

Global Health Day

SARS-CoV-2 in exhaled breath

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The SARS-CoV-2 virus causes COVID-19, a serious illness which has created a world-wide health crisis. The virus is thought to spread through respiratory droplets contained in exhaled breath of patients who have COVID-19. Recent work has been done to measure the size, quantity and mechanics of respiratory droplets in order to better understand transmission. However, though it may seem obvious that the virus is contained in those droplets, very little research has focused on directly measuring the SARS-CoV-2 virus in exhaled breath, and thus routes of transmission are still not fully understood. In our lab, we have successfully developed a method to measure SARS-CoV-2 RNA on the exhaled breath of infected patients. Compared to nasopharyngeal and other swab-based measures, our method uniquely allows direct detection and quantification of the virus in exhaled breath, meaning we are able to determine how much virus an individual patient is exhaling into the environment and therefore exposing people around them. With our method, our goal is to determine how contagious an individual patient is, possibly allowing us to identify potential super spreaders before they spread. Producing an exhaled breath sample is simple, noninvasive and portable, allowing us to ask patients to self-collect samples from their own homes and to track levels of exhaled virus in infected patients over the course of their disease. We have collected over 100 samples from COVID-19 positive patients, and a smaller but growing number of samples from COVID-19 negative patients. Though preliminary, our data suggest that exhaled viral loads peak around day 4 from symptom-onset, and that virus is still detectable on the breath of some patients even after symptoms have abated.

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