Scientists develop model to predict drug levels in Europe's rivers

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Scientists at Radboud University and the University of York have developed a sophisticated model to calculate the levels of pharmaceuticals in rivers across Europe. The study is published in the

journal *Environmental Science & Technology*.

While monitoring data does exist for pharmaceuticals in rivers around the world, for many countries there is limited or no data. Monitoring all of the pharmaceuticals we use in all rivers is extremely challenging, but the team at Radboud University and University of York say the [new model](#) could help to fill the data gaps. The [model](#) will give scientists and drug manufacturers the ability to estimate the concentrations of [pharmaceutical](#) in Europe's rivers. In the future it could be expanded to other regions of the world.

Three drugs in river Ouse

Known as ePiE (exposure to Pharmaceuticals in the Environment), the model uses prescription data to estimate the levels of drugs in the continent's waterways, taking into account population, climate, river flow and geochemical factors.

The model has already been used in a pilot study to estimate levels of a selection of pharmaceuticals in the Ouse basin in the UK, and has identified three drugs (an antidepressant, antihistamine and painkiller) which could potentially be impacting fish due to their high concentrations.

A mammoth task to sample every river in Europe

Professor Ad Ragas of Radboud University's Department of Environmental Science and co-author on the paper, said: "This model will allow us to identify which pharmaceuticals are potentially posing the most risk to the environment across Europe and the areas in Europe most at risk. To experimentally monitor pharmaceuticals, you have to physically take a sample from a river and then analyse the sample using

sensitive instrumentation. This is expensive and time-consuming and, practically, it would be a mammoth task to sample every river system in Europe.

"This new model allows us to quickly determine the levels of pharmaceuticals across Europe at a very fine spatial resolution. It will allow us to much better characterise the risks that pharmaceuticals pose to river systems across Europe and help us to focus mitigation efforts to reduce risks. There are similar models that have been developed for the catchment and country level, but ePiE allows us to understand environmental exposure for the whole of Europe," Professor Alistair Boxall of the University of York.

More information: Rik Oldenkamp et al. A High-Resolution Spatial Model to Predict Exposure to Pharmaceuticals in European Surface Waters: ePiE, *Environmental Science & Technology* (2018). [DOI: 10.1021/acs.est.8b03862](https://doi.org/10.1021/acs.est.8b03862)

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