

# Drug residues in wastewater: Private households mainly responsible

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Most drug residues discharged to wastewater come from private households. As contributors of pollution by Active Pharmaceutical Ingredients (APIs), health establishments, such as hospitals, psychiatric and nursing facilities are hardly worth mentioning. They merely discharge a small amount, and only at local level, of these significant contaminating substances to wastewater. These are the findings, which the sustainability researchers at Leuphana University of Lüneburg in collaboration with the Ortenau Klinikum at Offenburg-Gengenbach, have come to and recently published in the journal *Environment International*.

The research team led by Prof. Dr. Klaus Kümmerer analyzed drug [consumption](#) data from a hospital, a psychiatric clinic, and a nursing home in southwestern Germany. Based on the thus-determined [consumption patterns](#), the researchers identified 50 frequently administered substances, which are generally and particularly associated with discharge to wastewater. In a second step, the researchers compared the average of the three-year total consumption of these drugs by health-care establishments with the total annual consumption of selected substances by German households. To do so, they used the German Arzneiverordnungsreport (Drug Prescription Report), published annually, which lists all the drugs, which patients on the public health scheme are prescribed by German doctors' surgeries.

The results reveal that, after a comparison at national level, the vast number of substances tested show a clearly higher average consumption

– thus more contaminant emissions – by private households than [health care facilities](#). Thus, the consumption of drugs acting on the digestive tract or the cardiovascular system is 15 to 500 times lower in hospitals than in private households. In psychiatric clinics, the difference factor is even as high as 2,500. Even the consumption of painkillers in hospitals only accounts for a relatively small share of total consumption which is of only 22 percent in the case of Metamizole, the most widely used painkiller. Considerable quantities were only identified in the consumption of the sedative Clomethiazole by hospitals, as well as neuroleptic quetiapine and the antidepressant Moclobemide by nursing homes. In a regional perspective, specific APIs like these can, therefore, be ascribed to certain health-care facilities as emission sources.

The Lüneburg researchers' study demonstrated for the first time that, at national level, psychiatric hospitals and nursing homes only contribute a modest proportion of APIs discharged into municipal wastewaters compared to private households. Previous studies had only shown this to be the case for General Hospitals. The researchers' methodical approach – to model the prediction of API emissions based on consumption patterns – is new. "Our study has shown that consumption patterns provide at least as accurate a picture of wastewater pollution by individual substances as wastewater measurements themselves" said Manuel Herrmann, principal author of the study. "However, with respect to the measurement procedure, our method combines the advantages of being far less complex and less costly. Thus, contamination can easily be predicted, and policy and management can react appropriately and promptly."

**More information:** Manuel Herrmann et al. The significance of different health institutions and their respective contributions of active pharmaceutical ingredients to wastewater, *Environment International* (2015). [DOI: 10.1016/j.envint.2015.07.020](https://doi.org/10.1016/j.envint.2015.07.020)

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