

Parallel Session 3: Preparedness for the Next Pandemic

T3a - Grid Monitoring of SARS-CoV-2 in Sewage for an Early-warning Sign of Community Outbreak

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Introduction and Project Objectives: Sewage surveillance, which tests the collection of faecal samples in a given sewer shed, could offer a scalable, cost-effective strategy for measuring population-level infections. This project objectives are to test SARS-CoV-2 virus in community sewage collected from various sites of Hong Kong using methods established by the HKU team, to provide early-warning signals for the re-emergence of COVID-19 in local communities as a supplementary part for the clinical tests.

Methods: Sewage testing method for SARS-CoV-2 includes three steps: virus concentration, viral genetic material (RNA) extraction and quantification via Reverse transcription qPCR.

Results: The initial trial was conducted in early October 2020 as a response to an infection cluster at Kwai Chung. Initial findings of the trial indicated that sewage testing data were largely consistent with the clinical tests, and the sewage test was a useful tool to provide additional information for assessing the risk associated with outbreak in an area. We then applied our approach to monitor the re-emergence of SARS-CoV-2 circulation in local community by testing sewage samples collected from 26 stationary sites in Hong Kong. The sewage surveillance in this stage has effectively caught the rising trend of clinical cases in the fourth wave starting from the middle of November 2020.

From December 2020 to February 2021, routine sewage analysis at the 26 stationary sites were shifted to the monitoring of estates with infection clusters. Sewage testing results provided a basis for statutory public health action in identifying buildings and places for compulsory testing operations to uncover the infected individuals in local community. More than 50 confirmed cases were found, cutting off hidden transmission chains in these communities.

As the fourth wave of COVID-19 in Hong Kong begun to subside from February 2021, we resumed the routine monitoring of the 26 stationary sites for this HMRP project. Sewage testing results at this stage indicated the downward trend of the fourth outbreak.

Conclusion: The above results about sewage surveillance for SARS-CoV-2 in Hong Kong have demonstrated that the sewage surveillance could be used for the following purposes: (1) Providing early warning signals for COVID-19 outbreak; (2) Tracking the development trend of community outbreak; and (3) Complementing the monitoring of estates with infection clusters.

Since December 2020, daily sewage testing results have been incorporated into local monitoring scheme as an essential part of the whole control strategy of COVID-19. The systematic routine sewage monitoring programme now covers over 112 stationary sampling sites in Hong Kong, providing early warning signal of COVID-19 re-emergence for over 5.4 million people.

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