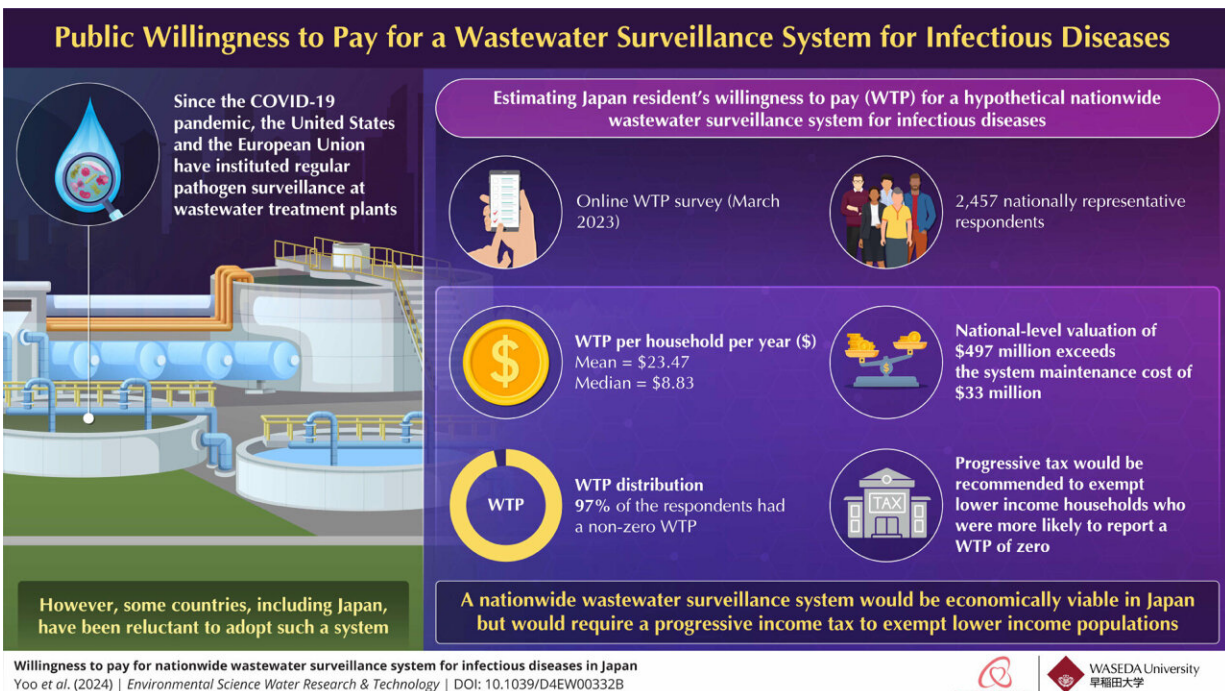


Understanding willingness to pay for nationwide wastewater surveillance in Japan

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A team of researchers conducted a large-scale survey with a nationally representative sample in Japan to estimate their WTP for a nationwide wastewater surveillance system for infectious diseases. Their assessment using the contingent valuation method revealed that people have a mean WTP of \$23.47, with a median WTP of \$8.83 per household per year for the surveillance system. Using this, the national monetary valuation aggregate was found to be \$497 million, which would cover the establishing and maintenance costs for the system, and also support applications of wastewater surveillance at major international airports in Japan. A progressive income tax is recommended to fund this system, so as to exempt lower-income individuals/households. Credit: Cannot be reused without permission

Globally, the COVID-19 pandemic and the increased likelihood of other such outbreaks in the future warrant the strengthening of epidemic surveillance systems. Among these, continuous wastewater surveillance at wastewater treatment plants is considered more advantageous for understanding the community-level disease dynamics, as compared to clinical surveillance.

This is because such a continuous system captures the epidemic status of a larger population without any selection bias and provides higher testing capacity even during an outbreak. Moreover, such a system is relatively inexpensive. Consequently, the U.S. and most countries in the European Union have established regular [wastewatersurveillance](#) in their cities after the beginning of the COVID-19 pandemic. However, many other countries, including Japan—where less than 20 cities implement wastewater monitoring for epidemic data—are still reluctant to adopt this system nationally.

This raises the question of whether a nationwide wastewater surveillance system for infectious diseases would be economically worthwhile in Japan. While [cost-benefit analysis](#) or return over investment (ROI) can help evaluate the system's economic efficiency, it is also important to understand the population's willingness to pay (WTP) for such a system in order to determine the budget allocations.

Understanding the public's WTP can also provide much-needed economic information for spearheading future discussions from a policy perspective. Consequently, a survey-based study led by Professor Byung-Kwang Yoo, from the Faculty of Human Sciences at Waseda University and the Graduate School of Health Innovation at Kanagawa University of Human Services, estimated Japan resident's WTP for a hypothetical nationwide wastewater surveillance system for infectious diseases.

Explaining the rationale further, Prof. Yoo says, "Providing economic information to stakeholders can support the rationale behind implementing or continuing large-scale pathogen surveillance at [wastewater treatment plants](#). For a potential future epidemic with uncertain risks, accurately simulating or predicting the wastewater surveillance system's ROI tends to be challenging. However, estimating the WTP elicited from taxpayers can overcome this challenge."

The findings of this study were [published](#) in *Environmental Science: Water Research & Technology* on 30 May 2024. The article was co-authored by Professor Rei Goto from Keio University, Professor Masaaki Kitajima from the University of Tokyo, Dr. Tomoko Sasaki, an independent consultant, and Dr. Sebastian Himmler from the Technical University of Munich.

For their study, the researchers conducted a large-scale [online survey](#) with a nationally representative sample of 2,457 people in Japan and gauged their WTP using the contingent valuation method.

The results of the survey suggested that around 97% of the respondents replied with a non-zero WTP. While the mean WTP was estimated to be USD (\$) 23.47, the median was \$8.83 per household per year for establishing and maintaining a regularized nationwide wastewater surveillance system.

Using the median value, the national monetary valuation aggregate was \$497 million, which was more than the estimated potential costs for system maintenance (\$33 million). In fact, the aggregated WTP would also be able to support broader applications of wastewater surveillance at major international airports in Japan.

Moreover, the survey revealed that the major predictors for WTP were income, education, age, and higher levels of awareness of disease

outbreaks. Specifically, lower-income individuals/households were more likely to report a WTP of zero, and people over the age of 47 were more likely to report a higher WTP.

All in all, these results imply that most residents in Japan value a nationwide wastewater surveillance system and are willing to pay an additional annual tax of \$8.83 for it, making the system economically justified for the country. To fund such a system and ease the burden of lower-income individuals/households, the researchers recommend a progressive income tax that exempts them from payments.

Concluding with the potential implications of these findings, Prof. Yoo says, "Our findings can inform and encourage Japan and other countries to launch or expand wastewater surveillance systems for infectious diseases. Governments can use our study as guidance for policy decisions and budget allocations for such a system. Moreover, even the U.S. and the EU can leverage our WTP study to justify the operations of their wastewater surveillance systems to their citizens."

More information: Byung-Kwang Yoo et al, Willingness to pay for nationwide wastewater surveillance system for infectious diseases in Japan, *Environmental Science: Water Research & Technology* (2024). [DOI: 10.1039/D4EW00332B](https://doi.org/10.1039/D4EW00332B)

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