

Infection prevention and control implications of highly transmissible SARS-CoV-2 variants

Infection Control Expert Group (ICEG) statement: 28 JANUARY 2021

Background

Evidence of new highly transmissible variants of SARS-CoV-2 is emerging in several countries overseas. These variants may be more difficult to control and this has led to increased concern that they may be introduced into the Australian community.

More than 220,000 international travellers have been quarantined in Australia since March 2020, including from countries with high rates of COVID-19 community transmission. During this time approximately 1% of travellers arriving by air have been diagnosed as confirmed COVID-19 cases.

There have been very few instances of 'escape' of SARS-CoV-2 from quarantine hotels. However, each instance has had major implications, including initiating the major 'second wave' of COVID-19 community transmission in Victoria and short periods of lockdown with minimal community transmission.

One case involved the new highly transmissible SARS-CoV-2 variant, B.1.1.7. Community transmission was prevented by rapid public health action. There has been no documented onward spread within healthcare settings from any incidents.

Even though there has been minimal community transmission, each incident has caused significant disruption, including the reintroduction of restrictions locally, and interstate border closures.

Transmission events in quarantine hotels have been investigated. This has included reviewing CCTV footage. Through this, minor breaches of infection prevention and control (IPC) practices have been identified, but there has been no obvious source of transmission. Continued training and quality assurance must be maintained to ensure that such breaches can be prevented in future.

An engineering review of hotel air ventilation systems suggests that contaminated air currents could have contributed to transmission.

Occupational transmission of SARS-CoV-2.

SARS-CoV-2 is mainly transmitted by close personal contact (via respiratory particles) or via contaminated fomites. It is less likely that transmission occurs via small respiratory particles (aerosols) that remain suspended in the air for prolonged periods. Airborne transmission is believed to mainly occur because of specific procedures or behaviours, in particular in poorly ventilated, crowded indoor settings. The procedures or behaviours include:

- aerosol-generating procedures (usually in healthcare settings);
- certain ('aerosol-generating') behaviours, such as singing, shouting and heavy breathing during strenuous exercise. This can produce increased amounts and forced expulsion of respiratory particles, including aerosols. These can travel and contaminate the environment, further than 1.5–2 m from the infected person.

Poor ventilation can increase the risk of airborne spread due to a low number of fresh air exchanges per hour. It can also direct air flow from an infection source towards, rather than away from, other people. The risk is exacerbated by crowding and humidity.

In healthcare settings where transmission has occurred despite appropriate use of personal protective equipment (PPE), detailed investigation often reveals multiple factors, including:

- aerosol-generating events
- a poorly controlled work environment
- inadequate ventilation and/or
- excessive workload and fatigue among staff, causing inadvertent lapses in IPC.

Implications of new highly transmissible SARS-CoV-2 variants of concern.

The increased transmissibility of some new SARS-CoV-2 variants is believed to be associated with:

- increased viral load during early infection
- a more prolonged period of viral shedding and
- potential increased affinity of the SARS-CoV-2 spike protein with the ACE2 host cell receptor (reduced infective dose) in susceptible contacts.

We still don't have a complete understanding of the implications of these variants and the optimal measures to prevent transmission. It is timely to review all aspects of IPC in quarantine settings, especially upstream, higher order controls, as a result. These include:

- physical distancing
- use of masks when physical distancing is impractical
- ventilation
- rostering and training of hotel quarantine staff and
- strict adherence - with monitoring - of all aspects of IPC, including appropriate use of PPE, based on risk.

Hierarchy of controls in quarantine hotels and medihotels.

Following the second wave of COVID-19 in Victoria, which originated from the escape of SARS-CoV-2 from an international traveller, changes have been made to strengthen the safety of Australia's quarantine program. The relatively small number of instances of quarantine breach have led to a review and further improvements in hotel quarantine IPC in all states and territories.

IPC measures are based on a hierarchy of controls. Some examples include:

- *Hazard elimination*: Border control and quarantine of overseas travellers are the most effective high-level controls. They have been strengthened recently, in response to new variants, by requiring:
 - pre-flight testing of international travellers
 - routine use of masks by passengers and crew within airports and during flights
 - enhanced testing and quarantine of air and maritime crew
 - more frequent testing of travellers in quarantine and hotel quarantine staff
 - in positive cases, prompt isolation, contact tracing and whole genome sequencing.

- *Hazard/source control*: Minimise the risk of transmission in quarantine settings by regularly reminding people to continue to practise these well-established measures:
 - physical distancing
 - cough/respiratory etiquette
 - frequent hand hygiene
 - enhanced cleaning of premises and transport vehicles
 - appropriate use of PPE
 - people in quarantine should perform hand hygiene and put on a mask (source control) when face-to-face contact with others is likely. For example when opening the door to receive food, communicate with hotel staff or when moving between rooms or facilities.

Monitor compliance with these practices.

- *Engineering controls*: Assess and monitor ventilation of transport vehicles and hotel rooms and corridors. This will ensure adequate air exchange and appropriate direction of air flow, to minimise risk of transmission if an occupant doesn't know they're infected. Don't use rooms with a common ceiling ventilation return.

Accommodate travellers with confirmed COVID-19 in premises that have been assessed as adequate by an appropriately qualified engineer. Alternatively, modify the premises to minimise infection risk to attendants (using appropriate PPE) who enter the room and others in adjacent rooms or corridors.

Use physical barriers or signs, where possible, to ensure physical separation of quarantined travellers from staff.

- *Administrative controls*: Quarantine IPC programs must clearly identify roles and responsibilities. It's essential that all relevant people are aware of, and appropriately trained in relevant procedures, including the need to maintain appropriate IPC precautions during breaks and after hours.

Fatigue or boredom among quarantine staff can lead to lapses in adherence to precautions. To ensure staff comply with requirements:

- monitor staff practices in a non-adversarial way
- remind staff of the importance of continued vigilance.

Monitor the well-being of staff to ensure they have adequate breaks and that any concerns for their own, or their family members', safety are addressed.

- *Appropriate use of PPE*: Together with all necessary high-level controls, hotel and healthcare workers in contact with international travellers should wear appropriate PPE, when physical distancing is not feasible. Depending on the task and level of contact, this will include face and eye protection and hand hygiene.

Train all staff in how to perform hand hygiene correctly and how to correctly use PPE.

Staff should wear surgical masks. The mask should sit firmly on the face and be moulded over the bridge of the nose and cover the chin. Staff need to understand that masks:

- should not be touched while in use

- should be carefully removed, without touching the front (to avoid contamination of hands)
- can be used for up to four hours but must be removed and discarded appropriately if they become damp or soiled. Hand hygiene should be performed after touching or removing the mask.

What PPE is appropriate with the new SARS-CoV-2 variants?

The more transmissible SAR-CoV-2 variants has raised concerns about whether the current recommendations for use of PPE need to change. It has been suggested that particulate filter respirators (PFRs, e.g. P2/N95) rather than surgical masks should be used in certain situations in quarantine hotel settings. For example in the (unlikely) situation that a staff member needs to be in close contact over a prolonged period with an acutely ill traveller.

The first priority has been to strengthen previous travel/quarantine restrictions and improve engineering and administrative controls (as outlined earlier). So far, there is no evidence of increased risk of hotel quarantine breaches, from returning travellers infected with transmissible variants, if these measures are appropriately applied¹.

Using the full hierarchy of controls, including appropriate use of PPE, based on the local context, will provide optimal protection for workers in contact with travellers infected with SARS-CoV-2, including new variants of concern.

ICEG recommends that all jurisdictions review, reinforce and continue to monitor the full range of existing infection prevention and control measures and guidance. No specific changes to current guidance are recommended at this time.

For more information, please refer to

<https://www.health.gov.au/resources/publications/the-use-of-face-masks-and-respirators-in-the-context-of-covid-1>

¹ to January 25, 2021, there have been 57 cases, in Australia, of infections due to the “UK” variant. B1.1.7 and 13 of the “South African variant” B1.351 identified in Australia and a single incident of quarantine breach (due to B1.1.7).