wastewater treatment plant (WWTP) that served a mainly urban catchment of more than 200K in South East Queensland (Australia). Samples were collected between 2011 and 2013, preserved and transferred frozen to Entox for analysis. Daily wastewater flow was recorded by the WWTP. Samples were analysed for methylone and mephedrone using direct injection on a state-of-the-art liquid chromatography coupled with tandem mass spectrometry (LC-MS/MS) system which provided sensitive and cost-effective analysis.

Results: Mephedrone was only detected in a few samples during the monitoring periods and was only at the limit of detection. Meanwhile, methylone was detected in about 40% of the samples. Both the frequency of detection and the concentration of methylone increased from 2011 to 2012 then remained stable from 2012 to 2013. The maximum load of methylone entering the WWTP was detected in July 2012.

Discussion and Conclusions: Sewer epidemiology could be used effectively to monitor the use of methylone but not mephedrone in the community. This may relate to market differences. However, alternatively, it may be that mephedrone is transformed to its metabolites more completely in the human body after consumption and thus cannot be detected in wastewater samples. More studies on pharmacokinetics of emerging drugs are required in order to back estimate their consumption level using sewer epidemiology. The results also demonstrate that, consistent with use trends internationally, methylone was still consumed in Queensland even after a ban implemented in 2011.

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