Review of: "Survey of nationwide public perceptions regarding acceptance of wastewater used for community health monitoring in the United States"

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Potential competing interests: The author(s) declared that no potential competing interests exist.

Introduction

The COVID-19 pandemic has had devastating consequences for society at a global scale. Multi-disciplinary communities comprising scientists, economists, public health specialists, policy-makers amongst others have, largely, worked hand-in-hand to deliver resource, information, intervention measures, and technologies to aid in mitigating the impacts of the crisis. However, public response to these has been tempered, particularly around public interventions and vaccination, by divisive or ambiguous messaging[1][2], that has exposed the need to establish and amplify trust by agencies with the power to shape and enact public health protection measures[3].

While many public health and epidemiological responses to COVID-19 were implemented through the delivery of pre-existing expertise and standardised approaches for pandemic disease control, relatively novel approaches gained traction, in part due to advances made in recent decades in the disciplines of data science, applied microbiology, and engineering disciplines. A major tool for monitoring disease (and other agents of public health resilience) that found utility during the pandemic across many countries has been wastewater surveillance[4], and subsequently wastewater-based epidemiology (WBE) when data generated from this surveillance is related to public health[5]. However, whilst much vaunted by those who are active in programmes using wastewater for monitoring of SARS-CoV-2 (the viral RNA is collected by sampling in the sewer network and quantified and characterised in the laboratory), its function still remains nascent. For example, standardisation of protocols, an understanding of its reliability and robustness as a measure of a community's risk (to the disease/agent), and it's true value for public health protection in comparison with established epidemiological tools, all remain partially or fully unresolved[6].

Review

This preprint[7] focuses on an area that is critical for the long-term ambitions of those pushing WBE as a tool for surveillance of population/community health and well-being; public awareness, perception, and acceptance. The author's conducted a Nationwide (USA) survey of over 3,000 members of the public to gauge their response to a series of questions related to wastewater monitoring; what is monitored (target), where it is monitored (scale), and privacy concerns. Data analyses of the responses tested for demographic differences (e.g. gender, age, education) using common statistical measures, and a Privacy Attitude Questionnaire (PAQ) used to assess the boundaries of respondent's

privacy concerns.

The results suggest that there is large support for WBE as a tool for public health monitoring, skewed marginally to younger respondents living in urban environments (contrasted with suburban residents). Noteworthy is the low number of respondent's having privacy concerns to routine monitoring that could shape policy actions. However, a distinction in support for monitoring of disease, chemical toxins, and national security (terrorist activity) - positive, versus lifestyle indicators, mental health, and, licit and illicit pharmaceutical usage - less positive, was also reported.

Conclusion

Surveys, such as that reported here, are useful to gauge public engagement with new and emerging tools that a potential to impact their lives and behaviours. However, this manuscript has several major flaws, mostly acknowledged by the authors, which limits its impact more widely for policy makers and agencies assessing the value of WBE currently (and beyond the pandemic) - a suggested benefit the author's claim will be generated by this work. While the survey was conducted according to established and approved guidelines, and has a significant sample size, the demographics of the correspondent's is skewed towards a section of society that may be biased towards providing positive opinion to many of the questions (i.e. white, female, professional, higher income). The author's also note the need to assess attitude and privacy concerns for WBE in rural locations, which may require markedly different monitoring strategies to areas with higher density populations and networked sewage systems. The demographic details suggest corresponde were pooled from suburban and urban environments only, and it is unclear whether ‘rural’ areas could be demarcated from these classes, or were missing entirely. Finally, while a national study is welcome, the true value of wastewater monitoring, especially for global threats such as the COVID-19 pandemic, will come from understanding the application of WBE and the different requirements, resources, and approaches available across the world. Public attitudes are likely to vary across regions, or even sub-regionally, depending on cultural and systemic perception and engagement with wastewater concepts. The results from the U.S. survey, documented here, are not overwhelming, but do point to further work being need to raise awareness (e.g. through education, as noted by the authors). However, while the field remains largely in its infancy, a more strategic ambition should be to target the research needs and gaps, to establish the use-case for WBE that can be used to inspire confidence, not just in the public, but in policy makers and funders who are the gatekeepers to the long-term WBE appropriation for public health.

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