

Association between purity of seized drugs with their daily loads measured in wastewater in an Australian catchment from 2010-2015

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Aims: To examine the association between the annual average purity of seized illicit drugs and their corresponding daily load measured in wastewater.

Setting/Design: Data of purity of seizure exhibits and daily loads measured in wastewater for methamphetamine, cocaine and MDMA were gathered from a catchment in Queensland for the period of 2010-2015. The wastewater data has been reported previously in Lai et al. (2016).

Catchment population: The studied sewer catchment serviced approximately 220,000 persons.

Data analysis: Statistical analysis including Pearson correlation, univariate linear regression modelling, and hierarchical regression modelling were applied to mass load and purity data to examine the association.

Findings: There was a strong linear increase in the average daily mass load of methamphetamine detected across study years ($p=0.003$). In the same period, the purity of methamphetamine products also increased and there was a good correlation between the annual average daily load from wastewater and the annual average of methamphetamine purity. There was a non-significant but meaningful linear increase in mass load of cocaine across study years ($R^2=0.56$, $p=0.054$), but there was no significant linear trend in cocaine purity during this time. There were no trends in mass load or purity of MDMA over the same period.

Discussion: Although increase in actual consumption of illicit drugs depends on various factors this study demonstrates that the load increases of methamphetamine in the studied catchment could be partly attributed to changes of purity of methamphetamine in the market over the years while the purity of cocaine and MDMA did not change. Therefore, interpretation of trends in drug load estimations from wastewater monitoring need to take changes in drug purity into account.

Reference:

Lai, F.Y., O'Brien, J.W., Thai, P.K., Hall, W., Chan, G., Bruno, R., Ort, C., Prichard, J., Carter, S., Anuj, S., Kirkbride, K.P., Gartner, C., Humphries, M. and Mueller, J.F. (2016) Cocaine, MDMA and methamphetamine residues in wastewater: Consumption trends (2009–2015) in South East Queensland, Australia. *Science of The Total Environment* 568, 803-809

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