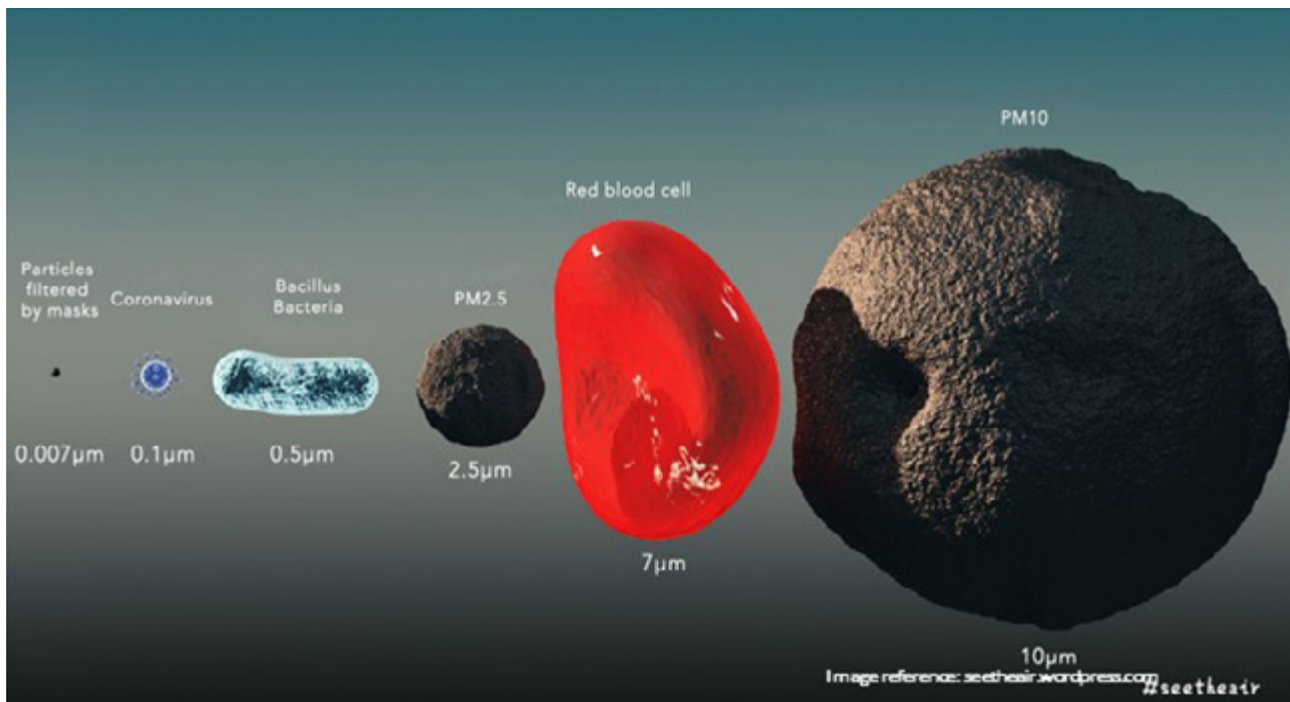




2.2.1 Disease aetiology and transmission

The communicable disease underpinning this resource is based on COVID-19, a virus as opposed to a bacteria. Viruses are infectious particles that reproduce by ‘commandeering’ a host cell and using its machinery to make more viruses. Because viruses can’t reproduce by themselves, they are not considered to be ‘living’. COVID viruses are small and this means they are likely to be airborne- they are so small they can attach to dust particles in the air and these particles are more likely to be encountered in closed in, poorly ventilated areas.^{1,3}

Size comparison of viral, bacteria, blood and dust particles



Consider this information in relation to a quarantine facility. Where possible activities considered risky are recommended to be carried out in open air- this is where the viral particles are “diluted” in the environment and literally disappear. High-risk activities such as viral screening is done on balconies, health checks are completed in the open environment and all arrivals are processed in large open spaces. Research demonstrated that in small and closed in rooms there is nowhere for the viral particles to go and this increases the risk of being exposed to them.

Disease Transmission

The mode of transmission presented here is based on COVID-19 presented as respiratory droplets, smaller particles (aerosols), direct physical contact with an infected individual and indirectly through contaminated objects and surfaces. Disease particles enter a person's system via their portals of entry identified as skin, gastrointestinal tract and respiratory tract.

Droplet transmission occurs with direct transfer of infected mucous (from an infected person) into the mouth, nose or eyes. This can occur through kissing or being in close contact with someone when they are talking, coughing or sneezing.

When an infected host sneezes or coughs, virus particles in mucous droplets are expelled and these droplets can travel at 75km/hr for up to 6 metres.¹ They are inhaled into the respiratory tract or absorbed through mucous membranes of the eye, mouth or nose.

Airborne transmission involves the direct inhalation of droplets or airborne particles into the respiratory system. For example, COVID-19 is expelled from the host's respiratory tract in a fine mist and it can stay suspended in the air for some time before falling to the ground.

This can happen when

- a person is coughing and sneezing with a high viral load OR
- a person sings or laughs expelling larger amounts of air OR
- when aerosol generating procedures (AGPs) are performed (which in quarantine may include cardiopulmonary resuscitation, non-invasive ventilation, use of high flow nasal oxygen and manual ventilation).⁴

The virus can transmit to a new host via airborne particles which are inhaled into the respiratory tract and/or absorbed through mucous membranes of the eye, mouth or nose.

Contact transmission is the indirect transfer of the virus from contaminated surfaces into the mouth, nose or eyes. This is more likely in high-risk areas such as those with a high number of people and a high level of surface contact occurring as seen in shared office spaces and shared equipment.

Droplets and viral particles drift down, landing on and contaminating surrounding surfaces. The virus can transmit to a new host via contact when it is transferred by touch (contact) from contaminated surfaces directly to the mucous membranes of the eye, mouth or nose where it is absorbed into the body.

2.2.2 Disease incubation periods

Understanding the disease incubation period is vital to inform quarantine and isolation requirements, this reduces the risk of releasing someone from quarantine who is still infected into the community. The incubation period for COVID-19 for example was 1 to 14 days, with most people becoming symptomatic 3 to 6 days after coming into contact with the virus.^{1,3}

It was found people with infection were able to transmit the virus from 1 to 3 days before the onset of symptoms. For the purposes of routine contact tracing with COVID-19, people are considered infectious from 48 hours before symptom onset. In high risk settings, this was extended to 72 hours before symptom onset guides. With COVID-19, many people remained asymptomatic throughout their infection, which means symptoms cannot be used to guide contact tracing in all cases.

2.2.3 Disease signs and symptoms

Understanding the disease signs and symptoms ensures staff are able to perform accurate health screens of residents (and themselves) and address any concerns early to prevent possible transmission of disease to others.

COVID-19 as an example presented many typical cold/flu like symptoms with up to 80% of unvaccinated experiencing a mild illness. As the virus evolved, different signs and symptoms became more or less significant. COVID-19 symptoms were identified as: fever (temperature of 37.5°C or higher), cough, chills or night sweats, sore throat, tiredness (fatigue), difficulty breathing, headache, muscle pain, loss of sense of smell and/or taste, nausea and vomiting, joint pain, loss of appetite, runny nose and acute blocked nose.¹

Older people and people who are immunosuppressed are at higher risk of severe symptoms and death. Up to 80% of symptomatic people who are infected with COVID-19 will experience symptoms beyond two weeks following onset of infection.^{1,2,4}

All viruses change over time. Mutations over time may provide either a biological advantage or disadvantage to virus propagation. During the pandemic, some mutations have been designated 'variants of concern' due to their increased transmissibility and/or higher mortality. With COVID-19, the delta variant predominated in 2021 with increased mortality. The Communicable Diseases Genomics Network is actively monitoring variants in Australia.⁵

2.2.4 Disease case definitions

A disease case definition is a set of standard criteria used to assess whether an individual has a disease or not, it assists with measuring diseases occurring within a population.⁶ For COVID-19 there were two generic case definitions – confirmed cases and probable cases.

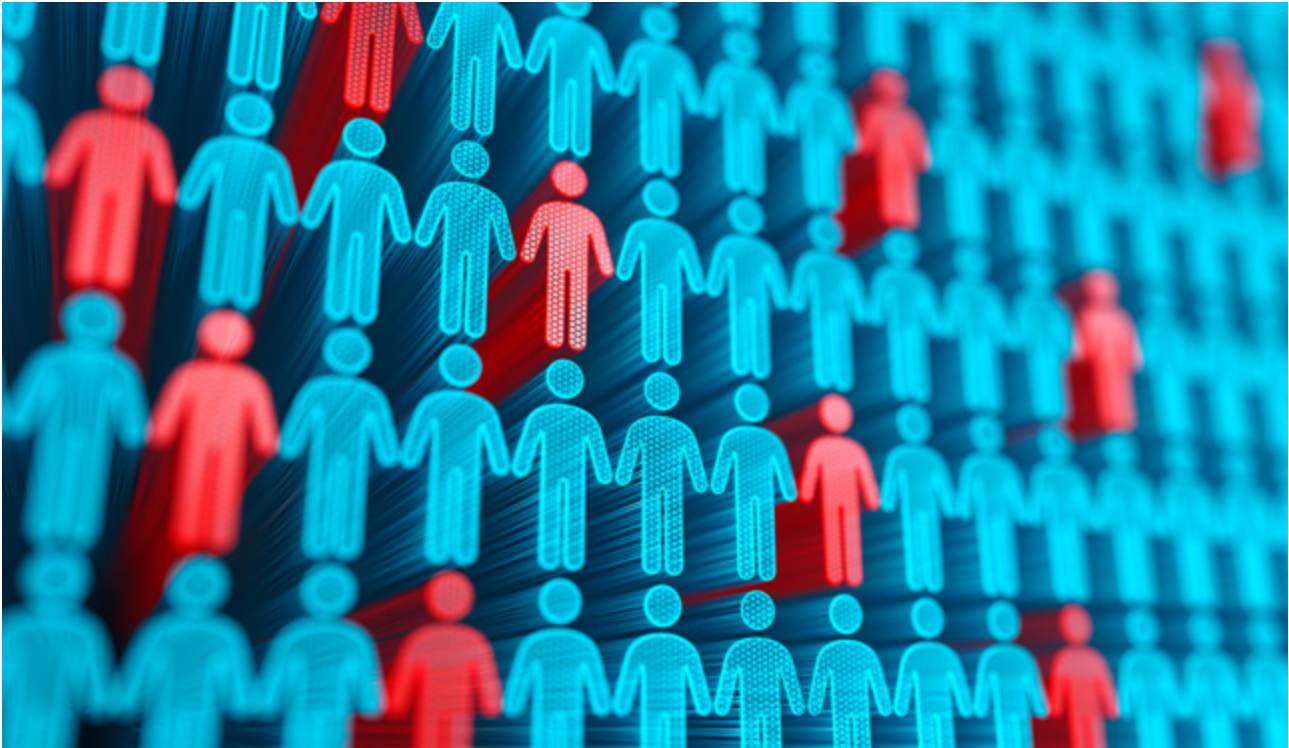
A **Confirmed Case** requires laboratory definitive evidence of current infection.⁶

A **Probable Case** includes individuals who have laboratory-suggestive evidence in the form of a rapid antigen test (RAT).⁶

For the purpose of quarantine the definition of a Close Contact is detailed in CHO Direction and defined that the person;

- resides in the same premises as an infected person; or
- is in close contact with an infected person for 4 hours or more while indoors with the infected person who is infectious; or
- someone who shares a closed space with a confirmed case for a prolonged period (i.e.: more than 2 hours) in the period extending from 48 hours before the onset of symptoms for the confirmed case; or
- is notified by the Chief Health Officer, their delegate, or an authorised officer that the person is a close contact of an infected person.

The aim of identifying contacts of people with COVID-19 is to interrupt transmission of the virus by quarantining. Of note, "In close contact", for the purposes of interpretation does not include where the quarantine facility's infection control measures of physical distancing, hand hygiene and mask wearing have been maintained. This means staff who enter zones wearing PPE and following IPC requirements are not considered close contacts even though they may have been in close proximity to positive cases.



A 'confirmed case' is detailed in CHO Direction that the person has;

- Returned a positive result to an approved COVID-19 testing procedure; or
- has been notified by an authorised officer or health practitioner that the person is infected with COVID-19

The aim of identifying contacts of people with COVID-19 is to interrupt transmission of the virus by quarantining.

In cases where there are emerging variants of concern, some jurisdictions may implement a more conservative approach to contact management. However, as the pandemic emerges, the close contact definition will continue to evolve to accommodate for the social consequences of quarantining a significant proportion of the workforce.