Wastewater monitoring meets with great interest

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Topics: Wastewater | Society

Today, over 60 experts from research, federal and cantonal administration, the police, politics and hospitals are meeting to discuss the current status and future of wastewater monitoring in Switzerland. The current trends: a seasonal increase for influenza and the RSV virus, stagnating or even declining for coronavirus. We spoke to environmental engineer Christoph Ort, who, together with environmental microbiologist Tim Julian, established the field of wastewater-based epidemiology at Eawag and - in cooperation with external experts - is constantly adapting it.

Data and methods are public

Since July 2023, wastewater samples have been taken from 14 wastewater treatment plants (WWTPs) in Switzerland, currently five samples per week, and analysed centrally by Eawag for various pathogens (SARS-CoV-2, influenza A and B viruses, RSV). During the Covid pandemic until the end of 2022, national monitoring included over 100 ARAs at times. The data and trends as well as exact descriptions of the methods can be accessed here: https://wise.ethz.ch/ and https://www.idd.bag.admin.ch/ The WISE platform (for 'Wastewater-based Infectious disease Surveillance and Epidemiology') also shows the data for the individual WWTP sites > click on 'Viruses' and 'Sites' in the main navigation bar. At the same time, the DroMedAario pilot project was set up with the Federal Office of Public Health, where wastewater is analysed for residues of drugs, medicines, alcohol and tobacco. The data is published quarterly and can be accessed at DroMedAario > Dashboard.

Überlandstrasse 133
CH-8600 Dübendorf
T +41 58 765 55 11
F +41 58 765 50 28
info@eawag.ch
www.eawag.ch
eawag aquatic research

Together with colleagues, you have organised a symposium today on the future of wastewater monitoring. Are you surprised by the level of interest?

(Photo: Eawag, Esther Michel)

Christoph Ort: No, I'm delighted and my impression is confirmed that many people are interested in the information contained in wastewater. Since the beginning of the pandemic, we have been receiving regular enquiries about our measurements.

Where is the interest greatest?

It's hard to say, but the field is very broad: When figures rise in individual cities, journalists immediately get in touch. They want to know what this means and how we assess the situation. Experts from the healthcare sector also regularly consult our data. Hospital doctors have told us that they can see in the wastewater what they can expect in hospital in a week's time. But private individuals, especially high-risk patients, also write to us. For example, when the measured values are published with a slight delay. But with the high demands on data quality, this does happen.

In fact, there are sometimes up to 10 days between sampling and the results being posted. Isn't that too long - especially with coronavirus - to recognise a new wave?

This is a matter for the authorities responsible for measures or the staff planning in the healthcare sector to judge. Compared to the figures from the hospitals and the reported serious cases, the wastewater is still showing the trends earlier. Much is also a question of resources: if more resources were invested in logistics and prompt measurement, a ‘delivery time’ of two to four days from the time a household flushes the toilet would theoretically be possible. There are now also measuring systems that prepare samples automatically and measure them very quickly. However, to the best of our knowledge, their sensitivity is not yet sufficient to match the high data quality of our measurements.

So you still think it's worth the effort?

Definitely. Because hardly anyone gets tested any more, there are no longer any reliable case numbers and so many people use the wastewater figures as a guide for their personal risk assessment: Working from home or going to the office? Eating out? Mask, yes or no?

Is interest in the drug figures as high as in the coronavirus data?

Interest in substance monitoring, i.e. the figures for drugs and medicines, has increased since longer, systematically collected time series have been available for ten Swiss cities. The range of substances is broad and because there are no consumption figures, or at least none that are publicly available, addiction experts and science journalists are very interested in the wastewater figures: Ketamine, Ritalin, cocaine, ecstasy, fentanyl, crack ... it's all about questions of party use, abuse, increases and trends. Are we seeing phenomena that are familiar from other countries here in Germany? Have new drugs also arrived here?

According to the invitation to tender for the symposium, it is also about the financing of the projects. Is this being called into question?

Savings are being made everywhere. We are relieved that funding for pathogen monitoring is guaranteed until the end of 2025. It is understandable that there is less need outside of times of crisis, in the new normal. But after the pandemic is before the pandemic. When cases of Mpox (monkeypox) were reported abroad, the local authorities immediately wanted to know whether it could also be detected in wastewater. In 2022, we were able to show promptly how Mpox also increased in Switzerland but then quickly disappeared again. This is only possible if at least minimal logistics are in place, routine measurements are carried out and the capacity to adapt the methods for new pathogens is guaranteed at all times. With a postulate (22.4271), Parliament instructed the Federal Council in May 2023 to press ahead with the institutionalisation of wastewater monitoring.

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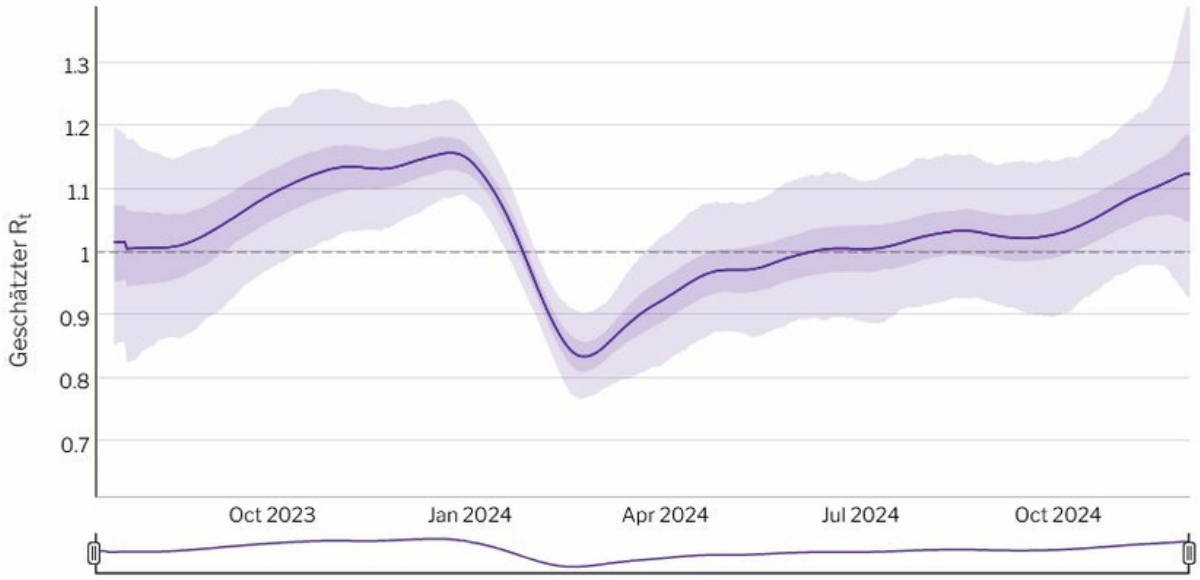

Calculated R-value from wastewater data for influenza A viruses. A value above 1 means that more than one person is infected per infected person. The flu epidemic at the end of 2023 and beginning of 2024 and the current renewed increase since November are recognisable. (Source: Dashboard wise.ethz.ch)

The numbers of influenza viruses and RSV are currently rising nationally - presumably due to seasonal factors? What do you attribute the stagnating or even declining incidence of SARS-CoV-2 viruses to?

Unlike influenza and RSV, SARS-CoV-2 occasionally also circulates in summer, such as in 2022 and 2024, when we observe a lower winter circulation than in 2021 and 2023, when there was hardly any summer circulation. We can't yet say what exactly is behind this pattern. But we have also observed that SARS-CoV-2 waves tend to be linked to the emergence of new variants.

The data on medicines and drugs show some interesting trends. For example, the increasing use of cocaine or the obviously very different regional use of Ritalin. Do you have any explanations for this?

With wastewater measurements, we provide an independent data source that enables objective statements to be made about the consumption behaviour or exposure of the population. We have to leave the interpretation to experts in the various fields. They have the necessary knowledge of individual patient or consumer groups. These experts use the data from wastewater monitoring to see at an early stage whether we are dealing with individual cases or a new trend.

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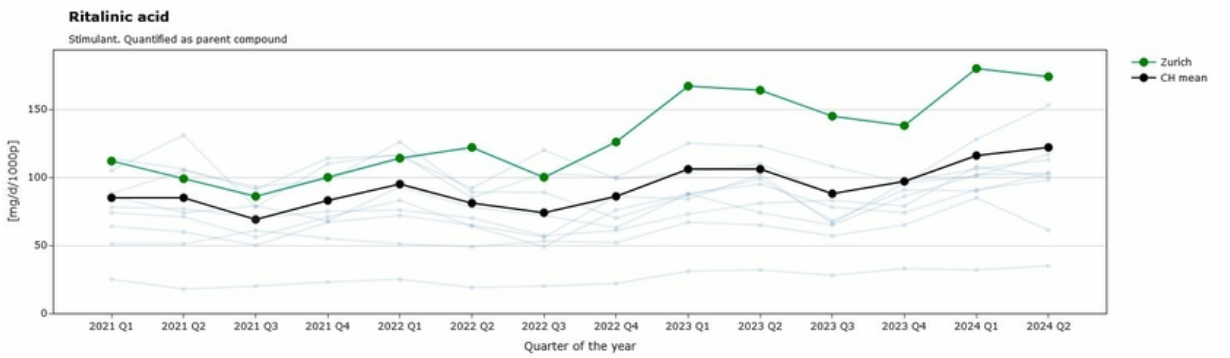

Increase in Ritalinic acid in wastewater in Zurich (green) and throughout Switzerland (black) since 2021. (Source: Dashboard Dromedario)

In Germany and other countries, it has been reported that polioviruses have also been found in wastewater, although the disease is considered 'eradicated' here. Do you also measure this?

No, we are currently not looking for polioviruses in Swiss wastewater, or not yet. This is because the WHO reference methods require a laboratory where polioviruses can be cultivated. Our laboratory is geared towards detecting the viruses using molecular approaches, i.e. by recognising the DNA and RNA of the viruses. At the request of the FOPH, we are currently working with the national reference laboratory to develop a similar method for polio.

Since the first wave of coronavirus at the beginning of 2020, you and many other Eawag employees have been searching for viruses in wastewater almost constantly for almost five years. Do you still have the energy to continue?

The combination of research and monitoring, as well as networking and media work, is very demanding at times. But it's also exciting. The field is very interdisciplinary and every time we think it's becoming routine, something new comes along. Either we have new ideas in the team or we receive an enquiry that we follow up. We consider ourselves fortunate to be able to contribute to the objective assessment of the health situation in Switzerland.

Every time we think it's becoming routine, something new comes along. (Christoph Ort, environmental engineer)

Cover picture: Sampling at the Werdhölzli WWTP, Zurich, where wastewater from almost 400,000 people is collected. (Photo: Eawag, Esther Michel)

Related Links

'The future of wastewater monitoring in Switzerland'

Report of the crime analysis on Swiss wastewater monitoring

Contact

Christoph Ort

Tel. +41 58 765 5277

christoph.ort@eawag.ch

Tim Julian

Group Leader of Pathogens and Human Health

Tel. +41 58 765 5632

tim.julian@eawag.ch

Andri Bryner

Media officer

Tel. +41 58 765 5104

andri.bryner@eawag.ch

https://www.eawag.ch/en/info/portal/news/news-archive/archive-detail/wastewater-monitoring-meets-with-great-interest