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Communicable Diseases network AUSTRALIA

Coronavirus Disease 2019 (COVID-19)

CDNA National Guidelines for Public Health Units

Version 4.7
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Summary of revision history

For full revision history, please refer to Appendix F

Summary of revision history			
Version	Date	Revised by	Changes
4.7	24 June 2021	Communicable Diseases Network Australia	Revised: Case definition, Release from isolation criteria, Contact management
4.6	16 June 2021	Communicable Diseases Network Australia	Revised: The Disease, Testing, Case Management
4.5	26 May 2021	Communicable Diseases Network Australia	Inclusion of new guidance: Use of COVID-19 vaccination in outbreak situations Revised: Special situations
4.4	11 May 2021	Communicable Diseases Network Australia	Inclusion of new appendix: Appendix B: Outbreak investigation and management Revised: Summary, The Disease, Case definition, Testing, Case Management, Release from Isolation, Management of contacts, High-risk settings
4.3	04 March 2021	Communicable Diseases Network Australia	Inclusion of new section: Appendix C Revised: The Disease, Case Definition, Testing, Case Management, Release from Isolation , Close contacts, Outbreak investigation and management in high-risk settings, Special situations, Appendix B
4.2	29 January 2021	Communicable Diseases Network Australia	Revised: The Disease; Case definition
4.1	12 January 2021	Communicable Diseases Network Australia	Inclusion of new subsection: Prioritisation of whole genome sequencing for all cases Revised: Case management with inclusion of subsection detailing management of cases infected with a SARS-CoV-2 variants of concern.

These guidelines outline Australia's national minimum standard for surveillance, laboratory testing and contact management for coronavirus disease 2019 (COVID-19). Jurisdictions may implement policies that exceed the national minimum standard based on local epidemiological context. CDNA will review and update these recommendations as new information becomes available on COVID-19 and the situation in Australia.

Readers should not rely solely on the information contained within these guidelines. Guideline information is not intended to be a substitute for advice from other relevant sources including, but not limited to, the advice from a public health specialist or other health professional. Clinical judgement and discretion may be required in the interpretation and application of these guidelines.

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Abbreviations and definitions

COVID-19:	Coronavirus disease 2019. The name of the disease caused by the virus SARS-CoV-2, as agreed by the World Health Organization, the World Organisation for Animal Health and the Food and Agriculture Organization of the United Nations. For more information, refer to the WHO Director-General's remarks at the media briefing on 2019-nCoV on 11 February 2020.
SARS-CoV-2:	Severe acute respiratory syndrome coronavirus 2. The formal name of the coronavirus that causes COVID-19, as determined by the International Committee on Taxonomy of Viruses. Previously, this coronavirus was commonly known as 'novel coronavirus 2019 (2019-nCoV)'. For more information, refer to the Consensus Statement of the Coronaviridae Study Group of the International Committee on Taxonomy of Viruses.

CONTENTS

1. Summary

These guidelines outline Australia's national minimum standard for surveillance, laboratory testing and contact management for coronavirus disease 2019 (COVID-19). Jurisdictions may implement policies that exceed the national minimum standard based on local epidemiological context. CDNA will review and update these recommendations as new information becomes available on COVID-19 and the situation in Australia.

For detailed guidance on infection prevention and control, please refer to *Infection Control Expert Group-endorsed infection prevention and control guidance*.

Public health priority

Urgent – public health responses should be initiated as soon as possible.

Case management

Confirmed cases must isolate according to isolation and restriction guidance until they meet the appropriate release from isolation criteria, regardless of vaccination status. All newly confirmed cases should undergo whole genome sequencing.

Confirmed historical cases do not need to isolate and their contacts do not need to quarantine, unless it can be determined the case is a recent historical case that has not met release from isolation criteria. Some historical cases may also warrant further investigation to identify potential source contacts or chains of transmission. For more information, see Identification of potential source contacts.

Contact management

Close contacts should be managed according to management of contacts guidance.

Primary close contacts must quarantine for 14 days following the last close contact with the confirmed case during their infectious period, regardless of vaccination status. Primary close contacts should be actively monitored for development of fever or COVID-19 symptoms during this period, where feasible, and should be tested if symptoms develop. Primary close contacts should also be tested on entry to and (where appropriate) exit from quarantine, even if asymptomatic.

Testing

Individuals meeting the suspect case definition should be tested for SARS-CoV-2, regardless of vaccination status.

Individuals meeting the enhanced testing criteria should be tested for SARS-CoV-2. However, if presentation for enhanced testing is within 48 hours of receiving a vaccine, in the absence of respiratory symptoms (including loss of smell), testing may not be required. See testing following a possible vaccine-related adverse event for more information.

Routine testing is required for international travellers, international aircrew, COVID-19 quarantine and isolation facility workers and primary close contacts in quarantine.

For detailed guidance on laboratory testing for SARS-COV-2, please refer to *Public Health Laboratory Network Publications*.

2. The disease

Infectious agent

SARS-CoV-2 is the infective agent that causes COVID-19. SARS-CoV-2 is a novel coronavirus that was first identified in humans in Wuhan, China, in December 2019. SARS-CoV-2 shares 80% sequence identity to SARS-CoV-1 (1, 2).

Coronaviruses are a large family of viruses, some causing illness in people and others that circulate among animals, including camels, cats and bats. Rarely, animal coronaviruses can evolve and infect people and then spread between people. Human coronaviruses cause mild illness in humans, such as the coronaviruses that cause the common cold. Rarely, animal coronaviruses can evolve and infect people and then spread between people. Mutations allowing human-to-human transmission have led to outbreaks of severe acute respiratory disease due to MERS-CoV and SARS-CoV.

Reservoir

The *WHO-convened Global Study of Origins of SARS-CoV-2: China Part* suggests bats and pangolins may be the reservoir for SARS-CoV-2. While the coronaviruses most highly related to SARS-CoV-2 are found in bats and pangolins, they are not sufficiently similar to be definitively confirmed as the reservoir. Further investigation is required to confirm the origin of SARS-CoV-2 (3).

Mode of transmission

SARS-COV-2 can be transmitted through respiratory droplets, smaller particles (aerosols), direct physical contact with an infected individual, and indirectly through contaminated objects and surfaces (4). While the exact relative contributions of these routes remains unclear, those who have been in close contact with a COVID-19 case are at highest risk (4).

Aerosol transmission

There is a gradient from large droplets to smaller aerosols, which may contribute to transmission of SARS-CoV-2 in certain situations. These include during aerosol generating procedures in clinical settings (refer to Aerosol-generating procedures), in the context of certain behaviours, such as singing and shouting (5) and in certain environmental conditions. These behaviours and conditions can increase the force and range of spread of both large and small particles. Where an indoor environment has a low air exchange rate (i.e. less movement of outside air replacing the air indoors), small particles that are normally rapidly dispersed may remain suspended or be recirculated for longer periods. The particles may be moved around by natural airflow, fans or air conditioners. In these situations, airflow may play a role in transmission.

Indirect transmission

Respiratory droplets and secretions expelled by an infectious person can contaminate surfaces and objects (4). Indirect transmission via contact with contaminated surfaces and objects may be possible but does not present the same degree of risk as direct close contact with an infected person. Live SARS-CoV-2 virus can survive on surfaces for several hours to a few days, depending on the surface type and environmental conditions (6, 7). However, SARS-CoV-2 can be rapidly inactivated by alcohol, household bleach, and other chemicals (8).

Reproduction number and transmission dynamics

Estimates for the basic reproductive number (R_0) of SARS-CoV-2 range from 2–4 (9). R_0 for confined settings may be at the higher end of this range. Estimates of the effective reproductive number (R_{eff}) vary between settings and at different time points. R_{eff} is dependent on a range of factors. These include public health interventions such as isolation, quarantine, physical distancing, and mask wearing to limit exposure between people (10, 11).

SARS-CoV-2 variants of concern or interest

All viruses, including SARS-CoV-2, change over time. Most mutations won't significantly alter the behaviour of the virus. However occasionally, changes may provide either a biological advantage or disadvantage to virus propagation (12).

During the pandemic, SARS-CoV-2 variants have emerged overseas. Some of these are denoted 'variants of concern' (VOC), as there is evidence for epidemiological, biological, or immunological features of concern. Some SARS-CoV-2 VOC may be associated with increased transmissibility or higher mortality compared with other lineages (13, 14). Lineages for which there is no clear evidence that the mutations confer epidemiological, pathological or immunological features of concern may be denoted 'variants under investigation' or 'variants of interest'. For more information please see*: PHLN statement on reporting of SARS-COV-2 variants of concern and interest*.

Some SARS-CoV-2 VOC have demonstrated the potential for escape from immune recognition. In vitro studies of some variants with the E484K mutation have shown evasion of neutralising antibodies in convalescent sera of individuals previously infected with non-variant SARS-CoV-2. Further studies are required to understand the impact of VOC on the risk of re-infection and vaccine effectiveness (15, 16).

The Communicable Diseases Genomics Network is actively monitoring variants and their reported mutations to understand how these may influence the behaviour of the virus. As variants are identified, studies are required to understand the impact of mutations on viral characteristics such as transmissibility, routes of transmission, disease severity, incubation period, and infectious period. These factors may have implications for public health measures necessary to contain the virus.

Jurisdictions should review, reinforce and continue to monitor the full range of existing infection prevention and control measures in response to SARS-COV-2 variants. For more information see Infection Control Expert Group (ICEG) endorsed infection control guidance.

Incubation period

The majority of people become symptomatic 5 to 6 days after coming into contact with another infected person, with a range of 1 to 14 days (17-19). Around 1% of COVID-19 cases will develop symptoms more than 14 days after exposure (20). The advice in this guideline uses an upper range of 14 days to guide public health measures such as quarantine and isolation. There is currently insufficient high-quality evidence to determine how the incubation period for emerging variants of concern may differ from other lineages.

Infectious period

Several studies have confirmed the occurrence of pre-symptomatic and asymptomatic transmission (21, 22). Pre-symptomatic transmission can occur 1-3 days before symptom onset (23, 24). Peak viral load in upper respiratory tract samples occurs most often around the time of symptom onset and declines after the first week following symptom onset (25).

High viral loads have been detected in asymptomatic, pre-symptomatic and symptomatic individuals, suggesting the potential for transmission irrespective of the presence of symptoms (22). However, faster viral clearance and subsequent shorter infectious periods have been observed for asymptomatic individuals (25). Symptomatic and pre-symptomatic individuals have a greater role in the spread of SARS-CoV-2 with a higher secondary attack rate than those who remain asymptomatic throughout their illness (26).

For the purposes of routine contact tracing, cases are considered infectious from 48 hours prior to symptom onset. More conservative periods (e.g. 72 hours prior to illness onset) may be considered in high risk settings. This should be at the discretion of the public health unit (PHU). Confirmed cases pose a risk of onward transmission and require isolation until criteria listed in the Release from isolation section have been met.

Clinical presentation and outcome

COVID-19 presents as a mild illness in approximately 80% of cases. Evidence suggests the most common symptoms are fever, cough, dyspnoea, malaise, fatigue, loss of taste and/or smell, and sputum/respiratory secretions (27-29). Other symptoms include headache, sore throat, fatigue, shortness of breath, myalgia, rhinorrhoea, chills, and vomiting. Atypical symptoms may include chest pain, diarrhoea, and conjunctivitis (1, 27-29). Loss of smell and/or taste are more common presenting symptoms than initially thought, seen in approximately 50% and 40% of cases, respectively (30).

The clinical presentation of COVID-19 differs from influenza, as the former typically presents with fever, then cough followed by myalgia, headache, and sore throat while the latter more commonly initiates with cough (31).

Recent studies have reported the clinical characteristics of patients with COVID-19. Severe or fatal outcomes occur more frequently in the elderly and those with comorbid conditions (32, 33). Older adults are at increased risk of severe disease compared with younger individuals due to age-related vulnerabilities (34, 35). While those with comorbid conditions have a higher incidence of severe or fatal outcomes, there are few studies investigating the relationship between severity and mortality of COVID-19 in the context of comorbidities (33).

COVID-19 is generally a mild disease in children, with the risk of severe disease being almost 25 times greater in adults (36, 37). A rare but severe complication of COVID-19 seen in children and adolescents is Paediatric Inflammatory Multisystem Syndrome Temporally associated with SARS-CoV-2 (PIMS-TS). PIMS-TS has features resembling Kawasaki disease (KD) and toxic shock syndrome and typically occurs approximately 2 to 4 weeks after the onset of COVID-19 (38).

The majority of cases recover from infection without clinical intervention, however, approximately 20% of identified cases globally to date have resulted in moderate to severe disease requiring hospitalisation. Some individuals remain asymptomatic throughout infection. Estimates of the proportion of cases which remain asymptomatic throughout their infection range from 15 to 48% (21, 22, 39-42).

Emerging evidence suggests up to 80% of patients with COVID-19 experience ongoing symptoms beyond two weeks following onset of acute infection (43). Reported long-term symptoms, include fatigue, headache, attention disorder, mood changes, chest pain, palpitations, hair loss, and dyspnoea (43, 44). Fatigue is the most common long-term symptom affecting around 58% of individuals (43). For individuals who experience loss of smell and/or taste as a result of COVID-19, most regain these senses within the first 28 days following infection but up to a quarter experience longer-lasting dysfunction (45). Long-term symptoms following COVID-19 are more likely with increasing age, body mass index and female sex (46).

For confirmed cases reported globally, the crude case fatality rate (CFR) is approximately 2.1% (47). The true case fatality rate for COVID-19 is difficult to estimate due to variable case ascertainment, especially for mild cases, and the impact of health systems on patient outcomes. Mortality is influenced by individual risk factors and health care quality and access. Australia's CFR is 3.1% (based on surveillance data notified in Australia as of 03 May 2021). Outbreaks in residential aged care facilities have contributed to Australia's slightly higher CFR compared with the global average due to the older age and higher rates of comorbid illness among those infected. To date, 75% (685/910) of COVID-19 deaths in Australia have occurred in residential aged care facility residents who may be at higher risk of severe disease and death (based on aged care public dashboard data and surveillance data notified in Australia as of 03 May 2021).

Immune response

Evidence is still emerging about the immune response to SARS-CoV-2 infection, including duration of immunity and duration of antibody response (48).

The immune response to SARS-CoV-2 involves both humoral and cell-mediated immunity.

IgM antibodies are detectable before IgG antibodies. Levels of IgM antibodies appear to peak at weeks two to five from the onset of symptoms, and then decline (48). IgG antibody levels peak later, approximately three to seven weeks following symptom onset, and then plateau. IgG antibodies have been shown to persist for at least eight weeks and up to several months (15, 48).

Host cellular immunity also plays an important role in the immune response to SARS-CoV-2. (15). Evidence suggests enduring T cell immunity, with a greater magnitude of T cell response, in patients who recovered from severe, compared to mild, disease (15). The longevity of this T cell immunity and the degree of protection it provides remain unclear.

Further studies are required to understand the implications of SARS-CoV-2 variants of concern and the risk of re-infection (see SARS-CoV-2 variants of concern or interest).

Vaccination

The SARS-CoV-2 vaccination program commenced in Australia on 22 February 2021. The Therapeutic Goods Administration has approved AstraZeneca ChAdOx1-S and Pfizer Australia - COMIRNATY BNT162b2 (mRNA) vaccines for distribution within Australia. Currently available evidence demonstrates that both AstraZeneca and Pfizer vaccines are effective in reducing the incidence and severity of COVID-19 (49).

It is not yet clear how widespread vaccination will affect the risk of SARS-CoV-2 transmission. Additionally, evidence is still emerging on vaccine effectiveness, including effectiveness following first and second doses (50).

The Australian Technical Advisory Group on Immunisation (ATAGI) has noted evidence of a rare but serious side effect involving thrombosis (clotting) with thrombocytopenia (low blood platelet count) following receipt of the AstraZeneca vaccine. ATAGI recommends the Pfizer vaccine as the preferred vaccine for adults aged under 50 years. For more information, see *ATAGI statement on AstraZeneca vaccine in response to new vaccine safety concerns*.

The safety and effectiveness of COVID-19 vaccination programs in Australia and overseas is being monitored closely in the context of how vaccination may impact upon the optimal public health management of COVID-19.

Persons at increased risk of exposure

People who have frequent, close, or extended contact with others have the potential for greater exposure to SARS-CoV-2.

People at increased risk of exposure include those who:

- Have travelled to areas with higher prevalence of COVID-19 through international or domestic travel;
- Are caring for COVID-19 cases; or
- come in contact with people with a higher likelihood of having active infection.

These groups of people often work in certain occupational groups and include, but are not limited to:

- international border staff
- workers supporting quarantine and isolation services
- air and maritime crew
- health care and aged care workers with direct patient contact

Depending on the epidemiological context, there are other groups of workers at higher risk of infection, such as casual and mobile employees working across multiple settings. Some of these workers include cleaners, rideshare service and taxi drivers, and security personnel. There are several factors that may put them at higher risk, including multiple exposure points, staff who may have a perceived need to continue work despite being unwell, and language barriers for people from culturally and linguistically diverse backgrounds. Other people at increased risk of exposure might include those in public facing occupations or crowded settings (e.g. hospitality, public transport, retail).

Persons who live or work in a high-risk setting, where there is evidence of a risk for rapid spread and ongoing chains of transmission, may also be at increased risk of exposure if an infectious case is introduced. Settings where disease is likely to readily transmit and be amplified are those with a high population density, settings where people are living or working in close proximity to others, or specific environmental conditions. These settings may include, but are not limited to:

- health care facilities;
- residential aged care facilities;
- residential care facilities;
- crowded or high-density housing;
- Aboriginal and Torres Strait Islander communities (particularly in rural and remote areas);
- correctional and detention facilities;
- homeless shelters and residential/crisis hostels;
- mining sites; and
- food processing, distribution and cold storage facilities, including abattoirs.

People at increased risk of severe disease

Older individuals are at the highest risk of severe COVID-19. Others with certain comorbidities are also at increased risk of severe COVID-19. Information on those at high and moderate risk of severe illness, and other factors that might increase the risk of severe disease, is available on the Department of Health's *Advice for people at risk of coronavirus (COVID-19)*.

Disease occurrence and public health significance

Cases of COVID-19 were initially thought to be associated with attendance at an animal wet market—located in Wuhan, Hubei Province, China—indicating a probable zoonotic source. Human-to-human transmission of SARS-CoV-2 is well established. As of 10 May 2021, numerous countries and all regions across the globe have reported broader community transmission, and globally there have been over 157.9 million confirmed cases and over 3.2 million deaths (47).

The World Health Organization (WHO) declared the outbreak of COVID-19 a Public Health Emergency of International Concern (PHEIC) on 30 January 2020 (51), and declared a pandemic on 12 March 2020 (52).

Australia implemented measures aimed at slowing the spread of COVID-19 into and within the country, and prepared healthcare services and laboratories for a targeted response. The *Australian Health Sector Emergency Response Plan for Novel Coronavirus (COVID-19)* details the national approach, the operational plan and guidance for the health sector response.

'Human coronavirus with pandemic potential' was added to the *Biosecurity (Listed Human Diseases) Determination 2016* as a listed human disease on 21 January 2020, and has been listed temporarily on the National Notifiable Diseases List (NNDL) since 10 February 2020.

On 18 March 2020, the Governor-General declared a "human biosecurity emergency" under the *Biosecurity Act 2015*, given the threat COVID-19 poses to human health on a nationally significant scale and the need to control its entry, emergence, establishment and spread in Australia. The declaration was recommended by the Minister for Health and informed by specialist medical and epidemiological advice provided by the Chief Medical Officer (in his capacity as the Director of Human Biosecurity) and the Australian Health Protection Principal Committee. The human biosecurity emergency declaration gives the Minister for Health powers under the Act to determine emergency requirements or issue directions to respond to COVID-19, such as restrictions on cruise ships and overseas travel. The emergency period is regularly reviewed to ensure it remains necessary and proportionate.

States and Territories have also exercised emergency powers under jurisdictional legislation as required throughout the pandemic to manage the spread of COVID-19 as quickly and flexibly as possible.

3. Routine prevention activities

Travel

The Australian government has implemented travel restrictions and quarantine requirements to reduce transmission between countries.

All incoming international travellers must provide proof of negative COVID-19 PCR result prior to their departure to Australia. This test must be conducted 72 hours or less prior to the scheduled departure time of their flight. See *COVID-19 FAQs- international travellers to Australia*.

Jurisdictions will also conduct testing in COVID-19 quarantine and isolation facilities, for more information see Testing section.

At present, overseas travel from Australia is restricted, with few exceptions. Travellers to other countries should comply with local requirements regarding quarantine, physical distancing and the use of PPE. They should also avoid contact with sick people and maintain good personal hygiene.

Some Australian jurisdictions may implement border closures and localised movement restrictions based on changes in local epidemiology of COVID-19.

Personal hygiene

Individuals should establish and maintain good hygiene practices to prevent infection from SARS-CoV-2, which includes:

- Practising effective hand hygiene and respiratory hygiene;
- Cleaning frequently touched surfaces regularly with appropriate detergents and disinfectants;
- Staying home and not attending public places including work or school if unwell;
- Maintaining a distance of 1.5 m from people when in public; and
- Wearing a face mask in situations where physical distancing cannot be maintained.

Public communications should encourage this behaviour. Individuals who develop symptoms of COVID-19 should self-isolate and seek medical assessment.

During outbreaks or in the presence of sustained community transmission, the use of masks in the community can supplement other control measures.

Physical distancing and gatherings

Physical distancing requirements may be enforced, and restrictions have been implemented, on private and public gatherings by state/territory governments. These restrictions have varied over time.

Physical distancing is an effective measure, but it is recognised that it cannot be practised in all situations. The aim is to reduce the potential for transmission. Whilst practising physical distancing, people can travel to work (including by public transport) and carry out normal duties. Physical distancing outside the workplace aims to reduce nonessential activities and includes:

- Avoiding physically greeting other people.
- Avoiding crowds and mass gatherings.
- Avoiding small gatherings in enclosed spaces, for example family celebrations.
- Attempting to keep a distance of 1.5 metres between themselves and other people where possible, for example when in public spaces.

Jurisdictions may have public health directions in place to ensure physical distancing is occurring to further support prevention of transmission, depending on the nature of the outbreak at a point in time. These physical distancing actions may range from reducing social interactions to 'stay at home' requirements for all except essential workers (commonly called shutdown or lockdown). Physical distancing can be enabled through density limitations of number of people allowed in a square metre. Other examples include: capped restrictions to the number of visitors allowed at a residence or outdoor gatherings; the number of people who can attend weddings, funerals or religious services; the number of people who can participate in sport and recreational activities; and number and spacing of patrons allowed at hospitality venues, events and musical activities.

If individuals are attending public gatherings or venues, they should comply with jurisdictional directions including limitations on the number of attendees. Some jurisdictions will also require venues, businesses and organisations to keep a record with contact details of all staff, patrons and contractors visiting their premises.

4. Surveillance

There are four main objectives of surveillance for COVID-19, which are to rapidly:

1. identify, isolate and manage cases.
2. identify, quarantine and provide relevant information to contacts.
3. detect and manage clusters and outbreaks, and
4. characterise the epidemiology of COVID-19 in Australia to inform the public health response including:
    - analysing the progression of the epidemic in time, person and place,
    - describing the transmission dynamics, and
    - identifying groups at special risk of infection.

Reporting

PHUs should immediately notify the central state/territory communicable diseases unit upon receipt of a notification or report of a confirmed or historical case of COVID-19 or death in an infected person.

As much information regarding the case's age, sex, comorbidities, place of residence, Indigenous status, any culturally/linguistically diverse background, date of onset, travel history, laboratory results, clinical status, likely place of acquisition, identification of close contacts and follow-up action taken should be included in the initial report, with additional information being followed up within one working day.

Central state/territory communicable diseases units will notify confirmed COVID-19 cases and deaths as soon as practicable to the Australian Government Department of Health via both transmission of data to the National Notifiable Diseases Surveillance System (NNDSS) and via email or telephone notification to the National Incident Room.

Data management

Initial information on confirmed and historical cases of COVID-19 should be entered onto the jurisdictional notifiable diseases database, for transmission to the NNDSS, within one working day of the notification/report. Enhanced surveillance data should be entered shortly after case follow-up.

5. Cases

Definitions

Reporting

Both confirmed cases and historical cases should be notified in the jurisdiction of diagnosis.

People who meet the confirmed or historical case criteria who have previously been diagnosed and managed overseas or in another Australian jurisdiction do not need to be re-notified. In this situation, documented evidence of diagnosis overseas or interstate must be provided to the PHU.

Confirmed case

The confirmed case definition is intended to capture newly diagnosed cases with laboratory definitive evidence to support a diagnosis.

A confirmed case requires laboratory definitive evidence.

Laboratory definitive evidence:

1. Detection of SARS-CoV-2 by nucleic acid testing[1];

   OR

2. Isolation of SARS-CoV-2 in cell culture, with confirmation using a nucleic acid test;

   OR

3. SARS-CoV-2 IgG seroconversion or a four-fold or greater increase in SARS-CoV-2 antibodies of any immunoglobulin subclass including 'total' assays in acute and convalescent sera, in the absence of vaccination[2].

Historical case

The historical case definition is intended to capture cases who have been infected sometime in the past that have not been previously reported and are not considered infectious at the time of diagnosis. Further laboratory testing is required to meet this criterion.

A historical case requires:

i. Laboratory evidence to support a historic infection; **AND**
ii. Absence of clinical evidence in the 14 days prior to swab date of positive test

Laboratory evidence of historic infection:

1. For people who have not been vaccinated:
   - Detection of SARS-CoV-2 by PCR with initial test results suggestive of a historical infection[3]; **AND**
   - A subsequent PCR is negative OR suggestive of a historical infection[3], taken at least 24 hours apart; **AND**
   - Detection of IgG or total antibody[2];

   OR

2. For people who have been vaccinated:
   - Detection of SARS-CoV-2 by PCR with initial test results suggestive of a historical infection[3]; **AND**
   - A subsequent PCR is negative, taken at least 24 hours apart.

Clinical evidence

- Fever (e.g. night sweats, chills); or
- Acute respiratory infection (e.g. cough, shortness of breath, sore throat)[4] ; or
- Loss of smell or loss of taste.

Suspect case

The suspect case definition is intended to identify those who may have an increased likelihood of current SARS-CoV-2 infection. Suspect cases may require specific infection prevention and control measures and public health management. Suspect cases do not need to be notified to the NNDSS.

A suspect case is a person who meets the below **clinical** and **epidemiological** criteria.

Clinical and public health judgement should be used in assessing if hospitalised patients with non-specific signs of infection and/or patients who do not meet the clinical or epidemiological criteria should be considered suspect cases.

Clinical evidence (in the past 14 days):

- Fever (≥37.5 °C) or history of fever (e.g. night sweats, chills); or
- Acute respiratory infection (e.g. cough, shortness of breath, sore throat)[4]; or
- Loss of smell or loss of taste.

Epidemiological evidence (in the past 14 days):

- Close contact with a confirmed case (refer to Close contacts below)
- International travel, with the exception of green zone countries (e.g. New Zealand)
- Workers supporting designated COVID-19 quarantine and isolation services
- International border staff
- International air and maritime crew
- Health, aged or residential care workers and staff with potential COVID-19 patient contact
- People who have been in a setting where there is a COVID-19 case
- People who have been in areas with recent local transmission of SARS-CoV-2.

Notes:

[1] There is possibility for false negative PCR results in children, as some children may be found to mount a brisk immune response that is highly effective in restricting virus replication, resulting in a lower viral load (53). PHUs may seek serological evidence of SARS-CoV-2 immunity in symptomatic children who are repeatedly PCR negative but are known primary close contacts.

[2] Antibody detection must be by a validated assay and included in an external quality assurance program. For all serological responses to be counted as laboratory evidence, a person should not have had a previous COVID-19 vaccination.

[3] PCR results suggestive of an historical infection should be undertaken in consultation with the responsible supervising pathologist or senior clinical scientist. PCR results suggestive of a historical infection may include high cycle threshold (Ct) values or equivalent findings using other platforms, which may not produce Ct values.

[4] Other reported symptoms of COVID-19 include: fatigue, runny nose, acute blocked nose (congestion), muscle pain, joint pain, diarrhoea, nausea/vomiting and loss of appetite. Clinical and public health judgement should be used to determine if individuals with sudden and unexplained onset of one or more of these other symptoms should be considered suspect cases.

Testing

Individuals meeting the suspect case definition should be tested for SARS-CoV-2, regardless of vaccination status.

Individuals meeting the enhanced testing criteria should be tested for SARS-CoV-2. However, if presentation for enhanced testing is within 48 hours of receiving a vaccine, in the absence of respiratory symptoms (including loss of smell), testing may not be required. See testing following a possible vaccine-related adverse event for more information.

State and territory communicable diseases units can advise on which laboratories can provide SARS-CoV-2 testing; appropriate specimen type, collection and transport; and also facilitate contact management if indicated.

To guide local approaches to testing, please refer to the *CDNA and PHLN Testing Framework for COVID-19 in Australia* (Testing Framework). The Testing Framework identifies key priority groups for targeted testing based on the likelihood of infection and the epidemiological situation. The Testing Framework also provides guidance on appropriate test types based on specific circumstances. Jurisdictions can apply this guidance according to their local context.

All jurisdictions should review, reinforce and continue to monitor the full range of existing infection prevention and control measures and guidance, see ICEG-endorsed infection control guidance.

Approach to specimen collection and testing for SARS-CoV-2

Laboratory testing for SARS-CoV-2 is important for individual patient diagnosis, and to guide infection prevention and control procedures and public health investigations. The main sample types submitted for testing are respiratory tract samples (upper and lower tract) and sera. Nucleic acid testing using reverse transcription polymerase chain reaction (RT-PCR) is the method of choice to detect SARS-CoV-2 during the acute illness.

Serology may be useful for diagnosis of historical COVID-19 cases, further investigation where nucleic acid testing is negative, and research purposes. However, currently no serological assays can reliably prove immunity to SARS-CoV-2 and the ability of serology to detect anti-spike antibody following vaccination for COVID-19 is unknown. The detection of anti-spike antibody cannot distinguish between natural infection and vaccination. Routine diagnostic serological testing is not recommended following COVID-19 vaccination.

Routine tests for acute pneumonia/pneumonitis should be requested where indicated and according to local protocols. This may include bacterial cultures, acute and convalescent serology, urinary antigen testing and nucleic acid tests for other respiratory pathogens.

The occurrence of viral coinfection in SARS-CoV-2 has been negligible in Australia to date. However, if SARS-CoV-2 is not detected, testing for other common respiratory viruses in a person with an acute respiratory tract infection may be clinically appropriate.

For advice on selecting a suitable sample for diagnostic RT-PCR testing for SARS-CoV-2; specimen handling in the laboratory; or the different types of SARS-CoV-2 specific testing, please refer to *Public Health Laboratory Network (PHLN) guidance on laboratory testing for SARS-CoV-2*.

Whole genome sequencing has become a vital part of Australia's response to the COVID-19 pandemic. State and territory public health laboratories have established pathogen

genomics capacity and capability at varying levels. Refer to *PHLN guidance on laboratory testing for SARS-CoV-2* and Genome sequencing for all cases for further information.

Enhanced testing

The information in this section reflects the current national recommendations for SARS-CoV-2 testing beyond the suspect case definition. These recommendations will change over time based on a variety of factors, including current epidemiology and testing capacity. It is important to check relevant state and territory health department case definitions and criteria for who should be tested, as these will vary according to local epidemiology and circumstances.

Testing beyond the suspect case definition should be undertaken on persons with: fever (≥37.5°C)[1] or history of fever (e.g. night sweats, chills) or loss of smell or loss of taste, where no other clinical focus of infection or alternate explanation of the patient's illness is evident, OR acute respiratory infection (e.g. cough, shortness of breath, sore throat)[2].

Notes:

[1] It is recommended that temperature is measured using a tympanic, oral or other thermometer proven to consistently and accurately represent peripheral body temperature.

[2] Other reported symptoms of COVID-19 include: fatigue, runny nose, acute blocked nose (congestion), muscle pain, joint pain, diarrhoea, nausea/vomiting and loss of appetite. Testing beyond the suspect case definition may, based on the clinical and public health judgement of the treating clinician, include individuals with sudden and unexplained onset of one or more of these other symptoms.

Testing in COVID-19 quarantine and isolation facilities

International travellers

Jurisdictions will conduct routine testing of international travellers who are in hotel quarantine. Testing should occur on day 0–2 and then on day 10-14, preferably as late as possible, of hotel quarantine, with results to be received prior to release from quarantine period. Exact arrangements will depend on state and territory protocols. Jurisdictions may also test asymptomatic persons quarantined due to interstate travel. For further information, see Contact management – international travellers.

COVID-19 quarantine and isolation facility workers

All COVID-19 quarantine and isolation facility workers (e.g. health staff concierge, transport staff, police, security guards, cleaners etc.) are required to undergo daily COVID-19 testing for screening purposes. Jurisdictions may determine appropriate methods for routine testing, including alternative methods of sampling, such as testing saliva samples.

Routine testing should complement but not replace existing infection prevention and control activities as well as occupational health and safety requirements intended to protect workers; to ensure the safety of quarantine facilities and prevent spread of infection from quarantine and isolation settings to the wider community.

Testing following a possible vaccine-related adverse event

If a vaccine recipient is not a suspect case and develops fever, headache, fatigue or other mild systemic symptoms within and lasting for less than 48 hours after receipt of a COVID-

19 vaccine in the absence of respiratory symptoms (including loss of smell), it is more likely that they have an expected vaccine response and testing may not be required.

PHU should consider the local epidemiology in determining whether SARS-CoV-2 testing is necessary in this instance. If symptoms persist past 48 hours post vaccination, these individuals should get tested. For more information, see *Australian Technical Advisory Group on Immunisation (ATAGI) Clinical guidance on use of COVID-19 vaccine in Australia in 2021*.

Post testing instructions and isolation requirements for people with symptoms that may be due to COVID-19

Jurisdictions should give clear instructions on isolation requirements after COVID-19 testing. Clear information should be made available (e.g. on the jurisdictional health department website, in multiple languages). Where applicable, culturally-appropriate resources and engagement with community leaders may also be considered.

Individuals must follow all relevant post-testing instructions regardless of vaccination status.

Healthcare workers providing testing services should have a good understanding of their jurisdiction's isolation requirements after testing, based on written information from the jurisdiction's Communicable Diseases Unit (or equivalent). Healthcare workers providing testing services should clearly communicate the isolation requirements each person should follow after testing, depending on their situation.

Factors to consider

Post-testing instructions and the level of isolation required after testing should consider the following factors:

- Epidemiological context
- Whether the person is symptomatic
- Potential risk of transmission of undiagnosed COVID-19
- The public health risk of creating a barrier to testing

Post-testing instructions and isolation requirements

PHUs may divide instructions on isolation requirements after testing into two groups:

1. People with a clinically compatible illness who are not in quarantine
2. People with a clinically compatible illness who are in quarantine

1. For people with a clinically compatible illness who are not in quarantine:
   - The person should stay at home until a negative test is returned AND symptoms have resolved[1].
   - Whilst staying at home and waiting for a negative test, they should continue to practise respiratory and hand hygiene, and, where possible, try to stay at least 1.5 metres away from others and where this is not possible, wear a mask.
   - Their household should not have visitors, but household contacts are free to come and go from the house.

Additional Instructions when there is community transmission:

- Where possible, they should try to isolate in a single room in the household, avoid common areas and not carry out regular caring responsibilities that bring them into close contact with others.

- Household contacts should not attend high-risk settings (e.g. residential aged-care facilities)

2. For people with a clinically compatible illness who are in quarantine:
   - The person should isolate in a single room in the household, avoid common areas and not carry out regular caring responsibilities that bring them into close contact with others.
   - They must remain in quarantine for the pre-determined period as determined by the relevant PHU, regardless of negative test result.

Notes:

[1] In some situations, where the pre-test probability is very low and particularly where there is a long delay between taking a test and receiving a result, public health authorities may decide that it is permissible for individuals with complete symptom resolution to leave their homes, even when they have not yet received a negative test. In this situation, individuals may still be asked to avoid any high-risk settings (e.g. RACFs) until a negative test is received. Decisions on this advice will rest with local public health authorities who are best placed to recognise the level of local risk.

Procedure for assessing indeterminate and suspected false positive SARS-CoV-2 PCR results

Australian laboratories use highly accurate SARS-CoV-2 PCR assays and have procedures in place for confirmatory testing when required. Despite this, it may not be possible for the laboratory to provide a definitive positive or negative result for all specimens tested for SARS-CoV-2.

In addition, despite the highly specific nature of the SARS-CoV-2 PCR, the low prevalence of COVID-19 in some jurisdictions and high levels of enhanced testing means the positive predictive value of the test result may be reduced, increasing the risk of a false positive result. PHUs should consider this in low prevalence settings along with the clinical and epidemiological information, especially when the case is not linked to a previous known case and has no other epidemiological risk factors (e.g. international travel or travel to a setting with increased incidence). Such an assessment is particularly important in order to avoid continuing unnecessary isolation of cases, quarantine of contacts, and strain on public health resources. When deciding on appropriate action, it is important to note that the incidence of false positive results in Australia to date has been very low, despite most testing being conducted in low prevalence populations.

Indeterminate or inconclusive PCR results

Despite most laboratories employing multiple PCR tests for the detection of SARS-CoV-2, often with several gene targets in each assay, it may not be possible to resolve initially discrepant PCR results in all instances (e.g. the laboratory PCR test results are weakly positive for only one SARS-CoV-2 specific target). Indeterminate results may be due to SARS-CoV-2 infection with very low viral loads, persistent shedding or due to non-SARS-CoV-2 reactivity in the PCR test. In these circumstances, PHUs should first contact the laboratory microbiologist to discuss the results and decide whether further testing is warranted. As for all indeterminate results, results should be considered in the context of the clinical and epidemiological circumstances to inform decisions on any required further public health action. Indeterminate results are not always false positive results and may occur, for example, with low viral loads or in historical cases. The procedures for investigation of suspected false positive PCR results (below) may be employed when

determining whether the person with indeterminate PCR results is to be managed as a COVID-19 case.

Suspected false positive PCR results

False positive test results are rare but can occur for a variety of reasons. Further information on the possible sources of false positive PCR tests see *Public Health Laboratory Network Guidance on Nucleic Acid Test Result Interpretation for SARS-CoV-2*.

The usual circumstance for a positive SARS-CoV-2 PCR result to be suspected to be a false positive is when there is a lack of an epidemiological risk factor for acquisition of COVID-19, especially in the setting of asymptomatic screening. Before attributing the result as a false positive it is very important that the PHUs first contact the laboratory microbiologist to obtain more details of the PCR test results.

The laboratory microbiologist will investigate for any evidence of laboratory error or non-specific reactivity in the PCR test, and ascertain whether further testing of the sample is required (e.g. has retesting of the sample already been performed, has the result been confirmed using an assay with a second gene target or using a second molecular assay, either within the original testing laboratory, or by referral to a reference or another laboratory). The laboratory may also perform molecular tests for alternate diagnoses, particularly molecular testing for other respiratory viral pathogens.

If results from the further laboratory investigations provide convincing evidence that the case is negative, the case may be considered a false positive and the laboratory will issue an amended report.

Investigation of suspected false positive PCR results

Where there is agreement that the PCR result should be queried as a possible false positive, further assessments should be conducted in close collaboration with the laboratory microbiologist and the treating clinician:

1. Ensure that all relevant public health action, including case isolation and contact tracing, continues until there is consensus (or majority decision) that the case is a false positive.
2. Thoroughly review the clinical history (including for mild/atypical symptoms; delayed development of symptoms; history of compatible illness) of the case and any potential epidemiological links. Consider the potential of the case being any of the following:
    - True asymptomatic infection
    - Pre-symptomatic infection
    - Symptomatic infection (especially mildly symptomatic infection)
    - Previous infection with persistent shedding of viral RNA
3. Immediately collect another respiratory specimen for PCR testing, where feasible.
4. Consider collection of acute and convalescent serum, where feasible, for serological testing to look for seroconversion or significant rise in SARS-CoV-2 neutralising or IgG antibody level.
5. Where feasible and at the discretion of PHU, collect and test respiratory specimens from primary close contacts of the case, starting with those who have had the most regular and prolonged contact (e.g. household contacts).
    - Consider collecting sera of contacts to identify ‘potential source contacts’.

The results of the above investigation procedures, including the relevant laboratory information following discussion with the microbiologist, should be recorded and collated into a standard report.

During this process, if a second sample is PCR positive or there is evidence of seroconversion, the person should be classified as a confirmed case of COVID-19.

To assist with this determination and with public health actions, a case conference with experienced public health practitioners, the microbiologist and the treating clinician may be considered once the laboratory, clinical and epidemiological information from the investigation is available. In some jurisdictions, there may already be established panels for this purpose. Where there may be a degree of uncertainty or difficulty reaching an agreement as to whether the PCR is a false positive; the risks of missing a true COVID-19 case should be considered. Depending on the circumstances, it may be pertinent to consider the case as a confirmed case.

Where the outcome of the above assessment or case conference is that the PCR result can confidently be considered to be a false positive, all public health interventions can be ceased, and the case and contacts should be made aware of the outcome. If notification has taken place and the case is included in jurisdictional and national reporting, PHUs should take necessary actions to reverse this.

Case management

Response times

Confirmed or suspect cases:

Begin follow up investigation of confirmed or suspect cases as soon as practicable and, where applicable, notify your central state or territory communicable diseases unit. Case interviews, exposure site identification and primary close contact identification should be completed within 1 day of notification of a confirmed case.

PHU staff should be available to contribute to the expert assessment of patients under investigation as possible cases on request from hospital clinicians or general practitioners.

Historical cases:

Confirmed historical cases do not need to isolate and their contacts do not need to quarantine, unless it can be determined that the case is a recent historical case that has not met release from isolation criteria. Some historical cases may also warrant further investigation to identify potential source contacts or chains of transmission. For more information see Identification of potential source contacts.

Response procedure

Genome sequencing for all cases

With the emergence of new variants of SARS-CoV-2 (54, 55), whole genome sequencing of COVID-19 cases in Australia must be prioritised for all new cases (overseas and locally acquired). Laboratories across Australia are routinely monitoring sequences for variants. Rapid identification of cases infected with a SARS-CoV-2 variant of concern enables cases to be managed with additional precautions to mitigate risk to the public (see release from isolation criteria). Public health authorities should work with the Communicable Diseases

Genomics Network (CDGN) to ensure timely reporting of genomics to AusTrakker, where feasible.

While all positive SARS-CoV-2 samples should undergo whole genome sequencing, whole genome sequencing is not always successful, particularly when there is not enough virus present in the specimen. If a specimen is unable to be sequenced and the case has no clear epidemiological link to another confirmed case, repeat sample collection should be attempted to try to identify infection with variant of concern. This is particularly important to inform how a PHU will manage the case (e.g. when they can be released from isolation/hotel quarantine).

When whole genome sequencing cannot be done or where a confirmed case is infected with an unknown SARS-CoV-2 variant, it may be appropriate for PHUs to take a precautionary approach and manage the case as if they were infected with a SARS-CoV-2 variant of concern (e.g. cases who are international travellers who have transited through hub airports or who have spent time in a country where variants of concern are prevalent). This also includes confirmed cases where the strain identity cannot be confirmed by sequencing and who do not have a clear epidemiological link to another confirmed case infected with a strain that is not a SARS-CoV-2 variant of concern. Please see Release from Isolation for more information.

Case investigation

The response to a notification will normally be carried out in collaboration with the clinicians managing the case and be guided by the COVID-19 PHU checklist (Appendix A) and the state or territory COVID-19 case report form.

Regardless of who does the follow-up, PHU staff should ensure that action has been taken to:

- Isolate the case.
- Confirm the onset date and symptoms of the illness.
- Confirm results of relevant pathology tests, or recommend that tests be done, including repeat tests where relevant.
- Record vaccination status including vaccine type, date and country of administration.
- Determine if the diagnosis has been discussed with the case or relevant caregiver before beginning the interview).
- Review both case and contact management.
- Commence or complete contact tracing, aiming for identified primary close contacts to be placed in quarantine within 48 hours of specimen collection from the case.
- Determine if the case has attended settings that are at higher risk for transmission.
- Ensure appropriate infection control guidelines are followed in caring for the case.
- Identify the likely source of infection.

Note: If interviews with suspect cases are conducted face-to-face, the person conducting the interview must have a thorough understanding of infection control practices and be competent in using appropriate PPE.

If a case has had occupational exposure to animals, it may be appropriate to consult with animal health authorities as transmission between humans and animals has been observed (56).

PCR positive tests in asymptomatic or pre-symptomatic persons

Jurisdictional enhanced testing regimens may identify asymptomatic or pre-symptomatic PCR positive cases in the community (i.e. not in quarantine or a high-risk outbreak setting). In such circumstances, the person is considered a confirmed case and should be isolated while the following steps are taken:

1. Confirm veracity of the test in close liaison with the laboratory, if indicated depending on local epidemiology. In some cases, this may involve re-running the test on an alternative platform, retesting, or testing at a reference laboratory.
2. Thorough investigation of the case history for the past 3 months to determine if they had recent symptoms compatible with COVID-19 or an identified epidemiological link. If historical symptoms are identified, the duration of infectivity is regarded as commencing 48 hours prior to symptom onset for the purposes of contact tracing.
3. If no historical symptoms are identified, the case is considered infectious for 48 hours prior to the initial positive test for the purposes of contact tracing.
4. Regardless of whether historical symptoms are identified, the case should be followed prospectively for 10 days after the initial test to determine if symptoms develop. If symptoms develop, the case is considered to have been pre-symptomatic and the case and contacts should be managed according to the time of symptom onset.

Patients identified as asymptomatic or pre-symptomatic may be released from isolation when they meet the relevant 'release from isolation' criteria (refer below).

Identification of potential source contacts

Potential source contacts (or 'upstream contacts') are individuals who had contact with the first reported case during the time in which the case was likely to have acquired infection. Where a confirmed case has no identified source of infection, potential source contact tracing of the 'first reported case' (or in an outbreak, index case) should be undertaken. The aim is to identify potential unrecognised chains of transmission, and may be particularly important to identify the source of introduction of disease in a setting where there is potential for rapid transmission (e.g. aged care facilities, correctional facilities, and closed community settings). In such settings, potential source contact tracing should be done for the index case.

For most cases, infection is likely to have been acquired 5-6 days prior to the first reported case becoming symptomatic (i.e. the median incubation period of the disease) but may be from anyone who has had contact between 14 days and 24 hours before the first reported case became symptomatic (i.e. the longest and shortest possible incubation periods). These individuals may be unidentified cases and the transmission source for the first reported case. Follow-up should occur for any person who in that period had:

- face-to-face contact of any duration or shared a closed space (for at least 1 hour) with a confirmed case during their infectious period (from 48 hours before onset of symptoms until the case is no longer infectious)
- exposure to a setting or exposure site where there is a high prevalence of infection e.g. a country where there is community transmission of COVID-19, or unprotected exposure in a quarantine hotel for international travellers
- been in a venue where transmission has been demonstrated to have occurred during the time frame in which the transmission would be expected to have occurred.

All potential source contacts should be screened for possible symptoms, have their temperature measured and, where feasible, be tested for SARS-CoV-2 infection with a PCR test; with prioritisation of those at highest risk. If a validated serological assay is available, serological testing should be considered for potential source contacts who are currently well (noting the limitations of antibody testing and potential lack of availability). In settings where there is potential for rapid transmission, it is likely that some contacts will be identified as both close contacts and potential source contacts and contact status may not be able to be determined.

For potential source contacts who test positive, via PCR or a validated serological assay, clinical and public health judgement should be used to determine if they are infectious; if infectious, they should be managed as any other confirmed case. They should also be assessed to determine if they are likely to be the primary case who infected the index case, a secondary case infected by the first reported case, or represent a separate transmission chain.

Wherever a new case is identified, rapid contact tracing of these cases must also occur.

Clinical management

In the absence of pathogen-specific interventions, patient management largely depends on supportive treatment, and vigilance for and treatment of complications. Further advice on clinical management is available from:

- WHO: https://bit.ly/3eKZQs3
- National COVID-19 Clinical Evidence Taskforce: (https://covid19evidence.net.au/)
- Cochrane Library: Coronavirus (COVID-19): (https://www.cochranelibrary.com/covid-19)

Education

Cases should be educated about the nature of the illness, importance of isolation and infection control measures that prevent the transmission of COVID-19. PHU staff should make accessible a COVID-19 factsheet to cases and their household contacts.

Personal protective equipment

For guidance on infection prevention and control, including personal protective equipment, see ICEG-endorsed infection control guidance.

Isolation and restriction

Depending on clinical indication, cases should either be managed in hospital, at home, or other community settings identified by the PHU. Cases may be managed at home or in a community setting only if:

- a risk assessment is conducted regarding the suitability of the accommodation and living arrangements, including who else is in the home and their vulnerability to severe disease;
- If it can be assured that the home environment permits separation of the case from other household members; the case and household contacts are counselled about risk, and appropriate infection control measures are in place; and
- There is a reasonable level of confidence of the compliance of the case.

If a case is identified through serology, clinical and public health judgement should be used in determining case management and whether or not a case requires isolation. See Release from isolation for further information.

PHUs should undertake a risk assessment for suspect cases who initially test negative for SARS-CoV-2. If there is no alternative diagnosis and a high index of suspicion remains that such cases may have COVID-19, consideration should be given to continued isolation and use of the recommended infection prevention and control precautions, pending further testing (refer to Testing section and *PHLN guidance on laboratory testing for SARS-CoV-2*) and re-assessment. Suspect cases can otherwise discontinue isolation upon receipt of a negative test result and resolution of symptoms. Suspect cases who are primary close contacts or are required to quarantine for other purposes (e.g. international travel) must continue to quarantine for the remainder of the 14-day period, regardless of any negative.

Release from isolation

Historical infections for which further isolation is not required

Some people who are asymptomatic, such as international travellers, may test PCR positive during their quarantine period, but their infection may have occurred previously and be 'historic' rather than acute. Similarly, occasionally a person may have a PCR result suggestive of a historical infection, and this result may be positive only on a subset of gene targets in the PCR assay/s used. These scenarios might be due to acute infection but could also represent previous infection (i.e. intermittent/persistent SARS-CoV-2 shedding in a historical case), sometimes with a concurrent upper respiratory tract infection due to another pathogen.

An additional swab collected at least 24 hours after the initial positive sample and serology testing can assist in distinguishing an acute from a historical COVID-19 infection. If the person is symptomatic, testing for other respiratory pathogens should be performed.

The following criteria can be used to determine if a person has had a historical infection. There is no public health need for further isolation or management of contacts:

1. PCR results suggestive of a historical infection[1] on two specimens[2] collected at least 24 hours apart, **OR** an initial PCR result suggestive of a historical infection[1] and a negative second PCR[2], taken at least 24 hours apart.
2. IgG or total antibodies detected via a validated laboratory serological test in the absence of recent vaccination. Consider the need to undertake supplemental or confirmatory serological testing in accordance with *PHLN guidance for serological testing in COVID-19*, particularly if there is no history of a previous clinically compatible illness.
3. Has had no new symptoms consistent with COVID-19 in the previous 14 days, or the symptoms are explained by either the detection of another respiratory pathogen or past SARS-CoV-2 infection that has met release from isolation criteria, as determined by treating clinician, laboratory and PHU (see below) .
4. Has not had contact with a confirmed case of COVID-19 in the 14 days prior to the first PCR result suggestive of a historical infection[1].

Formal documentation of previous infection is not necessary; however, some PHU and jurisdictions may require this.

For persons who meet some but not all the above criteria, including when serology is not available, an expert reference panel may undertake case-by-case review to determine

whether the infection is historical. This may be pertinent when a person has respiratory symptoms but is positive for another respiratory pathogen. The epidemiological context of the traveller's country of origin and any known links to a confirmed case should be considered.

Note:

[1] PCR results suggestive of an historical infection should be undertaken in consultation with the responsible supervising pathologist or senior clinical scientist. PCR results suggestive of a historical infection may include high cycle threshold (Ct) values or equivalent findings using other platforms that do not report Ct values. High Ct values are as defined in consultation with the responsible supervising pathologist or senior clinical scientist.

[2] Ideally, specimens should be oropharyngeal and bilateral deep nasal swabs or nasopharyngeal swabs, in accordance with *PHLN guidance on laboratory testing for SARS-CoV-2*. They should also be processed via the same laboratory and platform.

Release from isolation criteria for all confirmed cases who do not meet historical infection criteria

Note: Revisions to the release from isolation criteria have been made due to the significant increase in number of cases infected with SARS-CoV-2 variants of concern in Australia.

The following information details the circumstances under which all confirmed cases can be released from isolation. This includes confirmed cases infected with a SARS-CoV-2 variant of concern.

Cases can be released from isolation if they meet the appropriate criteria in any of points 1, 2, or 3 – whichever is applicable.

Significantly immunocompromised cases will also need to meet additional criterion in point 4 in order to be released from isolation.

Where all clinical criteria are met for points 1 or 2 below, some cases may be eligible for early release from isolation after day 10 from symptom onset if:

- PCR is negative; or
- detection of SARS-CoV-2 specific IgG or total antibodies on serology, in the absence of vaccination.

1. Confirmed cases who have remained asymptomatic

The case can be released from isolation if at least 14 days have passed since the first respiratory specimen positive for SARS-CoV-2 by PCR was taken and no symptoms have developed during this period.

2. Confirmed cases with resolution of fever and acute respiratory symptoms

The case can be released from isolation if they meet all of the following criteria:

- at least 14 days have passed since the onset of symptoms; and
- there has been resolution of fever and substantial improvement of respiratory symptoms of the acute illness for the previous 72 hours[1]

3. Confirmed cases without complete resolution of fever and acute respiratory symptoms

The case can be released from isolation if they meet **both** of the following criteria:

- at least 20 days have passed since the onset of symptoms; and

- the case is not significantly immunocompromised[3]

OR

The case can also be released from isolation if they meet **all** the following criteria:

- at least 14 days have passed since the onset of symptoms;
- there has been resolution of fever for the previous 72 hours;
- there has been substantial improvement in respiratory symptoms of the acute illness [1]; and
- the case has had two consecutive respiratory specimens negative[2] for SARS-CoV-2 by PCR taken at least 24 hours apart after day 10 from symptom onset.

4. Significantly immunocompromised persons

In addition to meeting the appropriate criteria described in points 1 or 2 above, persons who are significantly immunocompromised[3] and are identified as confirmed cases must meet a higher standard requiring additional assessment.

They can be released from isolation when they meet the following additional criterion:

- PCR negative[2] on at least two consecutive respiratory specimens collected at least 24 hours apart after day 7 from symptom onset[4].

Notes:

[1] Some people may have pre-existing illnesses with chronic respiratory signs or symptoms, such as chronic cough. Others may have on-going sequelae that result in symptoms such as continuing shortness of breath or post viral cough. For these people, the treating medical practitioner should make an assessment as to whether the respiratory signs and symptoms of acute COVID-19 have resolved.

[2] In patients in which swabs are required to meet release from isolation criteria but where swabs remain positive, additional factors may be considered to determine the need of ongoing isolation, including the clinical scenario and laboratory details (e.g. Ct values, viral culture and serology results). This should be discussed with the treating medical practitioner, the testing laboratory and public health unit.

[3] Persons who are clinically assessed as being significantly immunocompromised may have a reduced ability to effectively clear SARS-CoV-2 and a prolonged infectious period. Significantly immunocompromised persons may include, but are not limited to, those who have had an organ transplant and are on immune suppressive therapy; have had a haematopoietic stem cell transplant in the past 2 years; are on immune suppressive therapy for graft versus host disease; have had an active haematological malignancy; human immunodeficiency virus infection with CD4 T-lymphocyte count below 200 cells/per mm^3; or other conditions specifically noted by the treating medical practitioner.

[4] If the patient has a productive cough due to a pre-existing respiratory illness or other ongoing lower respiratory tract disease, then the sputum or other lower respiratory tract specimens must be PCR negative for SARS-CoV-2. Otherwise upper respiratory tract specimens (deep nasal and oropharyngeal swabs) must be PCR negative.

Testing post-release from isolation

Routine PCR testing post-release from isolation is not recommended unless the person re-develops clinical features consistent with COVID-19.

If a case has not re-developed COVID-19 symptoms but is swabbed and tests positive after they have met the above release from isolation criteria, then the case does not require re-isolation. Current evidence and Australian public health experience indicates these people are unlikely to be infectious.

If a case is identified retrospectively through serology, clinical and public health judgement should be used in determining case management and whether or not a case requires isolation. If the case had a clinically compatible illness consistent with a historic infection, it may not be necessary to isolate. If isolation is required, the case can be released from isolation when the appropriate criteria (above) is met.

Release from isolation and high-risk settings

Based on a review of available evidence, persons who fulfil the appropriate criteria above are not considered to be infectious, including those infected with a variant of concern (57-61). Cases returning to a high risk setting can be released from isolation based on the clinical criteria above and do not need to meet a higher standard or undergo additional assessment before going into any high-risk settings. This includes persons returning to work in a health care setting, living in a residential age care setting, or who regularly attend healthcare settings for any other reason. Specifically, if a person has met the appropriate criteria above, it is not necessary for them to:

- undergo isolation or quarantine in another ward, the facility they are returning to, or any other location, or
- have evidence of any negative test results for SARS-CoV-2 prior to returning to residential aged care or any other setting.

Note that for patients who are being transferred to another ward or hospital, they should remain in isolation with transmission-based precautions and appropriate PPE until the above criteria (point 3) is met.

People who have recovered from COVID-19 and have been released from isolation based on the criteria above do not require COVID-19 testing if they are hospitalised for a non-COVID-19 related condition.

Release from isolation and re-exposure

A person without significant immunocompromise who has recovered from COVID-19 does not need to quarantine if they become a primary close contact of a confirmed case and the re-exposure was less than 6 months since the recovered case's symptom onset (or first positive PCR test if the case was asymptomatic).

Recovered cases, unless immunocompromised, can continue to attend high-risk settings and do not need to be furloughed from work if re-exposed during this 6 month period.

For recovered cases re-exposed after 6 months from their symptom onset (or first positive test if asymptomatic), and immunocompromised recovered cases exposed at any time after release from isolation, consider serology testing in consultation with the microbiologist and/or virologist at the testing laboratory when making decisions about quarantine and exclusion from the high-risk settings.

As a precaution, all recovered cases should continue following community recommendations (e.g. physical distancing, hand hygiene, masks where indicated, etc.)

and healthcare workers should continue to use appropriate PPE as recommended when caring for COVID-19 patients, or in settings of potential exposure. Infectious cases living in the same household as recovered cases should remain isolated from recovered cases to the extent practicable.

Re-exposed recovered cases should self-monitor for symptoms clinically consistent with COVID-19 for 14 days after the last contact with the confirmed case. If symptoms reappear, they should immediately self-isolate and be re-tested for SARS-CoV-2. As further evidence becomes available on the duration of immunity, these recommendations may be amended.

Release from isolation and gastrointestinal symptoms

Faecal sampling is not recommended as a standard test, however, it may be done for patients with gastrointestinal symptoms. For cases who do have faecal samples tested and remain persistently PCR positive in these samples after all release from isolation criteria are met, further or extended precautions and exclusions should be implemented on a case-by-case basis:

- All cases with diarrhoea should be advised against preparing food for others until 48 hours after symptoms have resolved.
- Cases who are employed in a role where there is an increased risk of onward transmission (e.g. healthcare workers, restaurant workers and food handlers), should be excluded from work until 48 hours after any symptoms of diarrhoea have resolved.
- Cases with ongoing diarrhoea or faecal incontinence who may have limited capacity to maintain standards of personal hygiene should be isolated until 48 hours after the resolution of these symptoms.

Patients do not require repeat testing until they are PCR negative in faecal samples. It is recommended that people who remain persistently PCR positive in faecal samples use soap and water for hand hygiene. If this is unavailable, alcohol hand gel should be used. Education emphasising the importance of proper hand hygiene should be provided to all cases upon release from isolation.

Definition of COVID-19 death

A COVID-19 death is defined for surveillance purposes as a death in a confirmed COVID-19 case, unless there is a clear alternative cause of death that cannot be related to COVID-19 (e.g. trauma). There should be no period of complete recovery from COVID-19 between illness and death. Where a Coroner's report is available, these findings are to be observed.

6. Contacts

Close contact definitions

The aim of contact tracing is to interrupt transmission of SARS-CoV-2. In a setting of limited or no community transmission, the following definitions of contacts should be used to rapidly identify all persons who may be incubating the disease.

A primary close contact is anyone who has had unprotected exposure to a confirmed case. Identifying people who are secondary close contacts of those primary contacts is an intensive exercise aimed at a second ring of containment. It may or may not be implemented depending on the circumstances of the epidemic at the time.

Identification of secondary contacts may be more applicable in household settings; situations where there are communication challenges with contacts; where the primary close contact may already be infected; settings where there may be delays in receiving testing results (e.g. remote settings); or where secondary contacts work in settings where there is a high transmission risk (e.g. residential aged care).

Primary close contact

A primary close contact is defined as a person who has:

- had face-to-face contact of any duration or shared a closed space (for at least 1 hour) with a confirmed case during their infectious period (from 48 hours before onset of symptoms until the case is no longer infectious (refer to Release from isolation).
- the exposure may be any duration depending on risk setting such as: transmission has already been proven to have readily occurred, there are concerns about adequate air exchange in an indoor environment or concerns about the nature of contact in the place of exposure (e.g. the contact has been exposed to shouting or singing)
- been exposed to a setting or exposure site where there is a high prevalence of infection e.g. a country where there is community transmission of COVID-19, or unprotected exposure in a quarantine hotel for returned travelers
- been in a venue where transmission has been demonstrated to have occurred during the time frame in which the transmission would be expected to have occurred.

If the case is asymptomatic, see PCR positive tests in asymptomatic or pre-symptomatic persons for information on determining the asymptomatic (or pre-symptomatic) case's infectious period and to inform identification of contacts

Contact needs to have occurred within the infectious period of the case: a period extending from 48 hours before onset of symptoms in the case until the case is classified as no longer infectious (refer to Release from isolation). More conservative periods (e.g. 72 hours prior to illness onset) may be considered in high risk settings, at the discretion of the PHU.

If the case is asymptomatic, see PCR positive tests in asymptomatic or pre-symptomatic persons for information on determining the asymptomatic (or pre-symptomatic) case's infectious period and to inform identification of contacts.

Note that:

- Healthcare workers and other contacts who have taken recommended infection control precautions, including the use of appropriate PPE, while caring for an infectious confirmed COVID-19 case are not generally considered to be primary

close contacts, provided that appropriate PPE has been worn and there has not been any breaches.

- For aircraft passengers, passengers who were seated in the same row or two rows in front or behind a confirmed case are considered primary close contacts in most instances. Other factors PHUs may consider when determining close contacts among passengers include possible interactions within airport terminals, such as sitting in gate lounges and moving between gates, and transport to, from and within the airport. If the confirmed case was infected with a SARS-CoV-2 variant of concern, PHUs may consider classifying all passengers on board the flight as primary close contacts. Similar criteria can be used for people who have had close contact on bus or train trips.
- For aircraft crew exposed to a confirmed case, the relevant PHU should conduct a case-by-case risk assessment, in collaboration with airlines, to identify which crew members should be considered primary close contacts. Refer to Special situations and Appendix C for further information.
- For more information about close contacts in different settings, refer to Special situations and Appendix C.

Casual contact

A casual contact is defined as a person who has:

- been in the same setting with a confirmed case in their infectious period, but does not meet the definition of a primary close contact

At the discretion of the PHU, some casual contacts may be classified as primary close contacts. This may be relevant in super spreading events, where there is evidence of transmission occurring to people who do not meet the primary close contact definition (e.g. in restaurants, pubs, places of worship). The following factors should be considered prior to classifying casual contacts as primary close contacts:

- Epidemiological context, risk tolerance and level of community transmission
- Potential for the venue or setting to result in large scale amplification
- Jurisdictional capacity and resourcing requirements, including potential opportunity costs
- Adequate translation services, culturally-appropriate resources and engagement with community leaders, where appropriate

Secondary close contact

A secondary close contact (also known as a close contact of a close contact) is defined as a person who has:

- had face-to-face contact in any setting with a primary close contact from 24 hours after the primary contact's exposure to the case
- the exposure to the primary close contact may be any duration depending on risk setting such as: transmission has already been proven to have readily occurred, there are concerns about adequate air exchange in an indoor environment or concerns about the nature of contact in the place of exposure (e.g. the contact has been exposed to shouting or singing)

Management of contacts

All persons identified as having had contact with a confirmed case should be assessed to see if they should be classified as a primary close contact and should have demographic and epidemiological data collected.

All identified contacts who do not meet the primary close contact definition should be provided with information on their risk (refer to Education below), where feasible.

Quarantine and restriction

The site of quarantine needs to be carefully chosen to prevent transmission to others. Homes may not be feasible if the person cannot quarantine away from other house members.

Primary close contacts

Primary close contacts:

- are required to quarantine for 14 days following the last possible contact with a confirmed COVID-19 case, during the case's infectious period. Quarantine must occur for 14 days regardless of any negative test result.
- should be advised to monitor their health. PHUs should conduct active daily monitoring of primary close contacts for symptoms for 14 days after the last possible contact with a confirmed COVID-19 case, during the case's infectious period.
- should be advised on the processes for seeking medical care, including on how to safely seek testing for COVID-19. Refer to Medical care for quarantined individuals.
- should be tested during the quarantine period. At a minimum this should occur
    - On entry to quarantine – a positive test result would make the primary close contact a case and support a decision to move the person to an alternative place for isolation and would also bring forward contact tracing for that person
    - If symptoms of COVID-19 develop
    - Before exit from quarantine (where appropriate)
        - For household and individually identified close contacts, and all other close contacts considered to be at higher risk of infection, finding a positive test result late in the quarantine period (e.g. day 10–12) of a primary close contact who is asymptomatic or has under-reported symptoms would prevent the release of potentially infectious people into the community.
        - Exit screening is particularly important if the primary close contact is associated with a high risk setting or if the timing of potential exposure is likely to see infection develop later in the quarantine period.
        - In some circumstances, PHUs may also consider the need for extension of quarantine if a primary close contact refuses to undergo exit testing.

Casual contacts

Casual contacts should be provided with information about their exposure and need to monitor for symptoms and seek testing if symptoms develop. Depending on the circumstances, they may be asked to attend for asymptomatic testing.

Secondary close contacts

Some jurisdictional communicable disease authorities or PHUs may identify secondary close contacts (also known as close contacts of close contacts) and require them to

quarantine for a duration of time since the exposure of a primary close contact to the confirmed case.

PHU may consider quarantine of secondary contacts if:

- The primary close contact has a higher probability of becoming a case (e.g. exposed at a high-risk setting such as abattoir or hospital);
- The secondary contact has had extensive and/or ongoing exposure to the primary contact (e.g. living in the same household);
- There was a delay in confirming the initial case or commencement of contact tracing (enabling more time for the primary contact to become infectious prior to quarantine); or
- Secondary transmission has already occurred from a primary close contact to a secondary close contact.

Secondary close contacts should be quarantined until the PHU is certain that the primary close contact was not infectious at the time of last contact with the secondary close contact (i.e. the primary contact returns a negative test result, or the exposure time is not consistent with transmission) and contact with the primary contact is not ongoing.

Enhanced management of household contacts

In households with one or more confirmed cases of COVID-19, PHUs may implement several enhanced contact management strategies. These strategies may particularly be useful for people living together in close quarters where quarantine is not possible (e.g. single parent families with young children) or is challenging (e.g. extended families that share multiple living spaces, people who share a small apartment). Given the greater potential for multiple generations of transmission in these settings, enhanced contact management strategies may reduce the number of secondary cases as well as the overall period of quarantine for household members.

Potential strategies include those used in outbreaks in closed settings, for example:

- Providing separate accommodation to cases on diagnosis, or to asymptomatic household members
- Providing separate accommodation for close contacts who are unable to quarantine from the rest of the household
- PCR testing of household contacts in mid-quarantine, in addition to the entry and exit testing, to enable early identification and isolation of cases
- Quarantine of an entire household
- Serological testing of household contacts to identify household members who have had earlier undiagnosed infection and therefore not at risk of becoming infectious with COVID-19 (noting that interpretation of serology requires expert review and interpretation in light of clinical and epidemiological risk).

In some larger households, PHUs may wish to use similar principles in managing a case in an outbreak setting (see Appendix B: Outbreak investigation and management).

International travellers

International travellers are defined as those who have undertaken international travel to any country outside Australia in the last 14 days.

Jurisdictions will conduct routine testing of international travellers who are in hotel quarantine. At a minimum, testing should occur on day 0–2 and then on day 10-14, preferably as late as possible, of hotel quarantine, with results to be received prior to release

from quarantine. Exact arrangements will depend on state and territory protocols. Jurisdictions may also test asymptomatic persons quarantined due to interstate travel.

If negative test results are received, the international traveller may finish quarantine after the 14-day period has transpired. If a positive result is received, the international traveller should be isolated and managed as per the recommendations for confirmed cases.

All international travellers who have undertaken international travel in the last 14 days who are unwell with fever, or with respiratory symptoms (with or without fever) or other symptoms consistent with COVID-19 should be isolated and managed as per the current recommendations for suspect cases.

At a minimum, jurisdictions should provide messaging to all travellers who complete mandatory hotel quarantine to indicate that if they develop symptoms within 14 days of leaving quarantine they must get tested and isolate until they receive a negative result.

Health and residential care workers

Health and residential care workers with influenza-like illness should not work while they are symptomatic. They should be tested for SARS-CoV-2 and undergo isolation pending results.

Infection prevention and control units of health and residential care facilities may assist PHUs to identify and monitor health and residential care worker close contacts.

It is recognised that clinical work restrictions on primary close contacts who are health or residential care workers may place strain on individuals and on the delivery of health services. This underlines the importance of ensuring health and residential care workers implement appropriate infection prevention and control precautions when in close contact with confirmed and suspect COVID-19 cases. For detailed guidance on infection prevention and control, please refer to Infection Control Expert Group-endorsed infection prevention and control guidance.

In settings where the loss of the health and residential care worker will have a significant impact on health or residential care services, an individual risk assessment should be conducted in collaboration with the PHU.

Risk assessment of health and residential care workers

Where there are concerns regarding appropriate PPE use by the health or residential care worker and/or the case, a risk assessment should be performed to determine whether the contact was sufficient to warrant treatment as a primary close contact or a casual contact (with potential for testing and/or quarantine), see *Tables 2a* and *2b* below. Factors that may be considered include:

- Details of related transmission events in the outbreak.
- Vaccination status.
- Case details: presence of symptoms and timing of exposure in relation to symptom onset; high-risk behaviours (e.g. shouting, singing, wandering).
- Contact details: physical distancing, length of exposure time either directly to the case or within a shared closed space.
- PPE: use of PPE by the case and contact, appropriate PPE use and any reports or suspicion of PPE breaches.
- High risk procedures: if aerosol generating procedures were performed without appropriate PPE use.

- Environment: use of shared equipment (e.g. computers on wheels, pagers) and use of communal spaces (e.g. tea rooms, flight decks, work stations).
- Staff mobility: if staff work across multiple facilities or are highly mobile within the facility (e.g. security guards or cleaning staff).

Table 2a. Risk assessment matrix – PPE and type of exposure

		Exposure			
		Aerosol generating procedures	Close contact (refer to Close contact definition for further information)	Environmental contamination and/or working in COVID-19 treatment or testing facility	Casual contact (contact not meeting the Close contact definition)
Contact PPE	No PPE	High risk	High risk	Conduct individual risk assessment	Conduct individual risk assessment
	Surgical mask only	High risk	High risk	Conduct individual risk assessment	Low risk
	Mask and eye protection only	High risk	Conduct individual risk assessment	Conduct individual risk assessment	Low risk
	Other PPE concerns e.g. incorrect doffing	High risk	Conduct individual risk assessment	Conduct individual risk assessment	Low risk
	Appropriate PPE as per latest guidance	Low risk	Low risk	Low risk	Low risk

Notes:

1. PHU should consider vaccination status as a component of risk assessment.
2. Exposure must have occurred in the period from 48 hours before onset of symptoms in the case (or first positive PCR test if asymptomatic) until the case is deemed no longer infectious. In some high-risk settings, PHUs may opt for a more precautionary approach and use a time period of 72 hours prior to the case's symptom onset (or first positive PCR test if asymptomatic). Refer to Close contact definition for further information.

Table 2b. Actions following assessments of high or low risk*

High risk	Low risk
• Quarantine for 14 days as a close contact • Test if symptomatic at any time • Test upon entry or exit to quarantine as per jurisdictional practices	• Test and isolate until result received • Continue to work if negative • Health or residential care worker to be alert to mild symptoms • Test only if symptomatic or as part of outbreak response

*In circumstances where a risk assessment is indeterminate, it may be appropriate to adopt low risk actions with the addition of testing the health or residential care worker, and return of a negative result, prior to continuation of work.

Quarantine and essential workers

Quarantined individuals who are regarded as essential workers in a critical infrastructure industry should work from their quarantine location (e.g. home, hotel) and/or implement alternate staffing arrangements wherever possible. Where this is not feasible, an individual risk assessment should be conducted in collaboration with the PHU to identify essential workers who may be permitted to maintain normal work patterns while in quarantine.

This should only be considered in circumstances where there is risk of grave damage to Australian national interests and security if the worker is unable to work. If normal work patterns are maintained, the essential worker should practise vigilant physical distancing, hand and respiratory hygiene, and wear a mask whilst around others at work. Normal quarantine restrictions should be adhered to outside of essential work activities.

Medical care for quarantined individuals

If individuals in quarantine need medical attention for any reason (e.g. fever and respiratory symptoms or other illness/injury), they should telephone their GP or hospital Emergency Department before presenting. Patients with severe symptoms should call 000 and make it clear they are in quarantine or isolation (or otherwise) because of COVID-19. If the patient has symptoms consistent with the COVID-19 case definition, the local PHU should be consulted about the most suitable venue for clinical assessment and specimen collection. Where feasible, patients should don a surgical mask before presenting to any healthcare setting.

Management of symptomatic contacts

If fever or respiratory symptoms consistent with the clinical criteria in the suspect case definition develop within the first 14 days following the last contact with a confirmed case, the individual should be immediately isolated and managed as per the current recommendations for suspected COVID-19 cases, with urgent testing for COVID-19 undertaken in an environment that minimises the exposure of others.

Ill contacts who are being evaluated for COVID-19 can be appropriately isolated and managed at home or in other community settings identified by PHU, unless their condition is severe enough to require hospitalisation.

Symptomatic primary close contacts who test negative for SARS-CoV-2 by PCR should be re-tested, given the higher pre-test probability for COVID-19. Re-testing should occur as

soon as possible after a negative result is received, and if still negative, another test may be conducted on day 14 of the quarantine period. They will still need to be monitored for 14 days after their last contact with a confirmed COVID-19 case.

Prophylaxis

No specific chemoprophylaxis is available for contacts.

Education

Primary and secondary close contacts (where secondary close contacts are identified and contacted) should be counselled about their risk and the symptoms of COVID-19 and provided with a COVID-19 factsheet. They are required to self-quarantine. Casual contacts are not required to quarantine, but may similarly, where feasible, be counselled about their risk and the symptoms of COVID-19 and provided with a COVID-19 factsheet. They should be given advice about the need to immediately self-isolate and get tested should they develop symptoms and given information about where and how to access COVID-19 testing.

7. High-risk settings

Residential care facilities

Outbreaks of COVID-19 in residential care facilities should be managed with close reference to the *CDNA national guidelines for the prevention, control and public health management of COVID-19 outbreaks in residential care facilities in Australia.* These guidelines provide specific advice on the prevention, control and public health management of COVID-19 outbreaks in residential care facilities in Australia.

Outbreaks of COVID-19 in congregate disability accommodation settings should also be managed with reference to the *CDNA national guidelines for the prevention and management of COVID-19 outbreaks in disability residential services – The Disability Supplement*. These guidelines add tailored advice to support disability residential service providers and public health authorities to respond to the risk and occurrences of COVID-10 outbreaks in these settings.

Aboriginal and Torres Strait Islander Communities

CDNA will continue to monitor the emerging evidence around COVID-19 transmission risks in Aboriginal and Torres Strait Islander communities and revise these recommendations as needed. For further information, refer to the *CDNA National Guidance for remote Aboriginal and Torres Strait Islander communities for COVID-19* and *CDNA National Guidance for Urban and Regional Aboriginal and Torres Strait Islander Communities for COVID-19*.

Correctional and detention facilities

Correctional and detention facilities may have existing frameworks and protocols in place for testing and isolation in the event of a communicable disease outbreak. Correctional and detention facilities should prepare for and manage outbreaks of COVID-19 with close reference to the CDNA *national guidelines for the prevention, control and public health management of COVID-19 outbreaks in correctional and detention facilities in Australia*.

Meat processing facilities

Meat (including poultry) processing facilities may present a higher risk of COVID-19 transmission to workers. These workplaces are vulnerable for a number of reasons including: production line work in close proximity to others; limited hygiene measures due to tally driven work; temperature and humidity; and employer sponsored communal housing and transport.

PHUs may assist work health and safety representatives to implement measures aimed at mitigating risk of COVID-19 exposure. Further information on COVID-19 in these facilities is available in Work Safe Victoria's recommendations for Managing the risk of COVID-19 exposure: meat and poultry processing. PHUs may also refer to the US Centers for Disease Control's Facility Assessment Tool for Meat and Poultry Processing Facilities to conduct an assessment of infection prevention and control measures within the facility.

8. Special situations

Use of COVID-19 vaccination in outbreak situations

During COVID-19 outbreaks[1], targeted vaccination of identified, unvaccinated individuals at risk of exposure may supplement existing public health interventions. Examples of groups where targeted vaccination may occur include: individuals in closed populations, population groups with low vaccine coverage, or groups that are at higher risk of severe outcomes.

COVID-19 vaccination may be used for two purposes in the context of an outbreak:

1. As an outbreak management strategy to reduce the number and severity of COVID-19 cases associated with an outbreak, where there is likely to be an ongoing risk of exposure.
2. To opportunistically increase vaccination uptake in the population through timely messaging around the benefits of vaccination.

COVID-19 vaccination in outbreak management

There is no evidence to support the use of COVID-19 vaccination in first generation close contacts for the purpose of post-exposure prophylaxis. It takes around 14 days for a protective effect to be seen following the first dose of both the Pfizer and AstraZeneca vaccines (62). Vaccination as an outbreak response tool is likely to be of highest utility in closed settings and where there is an ongoing risk of exposure which may cause multiple chains of transmission, such as residential aged care facilities or correctional facilities. In this context, vaccination may be considered for unvaccinated individuals with the goals of:

- Direct protection against severe outcomes and death among those who receive vaccination.
- Limiting outbreak size and duration by reducing the risk of onward transmission, and thereby reducing morbidity/mortality/demand on clinical and public health resources.

Decision-making around the use of COVID-19 vaccines during outbreaks should consider the following key principles:

- The location, outbreak context, local epidemiology and likelihood of ongoing risk of exposure (beyond 14 days following vaccination) must be considered in the development of an outbreak vaccination strategy.
- The target population for vaccination should be clearly defined.
- Where there is constrained vaccine supply, priority should be given to those:
    - who have not yet received a first dose of vaccine.
    - at risk of severe outcomes or in whom non-pharmaceutical interventions are not possible (such as those unable to physically distance).
    - at highest risk of transmission of SARS-CoV-2.
- Evaluation should be undertaken after the conclusion of the outbreak.

Opportunistic vaccination

In geographic areas where an outbreak is occurring, opportunistic vaccination of eligible groups may be used to improve vaccination coverage in the population. An outbreak presents an opportunity to promote the benefits of COVID-19 vaccination to the broader community.

Note:

1. For the purposes of vaccination during outbreaks, an outbreak is defined as a single confirmed case of COVID-19 in the community. Individual jurisdictions' outbreak definitions may differ.

Aircrew

Testing and quarantine

Aircrew flying on international flights are required to be tested on arrival or undergo a COVID-19 test in Australia every 7 days, as directed by individual jurisdictions.

International aircrew arriving into Australia, who are not Australian-based (ie. local residents), need to quarantine in a dedicated quarantine facility either between international flights or for 14 days, whichever is the shortest. Aircrew who are local residents and who enter Australia in their state of residence may be allowed to quarantine at home for 14 days or until their next international flight. For more information, see *Australian Health Protection Principal Committee (AHPPC) statement on safe air travel – enhancing end-to-end mitigations – international*.

Risk assessment and identification of contacts

Decisions regarding the contact classification of cabin crews can be difficult to determine. On an aircraft with one or more confirmed cases of COVID-19, a case-by-case risk assessment should be conducted by the PHU, in collaboration with the airline, to identify which crew should be managed as primary close contacts.

Considerations for conducting a risk assessment should include:

- Infection prevention and control, including appropriate use of PPE
- Variants of concern
- Proximity of crew to confirmed cases
- Duration of exposure to confirmed cases
- Size of the compartment in which the crew member and confirmed case interacted
- The number of confirmed cases of COVID-19 on board
- Potential breaches of PPE

When the case is in a crew member, similar principles can be applied to identify passengers and crew who should be managed as primary close contacts.

Where it has been determined that a crew member is a primary close contact, the airline is responsible for notifying the relevant state/territory public health authority to facilitate management of the close contact. For further information, refer to Appendix C: Risk assessment and identification of close contacts in aircrew.

Management of aircrew

Please see Appendix D: Guidance on the management of aircrew for information on management of aircrew including:

- Aircrew who test positive for SARS-CoV-2 in Australia;
- Aircrew who are a close contact of a person with confirmed COVID-19;
- Returning aircrew who are primary close contacts;
- Aircrew with historical infections; and
- Onward domestic travel of aircrew who are Australian residents.

Cruise ships

Risk assessment and identification of contacts

Cruise ships represent a high-risk setting for outbreaks of COVID-19. All persons travelling on cruise ships, regardless of whether cases of COVID-19 have occurred, should be quarantined for 14 days following disembarkation.

Hospital transfer of confirmed or suspect cases

If confirmed or suspect cases on board require transfer to a hospital, the Commonwealth Biosecurity Officer will notify the port authority to provide access for medical transport. The jurisdictional Human Biosecurity Officer will then coordinate transfer of the person to an appropriate medical facility for further management, via the most appropriate means that adheres to necessary precautions.

Quarantine for passengers and crew after arrival at a seaport

All international travellers are required to quarantine. Returned international travellers, including cruise ship passengers and crew, must adhere to jurisdictional quarantine requirements. States and territories should ensure effective quarantine of returned international travellers, which may include hotel-based quarantine. Matters of quarantine should be addressed jurisdictionally. It is important that appropriate PPE precautions are employed during any travel following disembarkation.

Disembarking and embarking

After all confirmed and suspect cases have been managed appropriately and the Human Biosecurity Officer has determined that no other passengers or crew have symptoms consistent with COVID-19, remaining passengers and crew will be allowed to disembark. The vessel may be permitted to commence embarking once it is certain there is no risk of ongoing transmission.

Schools

The best way to prevent transmission of COVID-19 in schools is through the promotion of correct hand hygiene habits and cough/sneeze etiquette. Children or staff with respiratory symptoms should not attend school while symptomatic. If a child or staff member becomes ill with respiratory symptoms, they should be isolated from other students and sent home as soon as possible.

Contact tracing or management of school outbreaks may require temporary full or partial school closures; however, closures are not generally recommended as a reactive measure on public health grounds.

Organ donation and transplantation

To mitigate the risk of transmission through donated organs and to ensure transplantation is conducted as safely as possible, all deceased and living donors should be tested for SARS-CoV-2; ideally, recipients would also be tested. For more detailed information, refer to Appendix E.

Workplaces

Where a case has physically attended work while infectious, PHUs should conduct a risk assessment of potential workplace transmission in conjunction with workplaces. This may include requesting workplaces to provide a list of all workers who have had contact with an infected worker. Resources for workplaces can be accessed at *Safe Work Australia's COVID-19 information for workplaces* or jurisdictional COVID-19 work health and safety guidance.

Contingency capacity strategies for aged and healthcare workforce

Widespread COVID-19 transmission in health or aged care facilities may result in significant workforce shortages due to a large number of exposed (or potentially exposed) staff. Staff may not be able to attend work because they are confirmed cases, close contacts, or furloughed (directed not to attend work) as they have (or potentially have) had unprotected exposure to COVID-19.

In circumstances where all alternative surge workforce strategies are exhausted and return to work of furloughed staff is essential to maintaining facility operations and ensuring the safety and wellbeing of individuals (e.g. in health or aged care facilities), PHUs may be requested to assist in decision making processes to help enable exposed staff who are not confirmed cases to return to work. The decision on the requirement for staff who have been identified as having some risk of infection to return to work based on workforce requirements and resultant risk management remains with the facility decision makers.

As a last resort, PHUs could recommend a number of risk mitigation strategies (63). These recommendations should be made on a case by case basis, in addition to routine preventive protocols (e.g. symptom screening, IPC and PPE training) and, in no particular order, could include:

i. Risk assessment and stratification of workers by degree of exposure, including prioritisation of return to work in staff whose exposure is assessed to be less substantial (e.g. less cumulative duration of exposure to confirmed cases, use of PPE during contact with confirmed cases). PHU may also consider vaccination status as a component of risk assessment.
ii. Regular re-testing of PCR negative returned workers where feasible (e.g. 48 or 72 hourly) until 14 days after the last unprotected exposure; or until a positive result is returned (becomes a confirmed case and is required to isolate).
iii. Mandatory wearing of a surgical mask while at work until 14 days after the last unprotected exposure. Workers should change their mask throughout the day and only wear it for the maximum period recommended.
iv. Clear plans for how the worker will be managed within the facility (e.g. zoning staff to a specific wing or ward; caring for specific patients or residents, preferably people from lower risk groups; work in lower risk roles if available; and limiting staff members who can work together).
v. Clear requirements that, for 14 days from the last unprotected exposure, the worker must only work in one facility and, if a close contact, quarantine at home when not at work.

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Appendices

Appendix A: PHU checklist

Using the appropriate jurisdictional investigation form or program, contact the patient or their doctor to:

- Confirm the onset date and symptoms of the illness.
- Confirm results of relevant pathology tests, or recommend that tests be done, including repeat tests where relevant.
- Confirm vaccination status including vaccine type, date and country of administration.
- Where applicable and feasible, seek the doctor's permission to contact the case or relevant care-giver.
- Review case management including:
    - infection control measures being used in caring for the case, and
    - home isolation procedures are being followed.
- Ensure appropriate infection control measures are followed in caring for the case.

Interview the case or care-giver to complete exposure and contact history and other details

- Complete the exposure history and other sections of the relevant jurisdictional investigation form.
- Identify close contacts according to the contact definition.
- Identify the likely source of infection.
- Determine if the case has attended settings that are at higher risk for infection.

Follow-up case's contacts to:

- Assess risk of COVID-19 transmission and identify any close contacts.
- Determine current symptoms, if any, and manage as a suspect case if present.
- Explain symptoms, advise on active daily monitoring of symptoms by the PHU (close contacts) where feasible and need to immediately report any new symptoms.
- Explain to all primary close contacts the need for quarantine.
- Provide state based factsheets as appropriate.
- Arrange PCR and serological testing if available and contact is symptomatic, and follow local policy for testing in an outbreak setting. Seek protocol on this from the reference laboratory or central communicable disease agency where necessary.
- For cases in schools, aged care facilities, correctional and detention facilities, and Aboriginal and Torres Strait Islander communities, relevant guidelines should be followed. Refer to Special risk settings and Special situations for links to guidelines.

Notify central jurisdictional communicable disease control agency, if they do not already know

Central communicable disease control agency to notify Commonwealth Department of Health Office of Health Protection

Consider need for media release and designate a media spokesperson.

Appendix B: Outbreak investigation and management

Definitions

Outbreak:	For the purposes of investigation, an outbreak is defined as a single confirmed case of COVID-19 in the community.
Index case:	An index case is defined as the first confirmed COVID-19 case reported to a health agency that is part of an outbreak.
Primary case:	A primary case is the first confirmed COVID-19 case that occurred in the outbreak.

Outbreak investigation for specific settings

The following guidance relates to the general epidemiological investigation and response to an outbreak. Outbreak investigation and management differs depending on the specific context.

Some identified high-risk settings have specific guidance for the prevention, control and public health management of COVID-19 outbreaks. These include:

- Residential care facilities:
  See *CDNA national guidelines for the prevention, control and public health management of COVID-19 outbreaks in residential care facilities in Australia*.

- Disability residential services:
  See *CDNA national guidelines for the prevention and management of COVID-19 outbreaks in disability residential services – the disability supplement*.

- Correctional and detention facilities:
  See *CDNA national guidelines for the prevention, control and public health management of COVID-19 outbreaks in correctional and detention facilities in Australia*.

- Aboriginal and Torres Strait Islander communities:
  See *CDNA national guidance for remote Aboriginal and Torres Strait Islander communities for COVID-19* and *CDNA national guidance for urban and regional Aboriginal and Torres Strait Islander communities for COVID-19*.

Steps in outbreak investigation

1. Define the scope of the outbreak

COVID-19 outbreaks can occur in a range of settings where people congregate. This may include group residential settings, Aboriginal and Torres Strait Islander communities, schools, gyms, workplaces, places of worship, or other public places.

A single case of COVID-19 in the community should trigger an extensive review of potential exposure sites or settings for an outbreak. A case may have visited several settings while infectious leading to multiple related investigations.

Identifying potential exposure sites where cases may have visited while infectious is critically important. To achieve high levels of control, PHU should use a conservative approach to identifying exposure sites or settings. Affected exposure sites can be scaled back once additional investigation and/or testing is completed.

2. Confirm and declare a COVID-19 outbreak

For the purposes of investigation, a single COVID-19 case in the community is considered an outbreak to initiate active case finding and supplement routine case and contact follow-up.

3. Establish governance structures and lines of responsibility

PHU are the lead agency in COVID-19 outbreaks, however, management and governance arrangements may vary depending on the context. In some contexts (such as outbreaks in group residential settings) PHU should collaborate with managers of the setting to form a dedicated outbreak management team (OMT). Guidance on who should be included in an OMT can be found in the *CDNA national guidelines for the prevention, control and public health management of COVID-19 outbreaks in residential care facilities in Australia* and *CDNA national guidelines for the prevention, control and public health management of COVID-19 outbreaks in correctional and detention facilities in Australia*.

4. Identify and inform relevant internal and external stakeholders

It is important to ensure transparent and clear messaging about the outbreak to stakeholders, particularly when investigation and management follows an extended testing strategy. PHU should also identify other agencies involved in the oversight and management of the facility or setting.

5. Case interview

The case interview will help determine the number of contacts requiring follow up and classification of primary close contacts.

6. Contact tracing

A proactive approach to contact tracing is required in order to minimise potential transmission in the community. The PHU should contact all persons who have attended the setting or facility, and are deemed to be primary close contacts. These include, staff, residents (if relevant) and visitors.

PHU may need to use multiple communication methods to alert people of exposure where infectious cases have visited multiple venues and exposure sites.

7. Contact management

PHU should ensure all primary close contacts are quarantined and undergo testing as outlined in Management of Contacts guidance. Some PHU may also require secondary close contacts or casual contacts to quarantine.

i. Identify those most at risk of severe disease

Identify and document those at highest risk of severe disease as described in *Advice for people at risk of COVID-19*. Monitor those at risk of severe disease for symptoms.

i. Assess and record vaccination status

During outbreak investigations, it is important PHU assess all exposed individuals' vaccination status and capture it to estimate vaccine effectiveness. Vaccine type and timing of doses should be recorded routinely on case investigation forms.

8. Arrange COVID-19 testing for all people who attended the setting or exposure site

When an index case is likely to have acquired their infection within the setting or facility, it is likely there are already other transmission chains. Widespread testing of those exposed should help identify people who may be shedding virus or were part of the transmission chain.

Consider if serological tests are available to identify persons previously infected. See *PHLN guidance for serological testing in COVID-19* for more information.

If others who attended or live in the specific setting or facility are symptomatic and receive a negative SARS-CoV-2 test result, consider testing for other respiratory pathogens such as influenza.

9. Assist with notifying all people who attended the setting or exposure site

Ensure managers of an affected setting or facility notify all staff, visitors and residents (if relevant) that cases of COVID-19 have occurred within the specific setting or facility. Advice about who should be tested and quarantined must be clear. Management of the affected setting or facility should take a strong leadership role in responding to the outbreak with support from PHU staff.

10. Isolate and treat individuals who test positive

All confirmed cases must isolate according to isolation and restriction guidance until they meet the appropriate release from isolation criteria.

11. Advise staff about implementation of enhanced infection prevention and control (IPC) measures and develop a process for ongoing IPC observation

In certain settings, such as health and residential care facilities, there may be a need to enhance IPC in response to an outbreak of COVID-19. Enhanced IPC measures are detailed in the Infection Control Expert Group's *COVID-19 Infection Prevention and Control for Residential Care Facilities.* While the advice in these guidelines is tailored specifically to residential care facilities, these principles and actions can be applied to any setting where there is potential for rapid transmission.

Residential care facilities and other high-risk settings should ensure all staff have completed the IPC training relevant for their workplace, in person or online as required (e.g. COVID-19training.gov.au). Facility managers may consider appointing a specific staff member to observe day-to day practices, provide advice as needed and report daily to the OMT.

12. Descriptive epidemiology

Throughout the course of the investigation, epidemiologists should describe the epidemiology of cases associated with the outbreak. This may be as simple as collating information into a line list describing people infected in terms of time, place, and person. A map of the setting (such as those used to identify evacuation points) may be useful to identify case locations. Seek staff rosters for employees who have been in close proximity to the index case. Consider diagrams for chains of infection.

Consider information that may assist with investigation of the source of introduction of disease, such as exposure type and ventilation patterns. This seeks to identify other chains of transmission in the community that may be unrecognised. For further information, see identification of potential source ('upstream') contacts.

At each stage of investigation, consideration should be given to the collection of data which may be valuable for future epidemiological investigation.

13. Ensure enhanced environmental cleaning of the setting

Regular, scheduled cleaning is essential during an outbreak. Frequently touched surfaces should be cleaned more often. These surfaces include:

- equipment
- door handles
- trays
- tables
- handrails
- chair arms
- light switches

During a suspected or confirmed COVID-19 outbreak, an increase in the frequency of cleaning and disinfection is recommended.
Detailed information on environmental cleaning and disinfection in health and residential care settings is in the COVID-19 Environmental cleaning and disinfection principles for health and residential care facilities factsheet. Disinfectants registered with the TGA as effective against the virus (SARS-CoV-2) are listed on the TGA website.

Additional instructions for group residential settings

14. Quarantine exposed individuals who test negative and monitor for illness

Individuals who have attended the affected setting during a COVID-19 cases' infectious period but test negative still require protection from any possible further exposure. Monitor these individuals for symptoms and consider a program of repeat testing.

15. Consider a program of repeat testing for those in quarantine who initially test negative

Repeat testing of people in quarantine can assist in identification of those who are pre-symptomatic or asymptomatic.

In group residential settings, frequent facility-wide repeat testing of both staff and residents is recommended until it is clear there is no ongoing spread of infection. Those already identified as positive do not require further diagnostic testing.

As described in *Table 1: Repeat testing and ongoing actions for outbreaks in residential settings* (see below):

a. With each round of testing, those who are PCR positive can be removed to positive cohort isolation wherever possible.
b. In subsequent rounds, only those who are PCR negative (i.e. those who may be susceptible) should be tested.
c. Symptom screening should be conducted daily for the negative (quarantined) cohort.

Table 1: Repeat testing and ongoing actions for outbreaks in residential settings

	Testing overview		Date for quarantine	
	Day 1	Repeat Testing Days (where feasible)	Quarantine Cohort Day 1	Quarantine Cohort on Retest Day/s
Recommended testing and actions	Who to test Test all members of the setting via PCR. Actions Isolate positive persons (may designate an area to cohort positive cases). Quarantine cohort of negative residents (an off-site quarantine site may suit depending on the setting). Where possible, people who initially test negative should be quarantined separately.	Who to test Re-test PCR negative cohort where feasible (e.g. 72 hourly) A subset of the quarantined cohort may be re-tested if appropriate. Actions Isolate positive persons Quarantine cohort of PCR negative residents and screen for symptoms. Where possible, people who initially test negative should be quarantined separately.	14 day quarantine starts from date that the quarantine cohort are PCR negative	If any of the quarantined cohort are positive: 1. Recommence 14-day quarantine period 2. Consider retesting every 72 hours until no new PCR positive tests.

16. For group residential settings, identify suitable sites where individuals may be cohorted or zoned into either isolation (symptomatic or SARS-CoV-2 positive) OR quarantine (exposed)

People who require isolation should be cared for separately to protect those in quarantine. Residents who have not been exposed should avoid exposure to both isolated and quarantined individuals.

Residents and staff from affected areas, wings or buildings should not work in unaffected areas.

Staff working at a facility with an outbreak should only work within one cohort and not move between those in isolation and those in quarantine. They should not work at a different facility for the duration of the outbreak. Staff should be regularly screened for symptoms, in addition to participating in whole of setting testing.

In some group residential settings (such as residential care facilities) consideration should be given to transferring PCR positive individuals to a suitable hospital or hospital-equivalent

setting. If confirmed cases remain within the group residential setting, specific staff should be allocated to support and care for PCR positive isolated individuals.

The facility should ensure that staff members:

- Do not move between their allocated room/section and other areas of the facility or care for other residents.
- Follow guidelines for IPC and correct use of PPE.

Staff in outbreak settings

Staff working in a facility or setting where an outbreak is occurring should not enter a high-risk setting until the outbreak is declared over (from 14 days following the date of isolation of the last case). All staff should self-monitor for symptoms of acute respiratory illness and self-exclude from work if unwell, even if appropriate PPE has been used or there was no obvious contact with a known case.

The setting should maintain a register for all staff and volunteers to check for symptoms of COVID-19 at the beginning of every shift. Contact details of attendees, contractors and other people visiting the setting should also be recorded. There may be a need to undertake frequent or daily screening of staff in an outbreak or high risk setting.

Declaring an outbreak over

In most circumstances, a COVID-19 outbreak can be declared over if no new cases occur within 14 days (maximum incubation period) following the date of isolation of the last case.

Once the outbreak is over, PHU should ensure cluster reports are provided to relevant stakeholders, and data are summarised appropriately.

Repeat testing allows for close observation of the outbreak and clarity regarding when it can be declared over.

Appendix C: Risk assessment and identification of close contacts in aircrew

These recommendations are intended to assist PHUs to undertake risk assessments, in collaboration with airlines, to identify which aircrew are primary close contacts of a confirmed COVID-19 case. These recommendations relate to the specific circumstance where an ill passenger or crew member has travelled on a flight and potentially exposed aircrew. It is important to note that an infected person may be infectious up to 48 hours prior to onset of symptoms and while asymptomatic. Any risk assessment needs to consider that a person may appear well, but still be infectious.

This risk assessment is directed at identifying aircrew primary close contacts. For more information on contact tracing of aircraft passengers see Close Contacts and Special situations.

General principles

- Case-by-case risk assessments should be conducted by the relevant PHU, in collaboration with airlines, to identify primary close contacts among aircrew where one or more confirmed cases of COVID-19 were present on a flight.
- As part of risk assessments, PHUs should consider whether aircrew have adhered to adequate infection control precautions (including the use of appropriate PPE, physical distancing and separate donning/doffing areas).
- Risk assessments for aircrew should be consistent with criteria for being a primary close contact:
    - Face-to-face contact of any duration with a confirmed case during their infectious period (from 48 hours before onset of symptoms until the case is considered no longer infectious).
    - Shared an aircraft section (for at least 1 hour) with a confirmed case during their infectious period (from 48 hours before onset of symptoms until the case is considered no longer infectious).
    - Direct contact with the body fluids (e.g. used tissues) of a confirmed case in the absence of wearing recommended PPE or if there was a failure of PPE.

Considerations for conducting risk assessments

For aircraft crew exposed to a confirmed case, a case-by-case risk assessment should be conducted by the PHU, in collaboration with the airline, to identify which crew members should be managed as primary close contacts.

Appropriate use of PPE and adhering to documented infection control procedures is an important consideration for assessing the risk for aircrew. This should include considerations about use of separate resting areas for crew and adherence to PPE and physical distancing while on layovers and airports. The PHU should determine this for all crew on affected flights. Where a PHU considers that both PPE and infection control are adequate throughout the potential exposure period, crew may be excluded as primary close contacts.

Additional considerations for conducting a risk assessment should include:

1. Variants of concern
   If the passenger is infected (or suspected to be infected) with a SARS-CoV-2 variant of concern, PHUs may consider classifying all aircrew and passengers on board the flight as primary close contacts.

2. Proximity of crew to confirmed cases
   Crew who have had face-to-face contact with an infected passenger of any duration during the course of the flight may be considered primary close contacts. Face to face contact may include provision of in-flight service, checking in a passenger and their baggage, or answering page calls.

3. Duration of exposure to confirmed cases
   Crew who provided prolonged periods (e.g. one hour) of in-flight service in the section of the aircraft where the infected passenger was seated should be considered primary close contacts.

4. Size of the compartment in which the crew and confirmed case interacted
   Subject to considerations about aircraft design and airflow patterns, crew who provided in-flight service of any duration in confined sections (e.g. first or business class) or within two rows of where the infected passenger was seated should be considered primary close contacts.

5. The number of confirmed cases of COVID-19 on board
   More than one case on board a flight may represent a higher risk to aircrew and should be factored into the risk assessment.

6. Potential breaches of PPE
   Crew who experienced potential breaches of PPE whilst providing assistance to an infected passenger (e.g. emergency medical assistance) should be considered primary close contacts.

Considerations for when the confirmed COVID-19 case is an aircrew member:

Where the confirmed COVID-19 case is an aircrew member, all crew should be considered primary close contacts unless there is evidence that they did not have face-to-face contact with the case. In this circumstance, PHUs will concentrate contact tracing efforts on passengers seated in the area where the crew member worked during the flight along with other members of the crew. Additionally, PHUs may consider factors such as common use of facilities, transport to and from work, and communal resting/dining areas. The same general principles and considerations detailed above can also be adapted to identify close contacts in these circumstances.

If an aircrew member is infected (or suspected to be infected) with a SARS-CoV-2 variant of concern, PHUs may consider classifying all aircrew and passengers on board the flight as primary close contacts.

Aircrew and passengers who are primary close contacts

If an airline becomes aware of a crew member or passenger who was a primary close contact of a confirmed case whilst on board a flight, they should notify the local PHU to facilitate management of the close contacts. For more information, see Appendix D: Guidance on the management of aircrew.

Appendix D: Guidance on the management of aircrew

1. Aircrew who test positive for SARS-CoV-2 in Australia

Aircrew who test positive in Australia and who are still in quarantine in Australia when the positive test result is notified should remain in isolation in Australia until they meet the release from isolation criteria. Note that those who meet the release from isolation criteria for a historical infection should be allowed to leave Australia, including as working crew.

Under exceptional circumstances aircrew who have tested positive for COVID-19 may be permitted to return overseas where the following conditions are met:

- the affected crew member is asymptomatic;
- the return flight does not carry any passengers;
- all other aircrew on board the flight wear PPE and practice physical distancing;
- where possible, the infectious crew member is isolated in a separate segment of the plane;
- the airline is aware and accepts the risk to crew and endorses the travel; and the receiving country is aware.

2. Aircrew who are a close contact of a person with confirmed COVID-19

Aircrew who are a close contact of a person with confirmed COVID-19 can be permitted to leave Australia if they are asymptomatic and the returning aircraft does not carry any passengers, PPE is worn by all on board and physical distancing is practiced.

Under certain circumstances a close contact can return on a passenger flight and where appropriate risk mitigation is in place. This might be that the close contact remains asymptomatic, is in an area completely separate to passengers, for example in a separate first- class section of the plane with a dedicated toilet.

3. Return to Australia of infected crew and crew who are close contacts

Aircrew who have tested positive for COVID-19 should not return to Australia within 14 days of their onset of symptoms and until there has been resolution of symptoms of the acute illness for at least 72 hours (note the 14 day period covers the situation where the infection is due to a variant of concern).

Aircrew who are a close contact should not return to Australia within 14 days of their last known exposure to a case.

Note that the above applies to instances where the case/close contact departed Australia prior to the result for the positive person being available, as well as instances where the close contact was in Australia at the time that the positive result was notified.

Jurisdictions can advise airlines that should individual crew return in the above time frames they will then be placed in isolation/quarantine in a managed hotel on arrival. Information on individuals and their relevant exclusion period may be shared between jurisdictions via the NIR.

4. Crew with historical infections

Air crew with a recent history of COVID-19 infection who swab positive on a SARS-COV-2 PCR test can be considered a historical infection and do not require follow-up as a confirmed case if they meet the following criteria:

- the PCR test has high Ct values (as defined by the testing laboratory);
- the person is asymptomatic;
- the person has evidence of a previous positive PCR test for SARS-COV-2 between 10 days and 8 weeks ago; and
- the person is not known to have been in contact with a confirmed case in the previous 14 days.

5. Onward domestic travel of aircrew who are Australian residents

Aircrew who have been tested on arrival into Australia and are not known to be a close contact of a person with infectious COVID-19 are permitted to travel onto their jurisdiction of residence if they travel on a flight with only aircrew on board (no passengers), PPE and physical distancing are undertaken, and there is COVID-safe travel transit/travel to the domestic airport (including an overnight stay in managed hotel quarantine if required).

If the above measures cannot be implemented, then they are required to quarantine for 14 days at point of entry prior to onward travel.

Jurisdictions should inform the receiving jurisdiction of any incoming aircrew who are completing onward domestic travel following an international flight.

Appendix E: Organ donation and transplantation

Testing of deceased and living donors and transplant recipients

Viral safety of donated tissue and organs remains a concern as there is significant uncertainty about viraemia during the COVID-19 incubation period; during an asymptomatic course of infection; or after symptom resolution (64-67).

There is currently no licensed test for the screening of blood, plasma or cell and tissue donations. Laboratory screening of blood, plasma, cells and tissues is currently not recommended. This is because transmission of COVID-19 through donated tissues and organs has not been reported; and levels of detected RNA in plasma coinciding with clinical symptoms are very low (64).

To mitigate the risk of transmission through donated organs and to ensure transplantation is conducted as safely as possible, all deceased and living donors should be tested for SARS-CoV-2 with negative results obtained prior to transplantation proceeding; The practice of routine testing of potential recipients of deceased donor organs should be determined by the local transplant unit in consultation with infectious disease clinicians. Transplant teams should have the discretion to proceed prior to test results being available in time constrained circumstances.

Donation should not proceed from deceased individuals in whom there is a clinical suspicion of COVID-19.

For further information, including specific guidance on testing for donors and recipients and when to proceed with donation and transplantation, refer to *the Organ and Tissue Authority, DonateLife and the Transplantation Society of Australia and New Zealand - Coronavirus (SARS-CoV-2) causing COVID-19: Information for donation and transplant professionals*.

Prioritising samples for testing

Processing of respiratory samples from donors (including all unrelated haemopoietic stem cell donors) and recipients should be prioritised in order to enable expedited retrieval and transplantation processes. Increasing availability of rapid testing may expedite testing timeframes to support time criticalities for deceased donor testing (see *PHLN guidance on laboratory testing for SARS-CoV-2).*

Interstate travel for tissue and organ retrieval and transplantation teams

To protect the health and safety of all involved in organ retrieval and transplantation during the COVID-19 pandemic, where possible, local teams should conduct surgical retrieval of organs within the donor hospital. Where this is not possible, organ and tissue retrieval and transplantation teams should not be restricted from interstate travel for the purpose of tissue and organ procurement or delivery.

Quarantine

Asymptomatic donors and recipients without any other epidemiological risk factors are not classified as suspect cases and do not need to be quarantined or isolated following testing, unless a positive test result is received.

Appendix F: Full revision history of the COVID-19 SoNG

Revision history			
Version	Date	Revised by	Changes
4.7	24 June 2021	Communicable Diseases Network Australia	Revised: Case definition, Release from isolation criteria, Contact management
4.6	16 June 2021	Communicable Diseases Network Australia	Revised: The Disease, Testing, Case Management
4.5	26 May 2021	Communicable Diseases Network Australia	Inclusion of new guidance: Use of COVID-19 vaccination in outbreak situations Revised: Special situations
4.4	11 May 2021	Communicable Diseases Network Australia	Inclusion of new appendix: Appendix B: Outbreak investigation and management Revised: Summary, The Disease, Case definition, Testing, Case Management, Release from Isolation, Management of contacts, High-risk settings
4.3	03 March 2021	Communicable Diseases Network Australia	Revised: The Disease, Case Definition, Testing, Case Management, Release from Isolation , Close contacts, Outbreak investigation and management in high-risk settings, Special situations, Appendix B Inclusion of new section: Appendix C
4.2	29 January 2021	Communicable Diseases Network Australia	Revised: Case definition
4.1	12 January 2021	Communicable Diseases Network Australia	Inclusion of new subsection: Prioritisation of whole genome sequencing for all cases Revised: Case management with inclusion of subsection detailing management of cases infected with a SARS-CoV-2 variant
4.0	23 December 2020	Communicable Diseases Network Australia	Modifications to meet a setting of low prevalence of disease in Australia. Inclusion of new sections: Close contact definitions, Appendix D. Revised: The disease, Routine prevention activities, Case definition, Laboratory testing, Case management, Contact management, Outbreak investigation and management in high-risk settings, Appendix C

3.11	10 December 2020	Communicable Diseases Network Australia	Revised: Summary, The disease, Case definition, Case management, Special risk settings, Appendix A
3.10	28 October 2020	Communicable Diseases Network Australia	Revised: The disease, Laboratory testing, Release from isolation, Contact management, Appendices
3.9	09 October 2020	Communicable Diseases Network Australia	Revised: The disease, Release from isolation, Outbreak investigation and management in high-risk settings, Special risk settings, Special situations.
3.8	23 August 2020	Communicable Diseases Network Australia	Revised: Modes of transmission, Release from isolation, Close contact definition – notes.
3.7	12 August 2020	Communicable Diseases Network Australia	Revised: Enhanced testing. Inclusion of new Special situations sub-section: Workplaces. Inclusion of new Special risk settings sub-section: Meat processing facilities.
3.6	30 July 2020	Communicable Diseases Network Australia	Revised: Case definition – Enhanced testing, Contact management.
3.5	24 July 2020	Communicable Diseases Network Australia	Inclusion of new section: Routine prevention activities. Inclusion of new Laboratory testing sub-section: Procedure for assessing indeterminate and suspected false positive SARS-CoV-2 PCR results.
3.4	01 July 2020	Communicable Diseases Network Australia	Revised: Case definition – suspect case, The disease, Communications, Laboratory testing, Case management, Appendix A, Appendix B, Appendix D. Minor wording changes in other sections.
3.3	22 June 2020	Communicable Diseases Network Australia	Revised: Case definition – enhanced testing, Case management – definition of COVID-19 death
3.2	12 June 2020	Communicable Diseases Network Australia	Revised: Case definition – suspect case clinical criteria.
3.1	04 June 2020	Communicable Diseases Network Australia	Revised: Laboratory testing, Case management – Release from isolation, Contact management.
3.0	28 May 2020	Communicable Diseases Network Australia	Revised: Case definition, Case management, Appendix B. Inclusion of new section: 11. Outbreak investigation and management in high-risk settings.

2.11	22 May 2020	Communicable Diseases Network Australia	Revised: Case definition, Case management, Contact management.
2.10	13 May 2020	Communicable Diseases Network Australia	Inclusion of new sections: Appendix C, Appendix D, Appendix E. Revised sections: The disease, Communications, Case definition – inclusion of serology, Laboratory testing, Case management, Contact management, Special risk settings, Special situations, Appendix A.
2.9	05 May 2020	Communicable Diseases Network Australia	Revised: Case definition – clinical criteria.
2.8	01 May 2020	Communicable Diseases Network Australia	Inclusion of new sections: Summary, The disease, Surveillance, Communications, and Data management. Revised: Case definition, Laboratory testing Case management, Contact management, Special risk settings, Special situations, Appendix A, and Appendix B.
2.7	24 April 2020	Communicable Diseases Network Australia	Revised: Case definition, Case management.
2.6	17 April 2020	Communicable Diseases Network Australia	Revised: Case management, Contact management – Close contact definition.
2.5	06 April 2020	Communicable Diseases Network Australia	Revised: Case definition.
2.4	26 March 2020	Communicable Diseases Network Australia	Inclusion of advice for probable cases throughout.
2.3	24 March 2020	Communicable Diseases Network Australia	Revised: Case definition.
2.2	21 March 2020	Communicable Diseases Network Australia	Revised: Case management – Release from isolation.
2.1	20 March 2020	Communicable Diseases Network Australia	Revised: Case definition, Contact management, Special situations.

2.0	13 March 2020	Communicable Diseases Network Australia	Revised: Case definition, Contact management, Laboratory testing, Appendix A.
1.18	10 March 2020	Communicable Diseases Network Australia	Revised: Case definition, Case management, Contact management. Inclusion of Aircrew and Schools advice in Special situations section.
1.17	05 March 2020	Communicable Diseases Network Australia	Inclusion of self-quarantine advice for returned travellers from South Korea, revised Case management, inclusion of table of contents.
1.16	04 March 2020	Communicable Diseases Network Australia	Inclusion of Aboriginal and Torres Strait Islander community advice in Special situations section.
1.15	03 March 2020	Communicable Diseases Network Australia	Revised: Case definition, Contact management.
1.14	02 March 2020	Communicable Diseases Network Australia	Revised: Case definition, Risk stratification of countries, Contact management.
1.13	28 February 2020	Communicable Diseases Network Australia	Revised: Laboratory testing, isolation and restriction and Appendix A: laboratory testing information.
1.12	27 February 2020	Communicable Diseases Network Australia	Inclusion of Cambodia in the list of countries in the Person under investigation section.
1.11	26 February 2020	Communicable Diseases Network Australia	Inclusion of Italy in the list of countries in the Person Under Investigation section.
1.10	23 February 2020	Communicable Diseases Network Australia	Inclusion of South Korea and Iran in the list of countries in the Person Under Investigation section.
1.9	21 February 2020	Communicable Diseases Network Australia	Revised: case definition, infectious period, contact management, special situation (cruise ship). Specific changes are highlighted.
1.8	17 February 2020	Communicable Diseases Network Australia	Inclusion of statement reflecting that passengers of the Diamond Princess cruise meet the criteria for close contact.
1.7	15 February 2020	Communicable Diseases Network Australia	Revised case definition.

1.6	14 February 2020	Communicable Diseases Network Australia	Addition of Appendix B: Interim recommendations for the use of personal protective equipment (PPE) during hospital care of people with Coronavirus Disease 2019 (COVID-19). Updated nomenclature.
1.5	7 February 2020	Communicable Diseases Network Australia	Inclusion of advice on release from isolation.
1.4	6 February 2020	Communicable Diseases Network Australia	Revised case definition and added rationale. Updated infection control advice throughout.
1.3	4 February 2020	Communicable Diseases Network Australia	Revised the case definition and use of the terms ‘quarantine’ and ‘isolation’.
1.2	2 February 2020	Communicable Diseases Network Australia	Revised the case definition, close and casual contact definitions and added self-isolation guidance.
1.1	27 January 2020	Communicable Diseases Network Australia	Removed references to Wuhan and revised the case definition.
1.0	23 January 2020	Communicable Diseases Network Australia	Developed by the 2019-nCoV Working Group.