

Enhanced surveillance plan for COVID-19 in NSW

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NSW has had success in controlling COVID-19 related illness – this far in 2020, and surveillance mechanisms for COVID-19 are well established in NSW. Actively identifying newly infected people and their close contacts have been essential to this success.

NSW maintains high rates of testing and low test positivity.

NSW has taken an aggressive approach to stem the number of cases associated with each outbreak and has tightened restrictions preventing the number of people able to attend public places. NSW continues to monitor the impact of the recent relaxation of public health restrictions through enhanced surveillance.

The existing activities that provide the foundations for surveillance and will be part of the public health response for the duration of the pandemic include:

- broad availability of COVID-19 testing for symptomatic people
- notification of positive cases to public health units with early, detailed case interviews conducted for all cases and isolation of all cases as per the [CDNA National Guidelines for Public Health Units – Coronavirus Disease 2019 \(COVID-19\)](#). [↗](#)
- contact tracing of all close contacts of confirmed cases, with home quarantine of close contacts for 14 days including enhanced testing.
- rapid public health response to confirmed cases with a connection to a high risk setting, including residential aged care facilities and health care facilities.
- identification of cluster sources through whole genome sequencing

Overview of enhanced surveillance to support the response to COVID-19

This plan describes the enhanced surveillance activities that will be performed in NSW to support the public health response to COVID-19. This plan is closely aligned to the [Australian National Disease Surveillance Plan for COVID-19](#) [↗](#), which in turn supports the [Coronavirus \(COVID-19\) in Australia – Pandemic Health Intelligence Plan](#). [↗](#)

The COVID-19 enhanced surveillance goals for NSW are to:

- provide daily updates on the characteristics and time-trends of COVID-19 cases, to support planning and evaluation of the public health response
- provide daily updates on the characteristics and time-trends of deaths due to COVID-19 to support planning and evaluation of the public health response, and monitor overall population level mortality
- provide daily updates on tests performed to detect SARS-CoV-2 infection and calculations of test positivity rates to assess the accessibility and equity of access to diagnostic testing
- report on specimen collection and laboratory services to support rapid case finding and contact tracing and the overall public health response
- report on the performance of contact tracing to support planning and evaluation of the public health response
- report on clusters, outbreaks and other community trends in COVID-19-related illness, and other respiratory viral illnesses, to assess the extent of community transmission and effectiveness of public health measures. Use genome surveillance to characterise clusters and establish additional links to complement the epidemiological investigation.
- describe the clinical severity of COVID-19 to allow prediction of resource use and characterise risk factors for serious infection to inform the public health response
- monitor impacts on the tertiary health care system to contribute to forecasts of demand, and to inform surge planning and redirect resources as required
- conduct serosurveys to determine prevalence of SARS-CoV-2 infection over time, age, population group and geographic location to inform the public health response
- undertake strategically targeted asymptomatic screening in high risk settings or vulnerable populations, particularly in association with a case exposure in these settings.

Background

This plan describes the NSW approach to surveillance for COVID-19, and the virus that causes it, severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).

Surveillance is the ongoing, systematic collection, analysis and interpretation of health-related data. Surveillance data collected as part of the plan will inform the public health response to COVID-19 in NSW, through timely reporting and description of cases and clusters, testing patterns, community transmission patterns and the outcomes and severity of illness.

Surveillance in NSW is a partnership between state government agencies, health research institutions, public and private laboratories, and other health sector stakeholders. The plan recognises and builds on established systems for communicable disease surveillance in Australia.

Governance and implementation

The NSW Public Health Response Branch (PHRB) is responsible for the plan and monitors its implementation. The plan is a living document that will be regularly updated as surveillance priorities and needs change, to support responses proportionate to the level of risk over time, geographic regions and for different population groups. The plan will be responsive to the needs of the Crisis Cabinet and the State Pandemic Emergency Management Committee. Principles underlying the development and implementation of the plan are at [Appendix 1](#).

Surveillance approaches adopted in the plan

Case based reporting

NSW has a well-established case based surveillance system which relies on reporting from public health units, which in turn depend on reports from laboratories, health facilities and medical practitioners. This system is used to report at state and national level on all new diagnoses of infection with SARS-CoV-2. It is also used to report at state and national level on testing for COVID-19.

Targeted active case finding

The ability to detect cases of SARS-CoV-2 infection is central to the strategies used to prevent transmission in Australia. A high rate of well-targeted testing is essential to provide confidence that cases will be detected as control measures evolve. A testing framework for COVID-19 in NSW has been developed as a companion to this plan (Appendix 2). The testing framework outlines the settings in which testing is currently being conducted or proposed to be conducted for COVID-19, and emphasises that the highest priority group for testing is people with symptoms.

Syndromic and sentinel surveillance

Australia has a number of established surveillance systems originally set up to monitor influenza and influenza-like illnesses and their complications. These systems include syndromic surveillance, where data are collected based on the clinical features of people without a diagnosis, and sentinel surveillance, involving selected health facilities that collect high-quality data that cannot be obtained through case-based reporting. There are also mechanisms for reporting on health service utilisation and outcomes for people admitted to tertiary care with COVID-19. The data collected will be used to signal trends and monitor the burden of disease in the community.

Serosurveillance

Serosurveillance complements the understanding of population transmission of SARS-CoV-2 obtained from case-based reporting, which largely misses asymptomatic, mild or atypical cases and those that do not present to health care or are not tested when ill. It helps us understand at a

population level how many people have been infected. This information will support epidemic modelling and may provide an indication of population immunity in future, noting the uncertainties around its interpretation and the need to understand the level of sero-reversion in the community and its implications

Molecular epidemiology

The incorporation of viral genomic data into epidemiological surveillance can clarify the likely source of infection in outbreak settings or in cases arising without a known source, and support characterisation of clusters and patterns of community transmission. It can also be used to monitor SARS-CoV-2 evolution to identify whether different virus variants are emerging over time, and if there is any impact to the accuracy of diagnostic tests or change in pathogenicity, immunogenicity, or transmissibility.

COVID-19 surveillance goals and indicators

Each surveillance goal contributes information to help national, state and territory public health authorities better understand the pattern and frequency of COVID-19 infection and factors (such as age) associated with infection. Data are used to assess and inform public health measures. Each goal is measured and monitored through one or more indicators.

Goal 1. Provide daily updates on the characteristics and time-trends of COVID-19 cases, to support planning and evaluation of the public health response

Indicators

- Daily number, and weekly rate (per 100,000 population) of locally acquired COVID-19 cases by age group and sex, and by LHD.
- Daily number of COVID-19 cases by source of infection (focussing on the source of infection for locally acquired cases).
- Number of COVID-19 cases in populations of interest (Aboriginal and Torres Strait Islander people/health care workers/pregnant women).

Specific activities

- Deliver a daily case summary and weekly surveillance report with detailed information on the latest epidemiology, load to the website and disseminate to the health system.
- Conduct a weekly review of epidemiology in collaboration with public health unit directors to determine the local government areas for increased testing. These are designated as 'areas for increased surveillance and testing', displayed on the website and communicated across the health system, including primary care and to the community.

Why is this important?

Data collected on all laboratory confirmed cases of COVID-19 are used to characterise the epidemic by person, place and time. This epidemiological information is critical to assess the effectiveness of public health measures and inform targeted approaches.

Goal 2. Provide daily updates on the characteristics and time-trends of deaths due to COVID-19, to support planning and evaluation of the public health response

Indicators

Daily number, and weekly rate (case fatality and per 100,000 population) of deaths in people with COVID-19 by demographic characteristics

Why is this important?

The number and rate of COVID-19 related deaths is an indication of the scale of the epidemic and the severity of infection, and can indicate whether these factors are changing over time. Mortality data identifies population groups most at risk while informing public health measures to protect them; and may provide insight into the performance of the health care system.

Goal 3. Provide daily updates on tests performed to detect SARS-CoV-2 infection and calculations of test positivity rates to assess the accessibility and equity of access to diagnostic testing

Indicators

- Daily number of diagnostic tests conducted and the proportion that are positive (and weekly by age group, sex, geographical distribution, and test type).
- Weekly rate of testing (per 100,000 population) by LHD and LGA level.
- Time from symptom onset to test.

Specific activities

- Expand COVID-19 testing of symptomatic people, with a target of an average of more than 8,000 tests per day (or 56,000 tests per week).
- Expand COVID-19 testing to target symptomatic health and aged care workers, vulnerable people and high risk settings.
- Monitor the rates of population-level COVID-19 testing by LHD and LGA, and collaborate with health services to expand access to testing for communities with relatively lower rates of testing.
- Monitor the rates of population-level COVID-19 testing for Aboriginal people statewide, and collaborate with relevant health services to expand access to testing for Aboriginal people if required.
- Review population-based testing rates by age, Aboriginal status, location of residence, location of service, and by public and private laboratory to inform the public health response, and to communicate the need for expanded access to testing where needed
- In collaboration with the Commonwealth and Kirby Institute, deploy rapid testing via GeneXpert platform to at least four Aboriginal Community Controlled Health services to support enhanced access to testing for Aboriginal people and regional communities.
- Time from symptom onset to test reflects the effectiveness of public health messaging, as well as the ease and acceptability of testing.

Why is this important?

The daily number of tests for SARS-CoV-2 conducted and the proportion that are positive are metrics used to better interpret case-based data. These data provide the uptake of testing in different populations, locations and time periods and are used to assess future need for testing related equipment, consumables and staff resources. Testing data is an important measure to indicate that the key disease control strategies of case isolation and contact quarantine can be effective.

Goal 4. Report on the performance of contact tracing to support planning and evaluation of the public health response

Indicators

- Number of contacts identified per case
- **Nature of exposure for contacts (ie household/ workplace/other)**

Specific activity

Work closely with the Commonwealth to use the data available from the COVIDsafe app to improve public health contact tracing efficiency and completeness. An evaluation of this activity is in development.

Why is this important?

People in close contact with a confirmed or probable case of COVID-19 are at higher risk of contracting an infection with SARS-CoV-2. Rapid identification and quarantining of close contacts of cases through contact tracing helps break chains of transmission by ensuring that contacts do not transmit the virus to any other people. For cases with no known source of transmission, contact tracing back through the time that the case would have acquired their infection may also identify previously undiagnosed cases in the community. Contact tracing data can contribute to knowledge transmission dynamics for SARS-Cov-2. In addition, these data provide a measure of public health effectiveness in undertaking contact tracing in a timely way.

Effective contact tracing also relies on the public health objectives of early diagnosis (people with symptoms isolating themselves and presenting for testing soon after symptom onset, and accessible and rapid laboratory testing and reporting) (indicators 1 and 2 above).

Goal 5. Report on clusters, outbreaks and other community trends in COVID-19-related illness to assess the extent of community transmission and effectiveness of public health measures

Indicators

- Daily report of new clusters and clusters under investigation of COVID-19, including those indicating local transmission.
- **Weekly summary of all clusters and outbreaks of COVID-19 specifying number of cases and contacts, along with setting, detail of transmission, management and associated outcome data.**

- **Longer term summaries of cluster outcomes.**

Specific activity

- Continue to investigate clusters in collaboration with public health units to interrupt transmission, better understand settings where community transmission is occurring and inform targeted prevention strategies.
- In collaboration with the National Centre for Immunisation Research and Surveillance, conduct enhanced investigations of confirmed cases in schools and early childhood learning centres, with reports loaded to website and disseminated to education providers and stakeholders.
- Conduct detailed case interviews in health care workers, with data linkage to the NSW Health Stafflink register. Conducting additional investigation (including broader testing and whole genome sequencing) to better understand the most likely source of infection and inform policy and infection control practice in health workers in all sectors and settings in NSW.
- Continue to screen all arrivals at Sydney Airport for symptoms of COVID-19 prior to commencement of hotel quarantine
- On 27 June, it was announced that all recent international arrivals in NSW will be tested for COVID-19 on day 10 of their hotel quarantine period regardless of symptoms, in addition to routine health screening prior to release. Anyone who refuses testing on the tenth day of their quarantine period will be required to stay in quarantine for an additional ten days.
- Establish a [research collaboration on sewage surveillance](#) of SARS-CoV-2 ("ColoSSoS") project to build capacity to deliver a national program led by Water Research Australia. NSW Health, Sydney Water and others are research partners.

Why is this important?

For effective suppression of COVID-19, it is important to rapidly identify and control clusters particularly in high-risk settings such as residential care and healthcare facilities.

Characterisation of clusters and secondary cases can inform targeted strategies to prevent further outbreaks.

Goal 6. Describe the clinical severity of COVID-19 to allow prediction of resource use and characterise risk factors for serious infection to inform the public health response

Indicators

- **Weekly symptom profile of patients notified with COVID-19.**
- **Weekly reporting of recovery data from patients**

Why is this important?

Our current understanding of COVID-19 is that approximately 80% of infections result in mild illness ¹; the most common symptoms are similar to those of other acute respiratory illnesses. Information on clusters, outbreaks and other broad patterns of community transmission when viewed together with data from other surveillance indicators paints a more complete picture of the scale and impact of the epidemic, and the effectiveness of public health measures.

Goal 7. Describe the clinical severity of COVID-19 cases to allow prediction of resource use and to standardise models of care, as well as characterise risk factors for serious infection to allow for targeted public health strategies

Indicators

- **Proportion of COVID-19 cases hospitalised, by demographic characteristics.**
- **Proportion of COVID-19 hospitalisations admitted to Intensive Care Units (ICU), by and demographic characteristics.**
- **Proportion of COVID-19 patients in ICU receiving ventilation or extracorporeal membrane oxygenation (ECMO) by comorbidity and demographic characteristics.**

Why is this important?

Describing the number and characteristics of hospitalised COVID-19 cases gives an indication of the extent of infection in the community, the severity of illness and whether these factors are changing over time. These indicators identify high-risk groups for severe illness or complications due SARS-CoV-2 infection to inform targeted public health measures. These data also inform resource allocation requirements to ensure safe, timely and quality health care.

Goal 8. Monitor impacts on the tertiary health care system to contribute to forecasts of demand, and to inform surge planning and redirect resources as required

Indicators

- **COVID-19 patient occupancy of hospitals, as count and proportion of total hospital capacity; reported daily.**
- **COVID-19 patient occupancy of ICUs, as count and proportion of total ICU capacity; reported daily.**
- **COVID-19 patients in ICU receiving ventilation/ECMO as count and proportion of total ventilation capacity; reported daily.**
- **COVID-19 presentations to emergency departments and public COVID-19 clinics, as a count; reported daily and by local health district**
- **Duration of hospital stay for COVID-19 patients (median, range); reported weekly.**
- **Duration of ICU stay for COVID-19 patients (median, range); reported weekly.**

Why is this important?

Hospital capacity and activity data, when collected over time, can be used to forecast resource requirements and allocation.

Goal 9. Conduct serosurveys to determine prevalence of SARS-CoV-2 infection over time, age, population group and geographic location to inform the public health response

Indicators

Antibody prevalence to SARS-CoV-2 by age group, sex, geographic area, risk group (e.g. by age, health care workers, Indigenous people) and over time (during and after epidemic peaks).

Specific activity

Conduct a population-based serosurvey to determine the prevalence of previous SARS- CoV-2 infection in pregnant women, routine blood donors, and other people who have had blood collected for monitoring of their health condition.

Why is this important?

Infection with SARS-CoV-2 can result in mild, asymptomatic or atypical illness which may not be detected by standard surveillance systems. Serological testing for surveillance can indicate how widely SARS-CoV-2 infection has spread across the general population and within specific groups. It should be noted that serological surveillance does not tell us if or for how long antibodies protect people against re-infection.

Goal 10. Undertake strategically targeted asymptomatic screening in high risk settings or vulnerable populations

Indicators

Number and proportion positive for SARS-CoV-2 of asymptomatic cases in structured, systematically designed studies of populations at high-risk, and/or settings in which repeatable cross-sectional sampling is feasible.

Specific activity

- On 27 June, it was announced that all recent international arrivals in NSW will be tested for COVID-19 on day 10 of their hotel quarantine period regardless of symptoms, in addition to routine health screening prior to release. Anyone who refuses testing on the tenth day of their quarantine period will be required to stay in quarantine for an additional ten days.
- In collaboration with the Commonwealth, participate in a cohort study of asymptomatic patients prior to elective surgery at three facilities in NSW.
- Undertake asymptomatic testing associated with investigations to inform identification of cases for the purpose of disease control.

Why is this important?

Asymptomatic testing is an active surveillance measure that seeks to uncover undetected infection in outbreak situations or high risk settings. This indicator contributes to the broader knowledge base on virus characteristics and provides a greater understanding of the extent of virus circulation in the community.

Appendix 1: Principles underlying the NSW Enhanced Surveillance Plan for COVID-19

- The plan provides a national framework for reporting on health and health service-related

aspects of infection with the virus SARS-CoV-2, and the disease that it causes, COVID-19. The plan drives a series of outputs which will be targeted to a range of stakeholders, including the general public.

- The plan is a living document, that responds to immediate priorities for indicators as determined by the State Pandemic Emergency Management Committee and the AHPPC, at the same time as considering technical feasibility and sustainability of the mechanisms needed to report the indicators. As Australia and NSW moves through the phases of response to the COVID-19 epidemic, this plan will evolve.
- The plan will also be responsive to the ongoing requirements of disease modelling and projections. Where data are shared for these purposes, the conditions and obligations under which data are shared will be communicated and compliance monitored.
- As each new iteration of the plan is produced, it will be presented to the State Pandemic Emergency Management Committee. Once the Committee has endorsed the new iteration, it will be loaded to the website.
- The COVID-19 Surveillance Team will track implementation of new recommendations and feedback any issues to the PHEOC and Public Health Controller that require resolution. The core of the plan will be a series of indicators, generally collected statewide or, if appropriate, from sentinel sites for select populations.
- Each indicator under the plan will be linked to specific surveillance goals, and accompanied by an explicit description of the mechanism by which the indicator is reported, and a list of issues that require action for full implementation of the indicator.
- Non-standard surveillance data sources that may aid in gaining a more comprehensive view of COVID-19 in NSW will be considered throughout the development of the plan, including novel data streams, emerging technologies and novel approaches to surveillance, for example wastewater monitoring.
- Overall coordination of information collection and dissemination under the plan will be the responsibility of the COVID-19 Surveillance Team within the PHEOC.

Appendix 2: Testing framework for COVID-19 in NSW

The ability to detect cases of COVID-19 is central to the strategies that can be used to prevent ongoing community transmission in NSW. A high testing rate across the population, and particularly in populations that are more likely to have infection due to symptoms or epidemiological links is essential to provide confidence that cases will be detected as control measures are adjusted.

This framework for testing for COVID-19 in NSW supports this plan, and also supports the [Australian National Disease Surveillance Plan for COVID-19](#), which has the tracking of testing rates among its key components. It outlines the range of surveillance activities that track routine testing, or introduce additional testing for surveillance purposes, for COVID-19.

It is important that surveillance and testing are prioritised to meet the key public health objectives of minimising transmission. Detection of infections, their contacts and outbreaks is currently conducted through testing in symptomatic people, followed by comprehensive contact tracing around every case. This strategy must be maintained and enhanced as the highest priority,

ensuring that all people who develop symptoms consistent with COVID-19, are tested. This is the most important and effective testing, providing direct public health results.

Enhanced testing approaches for symptomatic people

To increase testing coverage, the [Communicable Diseases Network Australia \(CDNA\) expanded its recommendations](#)  for testing from 22 June 2020 to anyone with Acute Respiratory Infection (ARI) or fever ($\geq 37.5^{\circ}\text{C}$) or history of fever 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. The uptake for this is yet to be evaluated.

Surveillance based on FluTracking for the week ending 26 April 2020 indicated that only one third of people with fever and cough were tested for COVID-19. There is added difficulty in increasing testing numbers when acute respiratory illness and influenza-like illness rates are markedly decreasing owing to the current physical distancing measures. To be confident there is high case ascertainment, the amount of testing should reflect the prevalence of acute respiratory illness in the community. This can only be achieved by effective communication to the public, and removal of barriers to testing to ensure all symptomatic people are tested, including marginalised populations, those with limited access to healthcare and those who may have a disincentive to be tested. This alone would greatly increase the number of tests conducted in Australia. As physical distancing measures are lifted and other respiratory viruses again circulate at a higher level in the community testing all people with ARI will further increase the COVID-19 testing rate.

Testing approach in outbreaks and certain settings

In addition to testing all symptomatic people, testing should also expand to asymptomatic people in settings of outbreaks, such as might occur in health care or aged care settings, and in vulnerable populations or remote and isolated communities. This can provide early detection of cases and information of asymptomatic people. Serology testing is also of value, both for population surveys to estimate how far infection has spread, and for upstream contacts of cases with no epidemiological link to identify sources of infection. The use of whole genome sequencing, which can demonstrate links between cases, may also be effective in these scenarios.

Role of asymptomatic testing

The incidence and significance of asymptomatic cases is not well understood. Most of Australia currently has very low COVID-19 incidence. At present the CDNA and the Australian Health Protection Principal Committee therefore do not recommend systematic, ongoing testing of asymptomatic people. Mathematical modelling shows that testing of unselected asymptomatic individuals is not an effective way of detecting community transmission compared with enhanced testing in symptomatic cases, and contacts of cases. Such testing would use significant testing resources and the effect of potential false positive results needs to be considered. Asymptomatic people may also choose not to be tested. Nevertheless, there may be a situation in which time-limited surveys of asymptomatic people may be of value, particularly in outbreak situations or in high risk settings such as health care or residential aged care facilities or in vulnerable populations.

Appendix 3: NSW COVID-19 serosurveillance approach

Purpose

Serosurveys measure the prevalence of antibodies to SARS-CoV-2, which in most people appear by around 12–14 days after initial infection, whether or not the person had symptoms of illness, and may remain detectable for several months or longer.

Serosurveillance complements epidemiological data collected using case reporting based on detection of the virus, which is likely to miss infections that are asymptomatic, mild or atypical or are not tested during the acute phase of their illness. Serosurveys provide a better understanding at the community level, of how many people have been infected with the virus, and are considered an essential piece of pandemic intelligence. However, currently serosurveillance cannot be used to measure population immunity, because the extent to which antibodies can protect against future infection is not known.

Objective 1: Monitor SARS-CoV-2 seroprevalence by geographic area and age group

Serosurveys conducted in NSW will be designed to examine variation in seroprevalence by geographic location, age group, sex, and population group. Populations that will be examined include the general population, pregnant women and blood donors.

The preferred approach for monitoring seroprevalence in NSW and Australia is through testing of anonymised residual blood specimens routinely collected for other purposes for the presence of SARS-CoV-2 antibodies. Using this approach, samples are selected using repeatable methodologies, to broadly reflect the desired population distribution. Analyses of these samples can be assumed to be reflective of time trends and geographic patterns in SARS-CoV-2 infection rates in the underlying communities from which they are drawn.

Objective 2: Monitor SARS-CoV-2 seroprevalence in populations of importance in public health strategies

Targeted serosurveillance supplements data from residual specimen collections described under Objective 1, but also addresses specific questions around infection risk, severity of illness and outcomes (if paired with clinical data) among key populations of interest. These surveys involve proactive blood specimen collection. Specific populations of interest include children and adolescents who have less routine blood testing, as well as high-risk populations such as the elderly and health care workers. Serosurveillance in younger age groups may be undertaken through active recruitment of consenting participants in emergency departments, health care facilities, residential aged care facilities or schools.

Governance and coordination

Approval to conduct serosurveillance to support the public health investigation into COVID-19 has been obtained under the Public Health Act 2010. This serosurveillance will be conducted in NSW as a collaboration between the National Centre for Immunisation Research and Surveillance

(NCIRS), the Kirby Institute, NSW Health Pathology. It will be funded by the NSW Ministry of Health.

Proposed measures

Prevalence of past or recent infection (as demonstrated by the presence of antibodies to SARS-CoV-2) by geographic area, age group, time, and in key populations, reported to the NSW Ministry of Health and made available to mathematical modellers and others who will appropriately use data.

Notes

- Wu Z, McGoogan JM. Characteristics of and Important Lessons From the Coronavirus Disease 2019 (COVID-19) Outbreak in China: Summary of a Report of 72 314 Cases From the Chinese Center for Disease Control and Prevention. *JAMA*. 2020;323(13):1239–1242. doi:10.1001/jama.2020.2648

Current as at: Sunday 22 November 2020

Contact page owner: [Health Protection NSW](#)