

# Technical supplement –

## Australian Respiratory Surveillance Report

# Summary

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This supplement to the series of Australian Respiratory Surveillance Reports describes the technical background to Australia's surveillance of acute respiratory illnesses, including coronavirus disease 2019 (COVID-19), influenza, and respiratory syncytial virus (RSV). The technical supplement describes each of the data sources used and any associated data considerations for the surveillance data. Further information on Australia's national surveillance of these viruses is detailed in the [Australian National Surveillance Plan for COVID-19, Influenza and RSV](#).<sup>1</sup>

## Background

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COVID-19, influenza, and RSV are acute viral respiratory infections that spread from person to person by infectious respiratory particles that are transmitted through the air after an infected person breathes, coughs, sneezes, or talks. Although there are similarities in the symptoms of these infections, they are distinct viruses with differences in their epidemiology, including who is most at risk for infection and severe disease.<sup>2</sup>

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the virus responsible for the COVID-19 pandemic, emerged in Wuhan, China, in late 2019.<sup>3</sup> Since that time, COVID-19 transmission in Australia has occurred in waves, with no strong seasonal trend.<sup>4</sup> Usually, people experience the onset of symptoms anywhere from two to five days, but sometimes up to 14 days, after infection. The most common symptoms are fever, chills, cough, loss of taste or smell, runny nose, sore throat and tiredness.<sup>5,6</sup> Some people do not experience any symptoms but can still spread SARS-CoV-2 to other people.<sup>5</sup> Most people experience a mild illness and recover without needing treatment in a hospital.<sup>2,5,6</sup> Some people experience more severe disease, such as difficulty breathing or pneumonia (an infection of the lungs), and will need treatment in hospital.<sup>2,5</sup> Severe illness is more common among adults aged 70 years or older, Aboriginal and Torres Strait Islander people, people who are not vaccinated against COVID-19, people who are pregnant, and people living with disability or chronic health conditions.<sup>2,6,7</sup> People who have had COVID-19, even if they were asymptomatic or their illness was mild, can also experience longer-term effects, such as long COVID.<sup>6</sup>

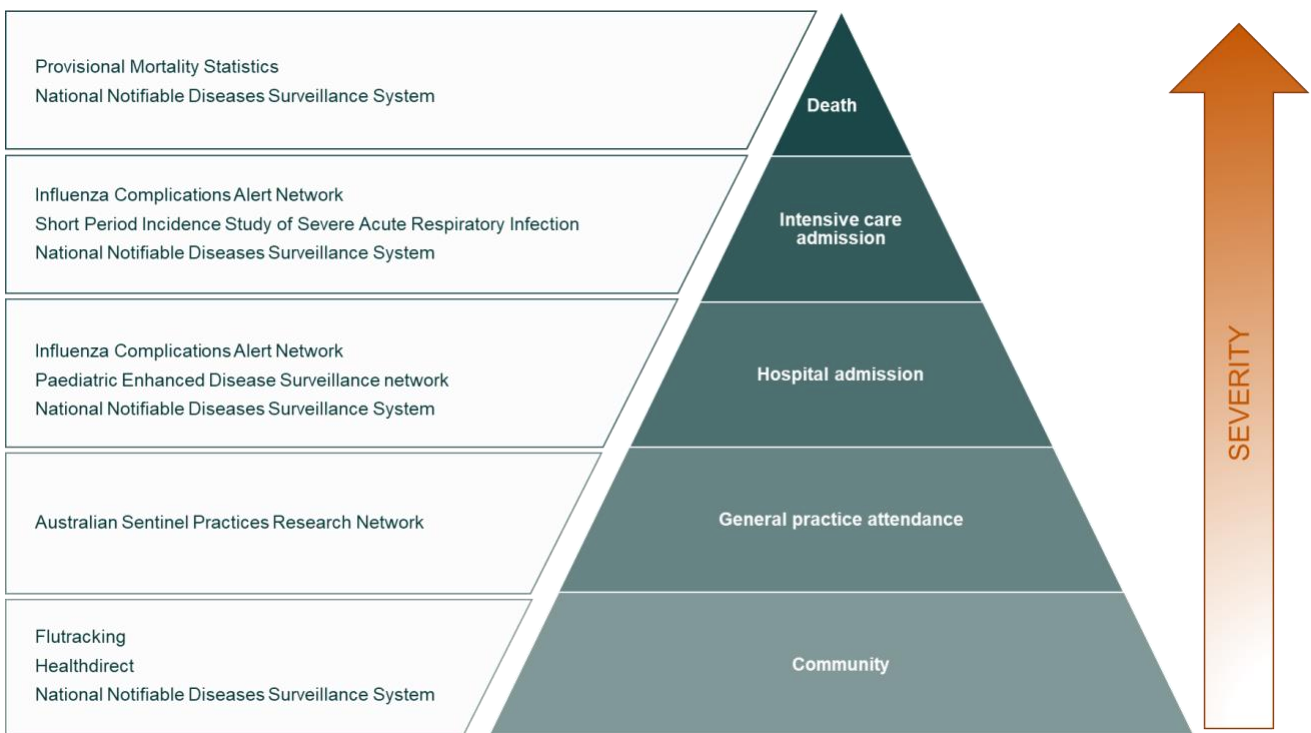
Influenza is an acute respiratory infection caused by influenza viruses.<sup>8</sup> There are three subtypes of influenza viruses known to infect people: subtypes A, B and C. Currently, influenza A and B viruses circulate, causing seasonal epidemics in Australia, especially during autumn and winter.<sup>2,8</sup> Usually, people experience the onset of influenza symptoms one to four days after infection.<sup>2</sup> Influenza symptoms include aches, chills, cough, fever, headaches, runny or stuffy nose, sore throat and tiredness. Vomiting and diarrhoea can occur, particularly in children. Most people experience a mild illness and recover within a week without requiring medical attention. In some people, severe influenza can worsen symptoms of other chronic diseases, or lead to pneumonia and sepsis (the immune system's response to an infection which causes the body to damage its own tissues and organs).<sup>2,8</sup> Severe diseases or complications associated with influenza are more common in at-risk population groups including, but not limited to, children aged under five years, adults aged over 65 years, people who are pregnant, and people living with chronic health conditions.<sup>2,8,9</sup>

RSV is one of the most common viral infections in children, partly due to the lack of long-term immunity after infection, meaning re-infection can be frequent.<sup>10,11</sup> Almost all children will have been infected with RSV within the first two years of life.<sup>11</sup> There is one serotype of RSV, classified into two subtypes: A and B.<sup>10</sup> Usually, people experience the onset of RSV symptoms four to six days after infection. The most common RSV symptoms include cough, fever, runny or stuffy nose, and wheezing or difficulty breathing. Most people experience a mild illness and will recover in a week or two weeks.<sup>2,10,11</sup> Infants aged 12 months or under are especially likely to experience severe illness with complications such as bronchiolitis (an inflammation of the small airways in the lungs) and pneumonia. RSV can worsen symptoms of chronic health conditions like asthma.<sup>11</sup> Severe illnesses are generally more common among infants aged 12 months or under, and young children or older adults with chronic health conditions.<sup>2,10,11</sup>

# Data sources and considerations

No one single system provides a complete picture of the epidemiology of acute respiratory illnesses in Australia. Instead, a number of acute respiratory illness surveillance systems collect information that together build a picture of the distribution and burden of disease from acute respiratory illnesses in Australia. These surveillance systems are based in the community, primary care, hospitals and laboratories to capture information at different levels of disease severity. In the Australian Respiratory Surveillance Report, notifiable diseases data and civil registration systems data are used alongside information from sentinel surveillance systems. All surveillance systems have strengths and limitations, so they need to be used in combination to provide comprehensive information for public health decision-making.<sup>1</sup>

**Figure 1. Levels of acute respiratory illness disease severity and data sources used in Australia adapted from Technical supplement – COVID-19 Australia: Epidemiology reporting<sup>12</sup>**



The COVID-19 pandemic had considerable impacts on circulating acute respiratory infections and acute respiratory illness surveillance systems. Therefore, the data reported from various surveillance systems may not accurately represent the distribution of acute respiratory infections during this time.

Some COVID-19 related public health and social measures (border restrictions, social distancing measures, and face mask use) likely resulted in a true decrease in acute respiratory illnesses across 2020 and 2021. In addition, there were likely changes in health seeking behaviour in the Australian community, including but not limited to, the introduction of respiratory clinics and focused testing for COVID-19, access to alternative streams of acute respiratory infection specific health services and increased utilisation of telehealth services. In this context, acute respiratory illness data should be interpreted with caution, especially where comparisons are made to previous seasons.

Due to the reduction in circulating acute respiratory illnesses in 2020 and 2021, data from these years may reduce five-year averages and affect analyses of usual seasonal trends. Therefore, the years 2020 and 2021 are excluded when comparing the current respiratory season to historical periods when acute respiratory infections circulated without public health restrictions. Where referenced in the Australian Respiratory Surveillance Report, the five-year average refers to the average of data from the years 2018, 2019, and 2022, 2023 and 2024.

# Community surveillance

## ***National Notifiable Diseases Surveillance System (NNDSS)***

The NNDSS coordinates the national surveillance of more than 70 communicable diseases which are notifiable under public health legislation in all states and territories. Accordingly, state and territory health authorities report notified cases to the Australian Government Department of Health and Aged Care via the NNDSS for national collation, analysis and to assist in the coordination of public health responses.<sup>13</sup> Data from the NNDSS are analysed and reported based on diagnosis date, which is the true onset date of a case if known, otherwise it is the earliest of the specimen date, the notification date, or the notification received date.<sup>13</sup> In the NNDSS:

- True onset date (previously “date of illness onset”) represents the earliest date the case exhibited symptoms
- Specimen date represents the date when the first laboratory specimen was taken
- Notification date represents the date when health professional signed the notification form, or the laboratory issued the results
- Notification received date represents the date the notification of the disease was first received by the communicable disease section of the health authority.<sup>13</sup>

When interpreting notifiable diseases data from the NNDSS, it is important to note that changes in notifications over time may not solely reflect changes in disease prevalence or incidence. Depending on the disease, the number of notifications may be influenced by changes in case definitions; changes in reporting practices; changes in testing practices and screening programs; the use of less invasive and more sensitive diagnostic tests; periodic awareness campaigns; and the use of other public health and social measures.

Changes to Australian national surveillance case definitions<sup>14</sup> which may impact the number of notifications over time include:

- The removal of the requirement to report probable COVID-19 cases (those positive by rapid antigen test) from the Australian COVID-19 surveillance case definition in July 2024.<sup>14</sup> Accordingly, only laboratory-confirmed COVID-19 cases are described in the Australian Respiratory Surveillance Report, unless otherwise stated.
- On 1 January 2022, the influenza surveillance case definition was updated to remove: ‘*Single high titre by complement fixation test (CFT) or haemagglutination inhibition (HAI) to influenza virus*’ from the list of laboratory definitive evidence. This change has had minimal impact on the interpretation of influenza notification trends, with the change ensuring consistency with the influenza laboratory case definition. For further information, please refer to the update to NNDSS laboratory-confirmed influenza case definition.<sup>15</sup>

Changes to reporting or testing practices which may impact the number of notifications, or the way in which notifications are interpreted include:

- As the COVID-19 pandemic has progressed in Australia, the proportion of cases reported through traditional surveillance has decreased. From late 2021 onwards, there was a transition away from test, trace, isolate and quarantine practices to suppress transmission of COVID-19. Consequently, case ascertainment was reduced across Australia. COVID-19 case notifications are likely to be considerable underestimate of the true incidence of COVID-19 in Australia.<sup>4</sup> For this reason, COVID-19 notification trends should be interpreted with caution, especially where comparisons are made to previous transmission waves when ascertainment and reporting was higher.
- The completeness and reliability of particular indicators such as Indigenous status, hospitalisations, intensive care admissions or deaths associated with acute respiratory infections has varied prior to and throughout the pandemic. This is because these indicators are sourced in different ways by state and territories based on their local surveillance system capabilities, definitions, priorities, and needs. The

completeness and reliability of these indicators has decreased over time and are now inadequate for meaningful interpretation. This is due to a number of factors, including:

- most laboratory notifications do not include these indicators
  - case follow-up for these acute respiratory infections are not routinely conducted and not a requirement of notification
  - these indicators are not a requirement of notification
  - data linkage systems that have been used to help capture these indicators for COVID-19 have not been extended in the post emergency climate or to other acute respiratory infections
- Therefore, notification data are no longer reported on for Indigenous status, hospitalisations, intensive care admissions or deaths.
  - The RSV surveillance case definition was first published in July 2021 when RSV was added to the *National Health Security (National Notifiable Disease List) Instrument 2018*. However, RSV only became notifiable in all states and territories on 1 September 2022 and comprehensive national notification data became available after this point. For this reason, RSV notification trends are only presented from 1 January 2023.

## **FluTracking**

FluTracking was launched in Australia in 2006, the system relies on voluntary participation by the public to self-report illness in an online weekly survey. FluTracking is used to monitor respiratory illness activity, including influenza-like-illness and COVID-19-like illness in the community. FluTracking provides consistent community level surveillance of respiratory illness activity in all jurisdictions and over time. FluTracking enables year-to-year comparisons of trends in the incidence and severity of COVID-19 and influenza in the community. In 2024, approximately 50,000 people completed a FluTracking survey each week in Australia. Participants are given the option to opt-out over the summer period and as a result there is a reduced sample size from October to April of the following year.

Participants who report they experienced a fever and cough are said to experience 'influenza-like-illness'. For fever and cough percentage calculations, the numerator includes all participants who completed a survey for the current week and reported new fever and cough symptoms, and the denominator includes all participants who completed a survey for that week. Those who report time off work or normal duties at any time during an influenza-like-illness is captured and recorded in the same survey week of the new influenza-like-illness. This is captured even if the time off work was reported in the second, third or fourth week of illness. Similarly, participants who report seeking medical advice at any time during an influenza-like-illness is captured and recorded in the same survey week of the new influenza-like-illness (even if the medical advice was sought in the second, third or fourth week of illness).

More information about FluTracking, including how to join, is available [here](#).

## **Healthdirect Australia**

Healthdirect is the national virtual public health information service that provides access to health advice and information via a website, app and telephone helpline to help people manage their health and connect them to the right care at the right time. The healthdirect helpline provides 24/7 access to registered nurses for triage, health information and advice. The healthdirect helpline became operational in 2007 in all states and territories except Victoria and Queensland. Healthdirect Australia assumed management of Victoria's triage helpline in July 2021. Queensland continues to operate its own nurse triage helpline; therefore, healthdirect helpline data will not be representative of Queensland. The healthdirect Symptom Checker is an online self-guided triage tool, allows people to check their symptoms and get advice about what to do next. This might include self-care at home, seeing a general practitioner, going to an emergency department or calling triple zero (000).

More information about healthdirect is available [here](#).

## General practice surveillance

### ***Australian Sentinel Practices Research Network (ASPREN)***

ASPREN is a year-round network of sentinel general practices sites in which general practitioners and nurse practitioners report de-identified information on selected conditions, including influenza-like-illness, seen in participating sites each week. ASPREN has been collecting data from sentinel general practice sites since 1991 to inform communicable disease activity in the community. ASPREN data are used for acute respiratory infection surveillance and general practice research, including providing annual vaccine effectiveness estimates to the Global Influenza Vaccine Effectiveness Collaboration.

ASPREN uses the World Health Organization (WHO) influenza-like-illness surveillance case definition which is defined as an acute respiratory infection with measured fever of  $\geq 38^{\circ}\text{C}$  and cough with an onset within the last 10 days.<sup>16</sup>

In addition to the overarching impacts of COVID-19 on influenza surveillance systems, interpretation of ASPREN data from 2020 onwards should consider the following COVID-19 impacts:

- Changes in the health seeking behaviour at sentinel general practices sites due to the availability of telehealth and respiratory clinics may result in fewer presentations to general practice
- Changes to swabbing practices at sentinel general practice sites, due to the availability of telehealth and respiratory clinics, may result in a lower number of swabs being taken.

Therefore, ASPREN data may underestimate the presence of acute respiratory infections causing illness in the community in early pandemic years.

More information about ASPREN is available [here](#).

## Hospital surveillance

### ***Influenza Complications Alert Network (FluCAN)***

FluCAN is a real-time, hospital-based surveillance system for severe acute respiratory infections. FluCAN was initially established to monitor seasonal influenza hospitalisations. In 2020, FluCAN was modified to capture COVID-19 hospitalisations. In 2024, FluCAN commenced surveillance for RSV hospitalisations. Participating sentinel hospital sites collect detailed clinical and laboratory information from all hospitalised patients with a laboratory confirmed diagnosis of COVID-19, influenza or RSV. FluCAN also provide annual vaccine effectiveness estimates to the Global Influenza Vaccine Effectiveness Collaboration. Date of admission is used for all patient analyses, except where the patient acquired their infection in hospital. For patients who acquired their infection in hospital, date of onset is used.

When interpreting FluCAN data it is important to note these data reflect the patients with severe acute respiratory illnesses who are hospitalised or admitted to intensive care; data are therefore not generalisable to all cases or patients in hospital. Approximately 20 sentinel hospital sites across Australia contribute data. Some jurisdictions (Victoria) are overrepresented amongst participating sites, and the majority of sites are in major cities, thereby underrepresenting activity in regional and remote areas.

Since 2014, the Paediatric Active Enhanced Disease Surveillance (PAEDS) network has partnered with FluCAN to contribute data on paediatric (those aged 16 years or under) admissions with COVID-19, influenza or RSV at sentinel hospital sites. This provides enhanced surveillance of these at-risk populations. Consequently, children are over-represented in the dataset and the age distribution may not reflect the age distribution of hospitalisations nationally. For this reason, children and adults are reported on separately in the Australia Respiratory Surveillance Reports.

More information about FluCAN is available [here](#). More information about PAEDS is available [here](#).



## ***Short Period Incidence Study of Severe Acute Respiratory Infection (SPRINT-SARI) Australia***

SPRINT-SARI Australia is a national, multi-centre, observational study that collects near real time data on the characteristics, outcomes, and interventions for patients admitted to participating intensive care units or high dependency units with severe acute respiratory infections. In early 2020, SPRINT-SARI Australia was launched in response to the COVID-19 pandemic by the Australian and New Zealand Intensive Care Society Clinical Trials Group (ANZICS-CTG), the Australian and New Zealand Intensive Care Research Centre (ANZIC-RC), Monash University, and with international collaborators in Oxford. From March 2020 to May 2022, data were collected only on patients with an admission to intensive care associated with suspected or confirmed COVID-19. From June 2022 onwards, data collection began for other severe acute respiratory infection patients with an admission to intensive care for the management of acute respiratory failure or a complication and who were positive for a viral respiratory pathogen. These viral pathogens included, but are not limited to, human metapneumovirus, influenza, parainfluenza, rhinovirus and RSV.

When interpreting SPRINT-SARI data it is important to note these data reflect the sickest patients with severe acute respiratory infections who are admitted to intensive care; data are therefore not generalisable to all cases or patients in general hospital wards or intensive care. Approximately 70 sentinel intensive care sites across Australia contribute data. These intensive care sites include intensive care units and high dependency units managed by an intensive care team. SPRINT-SARI Australia continues to be managed by the ANZIC-RC and Monash University.

More information about SPRINT-SARI Australia is available [here](#).

## ***Critical Health Resource Information System (CHRIS)***

CHRIS is a real-time national system which provides data to monitor intensive care activity, capacity, and resourcing. In March 2020, in response to rising numbers of COVID-19 associated intensive care admissions, CHRIS was developed as a collaboration between the Australian and New Zealand Intensive Care Society (ANZICS) and Ambulance Victoria, funded by the Australian Government Department of Health. CHRIS, which has been in use since 1 May 2020, receives data from all 191 adult and paediatric intensive care units (over 2,300 intensive care beds) across Australia twice daily. Throughout the COVID-19 pandemic, CHRIS was used to facilitate the transfer of critically ill patients and enable early diversion of ambulance presentations to hospitals with intensive care capacity.

More information about CHRIS is available [here](#).

## **Mortality surveillance**

### ***Australian Bureau of Statistics (ABS) Provisional Mortality Statistics***

Deaths *involving* acute respiratory infections are presented in the Australian Respiratory Surveillance Reports as the primary data source for monitoring acute respiratory infection associated deaths. These data are sourced from the ABS Provisional Mortality Statistics. The number of deaths sourced from notification data are no longer recommended to routinely monitor acute respiratory infection associated deaths due to issues with reliability and completeness. In times of public health emergency response, the data source for mortality surveillance will be reviewed for accuracy, completeness, reliability and timeliness.

The ABS Provisional Mortality Statistics (where deaths *involving* acute respiratory infections are sourced from) provides an early indication of the pattern of mortality. The Provisional Mortality Statistics are nationally representative and there is standardisation in the collection, processing, classification, and presentation of causes of death statistics.

The registration of deaths is the responsibility of state and territory Registrars of Births, Deaths and Marriages. Registrars then provide this information to the ABS for processing, coding and compilation into aggregate statistics. Registrars report all deaths that were registered in a month at the start of the following month. Generally, when data is received each month, the lag between the date of death and the date of registration means that approximately 40–50% of reported registrations are of deaths that occurred in the month being reported. The remainder are deaths that occurred in earlier months. For deaths which are doctor certified, approximately 95% of registrations are received after a second month. This is considered sufficiently complete to enable meaningful comparison with historical counts, noting that the level of completeness will be higher for the start of any given month than the end of that month.<sup>17</sup>

More information about the ABS Provisional Mortality Statistics methodology is available [here](#).

Deaths *involving* acute respiratory infections data focus on all deaths registered and reported with COVID-19, influenza or RSV written on the death certificate up until a specified time. These data include important information about these acute respiratory infection deaths, including demographic details. While it is recognised data will be incomplete, it can still indicate emerging trends or changes among these deaths. It is expected that numbers of deaths *involving* acute respiratory infections will increase for more recent time periods as more death registrations are received and processed by the ABS.<sup>18</sup> In particular, the most recent two months are considered incomplete due to the time taken for death registrations to be received, processed and Provisional Mortality Statistics reported. For this reason, deaths *involving* acute respiratory infections are presented in the Australian Respiratory Surveillance Reports will lag behind the standard reporting period by at least two months.

People are more likely to die *due to* COVID-19 or influenza rather than *with* COVID-19 or influenza, while the opposite is true for RSV – people are more likely to die *with* RSV. Therefore, to fully monitor the effects of acute respiratory infections on mortality in Australia, deaths involving (both *due to* and *with*) acute respiratory infections are presented in the Australian Respiratory Surveillance Reports. For disaggregation of acute respiratory infection deaths *due to* and *with* refer to [Deaths due to COVID-19, influenza and RSV in Australia](#).<sup>19</sup>

The Provisional Mortality Statistics will not be comparable with those reported in [Deaths, Australia](#) or [Causes of Death, Australia](#). Similarly, the Provisional Mortality Statistics will not provide official estimates of excess mortality. Differences are explained in more detail throughout the [Provisional Mortality Statistics methodology](#). The Provisional Mortality Statistics may also not be comparable with other data sources.

More information about the ABS Provisional Mortality Statistics is available [here](#). More information about acute respiratory infection mortality in Australia is available [here](#).

## Laboratory surveillance

### **AusTrakka**

In 2020, AusTrakka was developed to better facilitate public health genomics data sharing and analysis. AusTrakka is Australia's national pathogen genomic sequence and analysis platform for SARS-CoV-2 and coordinator of genomics outbreak investigations across jurisdictions. AusTrakka is overseen by the [Communicable Diseases Genomics Network](#) and the [Public Health Laboratory Network](#). Most state and territory public health laboratories upload genomic sequences and agreed epidemiological metadata; however, data should be interpreted with caution as sequencing strategies and the representativeness of sequences uploaded to AusTrakka have changed significantly over time:

- From late 2022, the rates of quantitative reverse transcription polymerase chain reaction (RT-qPCR) testing and referrals of positive samples to sequencing laboratories decreased significantly, resulting in changes to sequencing strategies across Australia.<sup>4</sup>



- From July 2023, some jurisdictions ceased SARS-CoV-2 sequencing, while other jurisdictions reduced the number of SARS-CoV-2 samples being sequenced. For jurisdictions that are continuing SARS-CoV-2 genomic surveillance, SARS-CoV-2 samples which are likely to be prioritised for sequencing include those from cases who are hospitalised, admitted to intensive care, or cases of clinical significance. As a result, these changes are likely to affect the representativeness of sequenced SARS-CoV-2 lineages across Australia.
- In addition, sequencing methodology and protocols vary between jurisdictions.

There are several additional data considerations that should be noted when interpreting SARS-CoV-2 genomic surveillance data.

- The number of sequences presented in the AusTrakka data are not equivalent to the number of reported cases, as not all cases are sequenced and there may be duplicates in the AusTrakka data.
- Only samples with laboratory-definitive evidence of SARS-CoV-2 are eligible for sequencing. Not all samples will be suitable for sequencing, especially those samples with low amounts of viral nucleic acid (i.e., high RT-qPCR cycle thresholds) such as those collected from cases late in their disease episode (common in returned travellers) or those subjected to storage at suboptimal conditions, causing viral nucleic acid degradation.<sup>12</sup> This may affect the representativeness of samples.
- AusTrakka defines SARS-CoV-2 genomic lineages using the Phylogenetic Assignment of Named Global Outbreak (Pango) lineage nomenclature.<sup>20</sup> Lineages and sub-lineage classifications are continuously defined, and lineage classification may change retrospectively as new sequences are added and lineages diversify over time. Sub-sub lineage designations may change with updates to Pangolin, USHER, and NextClade lineage calling software used by AusTrakka. For this reason, numbers and proportions of sub-lineages may be adjusted in future Australian Respiratory Surveillance Reports.
- From July 2023, AusTrakka has used the [World Health Organization designations](#) for any variant of concern, variant of interest, or variant under monitoring designations.<sup>21</sup> Currently, in AusTrakka variants of concern are determined from a viral sequence by using the NextClade Pangolin software and scorpio algorithm, which assigns a sequence to a Pangolin constellation (the presence of a set of characteristic mutations for each variant of concern lineage). Non-variant of concern lineages are determined using the Pangolin software PangoLEARN. This approach is aligned with the World Health Organization position on variant of concern classification and interpretation.

More information about AusTrakka is available [here](#).

## ***Sentinel laboratories***

Sentinel laboratories are a surveillance network of laboratories that collect data on diagnostic respiratory pathogen testing. This includes the number of tests undertaken, the number of positive results, and the detected viruses. Sentinel laboratories are not intended to capture all diagnostic testing occurring, rather, sentinel laboratories aim to provide a representative sample of people tested for respiratory viruses in Australia.

Sentinel laboratory site testing data are influenced by jurisdictional and laboratory testing practices and should be interpreted with caution. Sentinel laboratories include laboratory networks in South Australia and Tasmania, and the National Influenza Centres. In Australia, the National Influenza Centres are:

- Institute of Clinical Pathology and Medical Research in New South Wales
- PathWest Laboratory Medicine in Western Australia
- Victorian Infectious Diseases Reference Laboratory in Victoria.

The National Influenza Centres are part of the WHO Global Influenza Surveillance and Response System (GISRS), contributing testing data and sending representative clinical specimens and isolated viruses to the WHO Collaborating Centre for Reference and Research on Influenza for advanced analysis.

More information about National Influenza Centres is available [here](#).

## ***WHO Collaborating Centre for Reference and Research on Influenza***

In Australia, the WHO Collaborating Centre for Reference and Research on Influenza (the Centre) is hosted by the Victorian Infectious Diseases Reference Laboratory and is part of the WHO GISRS. GISRS was established in 1952 to monitor the changes in influenza viruses with the aim of reducing the impact of influenza through the use of vaccines containing currently circulating influenza viruses. Together with other WHO Collaborating Centres, the Centre is responsible for analysing the antigenic (immune response), antiviral drug sensitivity, epidemiological and genetic characteristics of influenza viruses currently circulating in the human population. The Centre

These data are used by the WHO to make recommendations on appropriate influenza subtypes to be included in annual seasonal influenza vaccines for the northern and southern hemispheres. The Centre also undertakes research, training and regional capacity building activities related to influenza.

More information about the Centre is available [here](#).

# Vaccination

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## Vaccine coverage

Vaccine coverage refers to the proportion or prevalence of complete immunisation in a population.<sup>22</sup> Vaccine coverage is a widely used indicator to determine if a vaccine program is being utilised, that is, are people actually being vaccinated. In addition, vaccine coverage can allow us to establish if enough people are being vaccinated so that the spread, or transmission, of diseases will be interrupted. In addition, assessing vaccine coverage in population sub-groups (such as age groups) or local areas can identify specific areas of low coverage so that measures to improve coverage can be appropriately targeted. Vaccine coverage is measured through registries (like the Australian Immunisation Register), routine administrative reports or community-based surveys.

### ***Australian Immunisation Register (AIR)***

The AIR is a national register that records vaccines given to people of all ages in Australia. The AIR includes vaccines given:

- under the [National Immunisation Program](#)
- through school programs
- privately, such as for seasonal influenza or travel.

Under the *Australian Immunisation Register Act* it is mandatory for recognised vaccination providers to report COVID-19 vaccinations administered on or after 20 February 2021 and influenza vaccinations administered on or after 1 March 2021.<sup>23</sup> For this reason, vaccinations reported to the AIR are substantially more comprehensive and complete in the most recent years. There is a reporting lag for the AIR data, as vaccine providers can upload the immunisation encounter days or weeks after the actual encounter occurs. Therefore, vaccination data particularly for the most recent weeks is subject to revisions and may appear lower than actual vaccine coverage.

In addition, any individuals who are no longer active in the AIR (e.g. deceased or permanently left Australia) are excluded from reports on time since last vaccination; however, these vaccinations are still counted in the overall doses administered. Therefore, vaccine coverage data based on time since last vaccination in this report may vary from data reported in other national reports and reports by states and territories.

More information about the AIR is available [here](#).

## Vaccine efficacy

A vaccine's efficacy is a measure of how much a vaccine lowered the risk of a person in a controlled clinical trial getting sick. Vaccine efficacy is based on how many people who got vaccinated developed the 'outcome of interest' (usually disease) compared with how many people who got the placebo (dummy vaccine) developed the same outcome (disease). To calculate a vaccine's efficacy, the numbers of sick people in each trial group are compared, in order to calculate the relative risk of getting sick depending on whether or not the trial participants received the vaccine. Vaccine efficacy seen in clinical trials applies to specific 'outcome of interest' in a clinical trial only.<sup>24</sup> Vaccine efficacy is not reported in the Australian Respiratory Surveillance Report.

## Vaccine effectiveness

Vaccine effectiveness is a measure of how well a vaccine works in the real world. Effectiveness is measured by observing how well the vaccines work to protect communities as a whole. Vaccine effectiveness in the real world can differ from the vaccine efficacy measured in a trial, because we can't predict exactly how effective

vaccination will be for a much bigger and more variable population getting vaccinated in more real life conditions. Vaccine effectiveness is often lower than vaccine efficacy, because it includes people in whom the immune responses to vaccines may not be as strong as healthy people in clinical trials, and because adherence to vaccine schedules may not be as good as in clinical trials.<sup>24</sup>

Vaccine effectiveness is monitored by several sentinel surveillance systems in Australia or estimated from observational studies. Outcomes may include disease incidence, or other measures such as general practice attendance with disease, or hospital admission with disease. In addition, for seasonal influenza vaccines, the effectiveness will depend on the match between the vaccine influenza strains and influenza strains circulating in the community and is likely to vary from season to season.

## ***Global Influenza Vaccine Effectiveness (GIVE) Collaboration***

The GIVE Collaboration provides information on vaccine performance in previous influenza seasons and interim reports on the current season. The GIVE Collaboration is made up of many different studies conducted in countries in both the northern and southern hemispheres. In Australia, the vaccine effectiveness estimates from the GIVE Collaboration are from ASPREN and FluCAN. Vaccine effectiveness estimates for seasonal influenza from the GIVE Collaboration are included in the Australian Respiratory Surveillance Reports in the latter part of each year.

To estimate vaccine effectiveness against general practice attendance with influenza, data on patients presenting with influenza-like-illness and who were tested for respiratory pathogens at participating ASPREN sentinel general practice sites are used in a test-negative observational study. In this design, vaccine effectiveness is estimated as 1 minus the odds ratio of vaccination. To estimate vaccine effectiveness against hospitalisation with influenza, data from all participating FluCAN sentinel hospital sites are used in a test-negative incidence density observational study. In this design, vaccine effectiveness is estimated as 1 minus the odds ratio of vaccination in case patients compared to test negative control patients.

## **Vaccine match**

Vaccine match refers to the similarity or match between the virus strains in a vaccine and the virus strains circulating in the community.<sup>25</sup> If the vaccine match to circulating strains is good, there is usually a lower burden of severe illness and severe disease outcomes at a population level. Each year, strains of influenza circulating in the community change, and influenza vaccines are reformulated to match circulating influenza strains as closely as possible. This is why an influenza vaccine is recommended for people aged six months and over each year. Virological surveillance of circulating influenza virus strains during the season can provide an assessment of vaccine match.

## ***Australian Influenza Vaccines Composition 2025***

Australia is transitioning from using a quadrivalent influenza vaccine to a trivalent influenza vaccine for influenza immunisation. During the transition period, the use of either the quadrivalent or trivalent influenza vaccine is supported.<sup>26</sup> This transition is because the WHO and the Australian Influenza Vaccine Committee recommended that the influenza B Yamagata (B/Yamagata) antigen no longer be included in seasonal influenza vaccines. The B/Yamagata lineage has not circulated for several years, indicating a very low risk of infection by B/Yamagata lineage viruses.<sup>26,27</sup>

The southern hemisphere 2025 vaccine will contain one new strain for the influenza A(H3N2) subtype virus component. The Australian Influenza Vaccine Committee has recommended the following viruses for vaccines used in the 2025 southern hemisphere trivalent influenza vaccines in Australia:

### **Egg-based influenza vaccines:**

- an A/Victoria/4897/2022 (H1N1)pdm09-like virus;
- an A/Croatia/10136RV/2023 (H3N2)-like virus; and
- a B/Austria/1359417/2021 (B/Victoria lineage)-like virus;

**Cell-based influenza vaccines:**

- an A/Wisconsin/67/2022 (H1N1)pdm09-like virus;
- an A/District of Columbia/27/2023 (H3N2)-like virus; and
- a B/Austria/1359417/2021 (B/Victoria lineage)-like virus;

The recommendation for the B/Yamagata lineage component of quadrivalent influenza vaccines remains unchanged from previous recommendations:

- a B/Phuket/3073/2013 (B/Yamagata lineage)-like virus.<sup>27</sup>

More information about vaccination in Australia is available in the [Australian Immunisation Handbook](#).

# References

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