



Scientific Evidence on Surveillance of COVID-19 in a Vaccinated Population: A Rapid Literature Review

Summary

This review is current to June 13, 2021. Evidence indicates that population screening for COVID-19 using PCR testing, antigen testing or some combination of both is the most common surveillance method reported in the literature. This review considers limitations of these approaches and evaluates other options. Reports of wastewater surveillance from a limited number of countries were reviewed and shown to predict major outbreaks and track very well with clinical data. This approach had limitations, such as cost and reproducibility. Emerging technologies such as wearables or machine-learning models were identified as new surveillance approaches, but most have not yet been studied in a real world setting.

Implications

Existing established surveillance methods are still important for post-vaccination COVID-19 surveillance. Novel approaches to detect and monitor COVID-19 are being studied. If successful, these would likely need to be integrated with existing methods to improve outcomes.

Reference: Egunsola O, Farkas B, Flanagan J, Salmon C, Mastikhina L, Clement FM on behalf of the University of Calgary Health Technology Assessment Unit. Surveillance of COVID-19 in a Vaccinated Population: A Rapid Literature Review. June 25, 2021.

PMID:

This research brief was written on June 25, 2021 and co-developed with our patient partner, JoAnne Mosel.

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What is the current situation?

- The process of monitoring for new COVID-19 cases is called surveillance.
- Several countries have vaccinated a substantial percentage of their population against COVID-19. As a result, the focus of public health officials is now shifting to identifying COVID-19 cases among the vaccinated population.
- Infection after vaccination is expected because the vaccines are not 100% effective and may not be fully effective against new COVID-19 variants.

What is the objective?

- The objectives of this review are: (1) to identify scientific evidence on the surveillance of COVID-19 in vaccinated populations and how this may influence the testing strategies used; and (2) to identify new technologies for undertaking surveillance.

How was the review conducted?

- A comprehensive search was conducted of several databases for studies published between 1 December 2020 and 13 June 2021. Other sources (e.g. studies awaiting publication) were searched by hand. Two reviewers read through summaries of the studies to decide which were suitable to include in this review. One reviewer then read through the full study to confirm. Key information from each study worth including was then evaluated in detail.

What did the review find?

- 33 studies were included in this review. Five approaches to post-vaccination COVID-19 surveillance were identified. These included: population screening with PCR, rapid antigen testing or a combination of both; genomic surveillance; wastewater surveillance; metagenomics; and testing of air filters on public buses to detect the COVID-19 virus.
- The most common form of surveillance was some form of population screening, mostly PCR testing but also rapid antigen testing especially during active outbreaks. This approach was used in 22 studies, mostly in healthcare settings but also long-term care facilities and in the community.
- A number of challenges to population screening were identified: the inability of rapid antigen testing to detect everyone with COVID-19; differences in people being tested voluntarily; people dropping out of studies following participants over time; and the lack of detail in larger studies.
- Wastewater surveillance was used in 6 studies. Several benefits of this approach were identified, including the ability to predict outbreaks. There were challenges, however. These included costs and inconsistencies in identifying specific COVID-19 variants.
- Three studies used genomic surveillance.
- A number of newer surveillance technologies were also reviewed. Many of these, however, have not yet been used in real-world settings. One study tested for and detected the COVID-19 virus in air filters in public buses.