

# Testing for SARS-CoV-2 / COVID-19

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Prompt testing and identification of people infected with SARS-CoV-2 (COVID-19) is imperative for preventing outbreaks. Testing for COVID-19 has been and remains central to the elimination strategy in Aotearoa New Zealand.

There are numerous methods and sample types for testing for SARS-CoV-2, the virus that causes COVID-19, which are used for different purposes and situations.

Polymerase Chain Reaction (PCR) and antigen tests are used for diagnosing an acute, active infection.

Antibody tests are used for detecting a recent or past infection, or for immunity following vaccination.

An ideal test is very sensitive (high probability of detecting SARS CoV-2 if it's present) and very specific (high probability that people without the virus will return a negative result). A high sensitivity is very important in New Zealand where we have a 'zero-tolerance' approach to COVID-19, commonly referred to as the elimination strategy, which also means we want to be sure to identify every potential case.

Other factors are also relevant, such as how acceptable the test is to the person being tested, how complex the test is to process in the lab, and the capacity of the overall system to collect and process a high volume tests if necessary.

Some countries may use a wider range of tests because of ongoing, widespread community transmission of COVID-19 and do not need to rely on highly sensitive tests that are processed in a laboratory. In New Zealand, laboratories must be accredited by International Accreditation New Zealand (IANZ). This ensures the testing is standardised so that the correct tests are being performed and results of the tests can be trusted.

The Ministry of Health constantly reviews emerging evidence on testing to help evaluate and improve the COVID-19 response. The COVID-19 Testing Technical Advisory Group ensures that tests being used in Aotearoa New Zealand support effective disease surveillance and case identification, The Committee also advises on the science and evidence of new and emerging technologies.

The following table summarises the variety of tests and the settings in which they are useful to New Zealand's strategy.

# Testing for COVID-19 Summary Table

Indication	Method	Primary intended use	Sample type(s)	Turnaround	Aotearoa New Zealand context
Current infection	RT-PCR	'Gold standard' diagnostic tool for confirming SARS-CoV-2 infection	Nasopharyngeal swab	1-2 days	Highly sensitive and specific and is used to confirm SARS-CoV-2 infection Used as both a screening and diagnostic tool Confirms any suspected case if another sample type was initially collected and is positive
		Screening for SARS-CoV-2 infection including where nasopharyngeal swabbing is not tolerated or is contraindicated	Nasopharyngeal swab, saliva, or combined nasal/throat	1-2 days	Screening border personnel and incoming travellers High frequency testing environments and high-risk individuals Nasopharyngeal swab used to confirm a positive sample
	Antigen	Rapid diagnostic test. Doesn't reliably rule out cases	Nasopharyngeal swab, saliva, blood/finger prick	Mixed but can be rapid – less than 1 hour	Only currently permitted for pre-departure testing for people travelling to NZ Other proposed uses: <ul style="list-style-type: none"> <li>Rapid testing in potential outbreak scenarios to test many people quickly</li> <li>Testing returning travellers as a way to rapidly test and triage</li> </ul>
Past infection or immunity	Antibody (serology)	Confirm recent or past infection	Blood	1–2 days	Determining historical cases that may have had a positive RT-PCR test result but is not symptomatic
		Seroprevalence	Blood	1–2 days	Limited practical use in New Zealand with no circulating community transmission. Could be an option in the future to monitor disease burden
		Immunity from infection or vaccination	Blood	1–2 days	Screen incoming travellers for proof of vaccination or confirm a person's immune state (when level of immunity has been well-established)
Public health surveillance	Genomic sequencing	Identify mutations and aid epidemiological investigations	Genetic material from positive samples	1-3 days	Performed on every positive case in New Zealand. Not every positive case is able to be sequenced due to lack of viable genetic material or other sampling/testing issues
	RT-PCR	Community disease surveillance	Environmental sampling (treatment plants, sewage)	1–3 days	Detection tool that complements other surveillance and testing strategies being implemented



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