Tackling covid-19 variants

Consistent long term surveillance is vital for public health action and research

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Japan announced on 26 June 2023 that it may have entered its ninth wave of covid-19 infections. Epidemiologists detected an increase in SARS-CoV-2 positive cases based on the national sentinel surveillance system, which includes some 5000 medical institutions across the country. The average weekly number of covid-19 cases per sentinel site increased from 1.12 in the week of 29 May to 5.11 in the week of 5 June 2023. XBB lineages were identified in most of the cases. Since XBB was first identified in India in August 2022, XBB lineages have spread across the world and have become the most common variant in various parts of the world.

XBB lineages have a remarkable growth advantage over other omicron variants, such as BA.5 and BA.2.75. Once it enters the population, the XBB lineage spreads and becomes predominant much more quickly than other variants. XBB lineages are one of the most immune evasive subvariants, causing an increase in reinfections. A national cohort study including about 2.5 million adults in Singapore evaluated the extent of protection provided by previous infection or vaccination against reinfection with XBB (between 18 October and 1 November 2022) and other omicron variants (BA.4 and BA.5 between 1 October and 1 November 2022). Across all combinations of natural infection and vaccine doses, protection against XBB reinfections was found to be lower and to wane faster than against other omicron variants. On the basis of these findings, a second booster dose might be needed to gain stronger protection, especially for older or immunocompromised people in settings with similar characteristics and situations to those in Singapore.

Surveillance

SARS-CoV-2 is probably here to stay. The question is whether countries have the necessary tools and capacity to detect new variants and evaluate their severity so that we can act quickly to protect the most vulnerable populations. Surveillance is the obvious essential tool, but is it robust enough? What is our current situation, and where are we headed?

Genomic surveillance has a critical role in detecting new variants, but 32% of countries lacked this capacity in January 2022, despite the scale-up during the covid-19 pandemic. To tackle this issue, the World Health Organization launched the International Pathogen Surveillance Network (IPSN) in May 2023 as a part of its 10 year strategy for pathogen genomic surveillance. Expanding access to genomic surveillance is important, but it is equally crucial to ensure a sufficiently large volume of testing so that sampled viruses accurately represent those circulating in the population.

Declining testing rates have made case surveillance challenging, but wastewater surveillance can help understand the circulation of SARS-CoV-2 in the population. Many countries used wastewater surveillance to support their public health response during the covid-19 pandemic, including the US, the Netherlands, Spain, Hong Kong, Bangladesh, and Uruguay. Despite the clear need for these wastewater programmes, some challenges remain. Long term funding for these programmes may be uncertain, especially in lower income geographies. In addition, most wastewater surveillance covers only urban populations, highlighting the need to ensure geographical representation. Further discussion is needed on how to conduct wastewater surveillance in resource limited settings with insufficient infrastructure and migration trends.

Although it has been reported that wastewater surveillance could be used for various pathogens, the findings must be interpreted with caution. Wastewater data are not individual level data and cannot be stratified by age group, ethnic group, or many other variables, and it is not immediately clear what they can be realistically linked to. To interpret wastewater data appropriately and meaningfully, they must be validated against infection and disease data to establish how changes in signals in wastewater could be linked to the circulation of pathogens.

Data linkage is crucial

Lastly, data linkage is fundamental. In the US, the Centers for Disease Control and Prevention and public health partners have been working diligently to improve the timeliness, representativeness, transparency, and availability of surveillance data. Although great advances have been made, numerous opportunities have been missed because of the challenges associated with linking data from various sources, such as vaccine registries, test results, mortality records, and hospital records. Establishing an infrastructure that allows analysis of linked data while ensuring privacy and security would be extremely beneficial.

Consistent surveillance of representative populations, linking diverse data sources, is key for both public health actions and research activities. Long term consistent support for surveillance programmes would allow us to detect abnormalities rapidly and act accordingly. We need the global community to come together to make this happen and to tackle the rapidly changing testing approaches and the challenges of surveillance.
Provenance and peer review: Commissioned, not externally peer reviewed.


10. COVID is here to stay: countries must decide how to adapt. Nature 2022;601:.

doi: 10.1038/s41586-022-00057-y pmid: 35013606


doi: 10.1289/EHP9966 pmid: 34499630


