A Rapid Review of COVID-19 Testing in Aotearoa New Zealand

COVID-19 Testing Technical Advisory Group

4 October 2021

Executive Summary

Diagnostic testing plays a critical role in Aotearoa New Zealand's COVID-19 response. High quality, timely and coordinated testing is required across the country to rapidly identify cases, to support surveillance activities, and to provide data for evidence-based decision making.

The performance of the laboratory sector during the COVID-19 pandemic has been very good overall. Largely driven by an elimination strategy that requires use of the most sensitive tests, there has been a relative slowness to introduce saliva testing and to prepare for rapid antigen testing. With anticipated progression from the elimination phase and the implementation of a reconnection plan, there is a pressing need to ensure that COVID-19 testing is adaptable and fit for purpose.

Common themes from the review included the need for better future planning; reduction in silos; a scenario-based testing strategy to help laboratories with planning; a clearer process for accreditation and adoption of new tests; and the urgent need for connection with innovators in the community in order to co-design and implement the testing strategy.

Key recommendations from the rapid review include a clearly articulated and communicated future-focussed COVID-19 testing strategy to assist planning; strengthening the leadership in the testing space within the Ministry of Health; and the creation of a dedicated testing approach to facilitate innovation and the implementation of new tests and testing strategies in a timely fashion.

Commendation

The review panel acknowledges the massive and vital contribution of laboratories to Aotearoa New Zealand's successful response to the COVID-19 pandemic, while often working under great pressure. Testing underpins all other response activities. Laboratory staff and frontline healthcare workers collecting samples are often the hidden heroes and, together with the large group of people who have supported testing activities (including staff from government agencies such as the Ministry of Health, Ministry of Business, Innovation and Employment, District Health Boards, Public Health Organisations, and others), their performance during the pandemic has been exceptional.

Reviews by nature focus on areas of improvement, and this report is no different. This should not detract from the sterling performance of laboratory staff and others working on COVID-19 testing during the pandemic.

Recommendations

1. To complement the existing surveillance strategy and testing plans, the Ministry of Health should develop a clearly-articulated future-focussed COVID-19 testing strategy that is based on scenarios for the purposes of laboratory planning. There is a pressing need for the strategy for the next phase of the pandemic response. This strategy should put equity at the centre of the decision making and be clearly communicated in a timely fashion to laboratories with identified trigger points for changes in strategy. The testing strategy must develop sustainable solutions to engage effectively with Māori, Pasifika and other vulnerable communities who are at risk of poorer outcomes or increased community transmission due to COVID-19.
2. Strengthen the leadership capacity and capability for testing within the Ministry of Health with a view to further position the Ministry as leading the current and future direction of the testing strategy. This strengthening is in addition to existing roles and should provide a link between operational and strategic activities, rationalise policies and procedures for seeking advice on testing, help break down the silos that have developed within the testing space, and strengthen external engagement. This could be a new appointment with a strong leadership background in laboratory operations, diagnostic testing and testing strategy, and be inextricably linked with surveillance activities of the Ministry of Health. Noting that testing and supplies are grouped within the same Ministry of Health work stream, this strengthening of capacity is for testing alone.
3. The Ministry of Health should facilitate the urgent establishment of an approach dedicated to test delivery innovation, which is separate from day-to-day Ministry of Health testing activities, but leads the co-design and implementation of fit for purpose innovative testing strategies. This approach would enable partnership with Māori, Pasifika, disability, rural, business, and other community groups to support and facilitate innovative ideas. While the exact nature of this approach would need to be determined, it should be developed with the principles of Te Tiriti and partnership.
4. Consolidate, rationalise, and resource the policies and procedures for seeking advice by the Ministry of Health on testing. This could be a task of the strengthened leadership on testing (recommendation 2).
5. The Ministry of Health should model test volume requirements across scenario-based assessments of the COVID-19 response planning. They should also urgently assess the current state of laboratories capacity in Aotearoa New Zealand (including research and commercial laboratories) who are or have the potential to be involved in COVID-19 testing and compare with modelled test volume requirements. This is with view to ensuring that laboratory services are fit for purpose for each testing context, including investment where needed. This assessment should be by region and include workforce capacity, facilities, technology, logistics, and couriers, and assessment of resilience in services to maintain essential business as usual services as well as COVID-19 testing.
6. In order to help address the current and known future shortage of the laboratory workforce, efforts need to be directed towards retention and recruitment factors for hard to recruit regions, including remuneration, and facilitating the recruitment of staff from overseas and the promotion of medical laboratory science as a profession.
7. The Ministry of Health needs to more clearly articulate the way in which tests are determined to be regulated and/or funded as part of the public health response, particularly for COVID-19. Findings of in-country evaluations of new tests should be shared widely across the laboratory sector to prevent unnecessary duplication.

8. The Ministry of Health should actively encourage and facilitate pilot new testing delivery approaches and ensure any approach is thoroughly evaluated post-implementation.
9. The Ministry of Health should develop a system for the comprehensive and ongoing assessment of new tests on the market. This requires dedicated resource, including time allocation, with skills in diagnostic test evaluation and cost benefit analysis. There may be possibilities for outsourcing this function. This system should also manage requests by companies to implement their COVID-19 testing products and services as a single point of contact.
10. The Ministry of Health should further develop its system of horizon scanning for novel testing approaches and development from other countries, and communicate findings with laboratories and other stakeholders. This likely requires more dedicated resource, including time allocation, and ongoing active searching and assessment.
11. The Ministry of Health should outsource ongoing review into the causes of success and failure of testing in other countries, with special consideration to what Aotearoa New Zealand defines as success and what it defines as failure in the different scenarios outlined in the testing strategy.
12. As part of the previously mentioned testing strategy, the Ministry of Health should establish a more strategic approach to COVID-19 testing community engagement and communication. This may include, but not limited to, the development of a toolkit to explain to the public, business communities and to healthcare providers the overall testing strategy as well as the science, performance of different tests, why and when they are likely to be most beneficial. The toolkit needs to be developed by the Ministry of Health in partnership with community and medical laboratories and business leaders, and needs to include a marketing team to help engage different communities who are not effectively reached through traditional health messaging frameworks, and those who do not have English as a first language. Further efforts are needed to reduce unintended consequences from communication of positive COVID-19 results through release of potentially identifiable information about individual cases.
13. The Ministry of Health should continue rapid implementation and expansion of shared technology solutions for e-swab orders, apps and database solutions to support sample collection, testing and reporting processes (patient, referrer, and national level) for all testing contexts (self-testing in the community, business, borders, and health care sites both mobile and fixed as well as laboratories). Solutions need to be robust and adaptable to support any testing regime made available through each phase of the national pandemic response, and provide real-time aggregate data to support public health strategy that is visible across the country. In the exploration of further technological solutions, the Ministry needs to provide leadership on the expected data management requirements of such solutions.

Introduction

Diagnostic testing plays a critical role in Aotearoa New Zealand's COVID-19 response, and will remain so for the foreseeable future. High quality, timely and coordinated diagnostic testing is required across the country to rapidly identify cases, to support surveillance activities, infection prevention and control and Public Health management, and to provide data for evidence-based decision making.

COVID-19 PCR tests were established rapidly in several laboratories within the first few weeks of the pandemic, and diagnostic capacity was successfully ramped up in anticipation of a substantial demand for testing, which was realised. This occurred in the context of a global demand for testing that created a critical shortage of laboratory equipment, reagents, consumables, and swabs. In addition, the rapid establishment of near real-time whole genome sequencing to aid contact tracing has been championed as a major success of the national pandemic response.

As the COVID-19 pandemic has progressed, a range of testing technologies and approaches for detection of the SARS-CoV-2 virus have become available internationally. These include the use of new sample types (e.g., saliva to increase acceptability and reduce risk to healthcare workers), the innovative use of existing supplies and technology (e.g., sample pooling), and the development of rapid tests (both molecular and antigen detection).

Serological testing is also now readily available and largely used to investigate potentially historic cases of COVID-19. A role for serology in determining immune status has yet to be established, either internationally or in Aotearoa New Zealand. However, as a greater proportion of New Zealanders gain immunity through vaccination or infection, the demand for serological and cellular immune correlates of protection is likely to grow.

The interest in COVID-19 diagnostic testing by the public, politicians and scientists has been unequalled. There is a pressing need to maintain public and referrer trust and confidence in diagnostic testing. In addition, it is necessary to keep abreast of international developments in COVID-19 diagnostics.

COVID-19 is disproportionately affecting members of society in Aotearoa New Zealand who are already burdened by health inequities and those who are under-vaccinated. Traditional testing strategies may not work for these groups and innovative strategies will be needed. Considerable pressure has mounted from business and many other sectors for the adoption of new testing technologies, approaches, and innovations to help manage the pandemic. New (sometimes unvalidated) tests have been heavily promoted, often without a full understanding of the clinical utility.

An effective testing strategy must engage effectively with all communities to ensure the right people receive an appropriate test at the right time. Throughout the COVID-19 response businesses and communities have been keen to contribute and innovate and these partnerships will continue to be important.

Aotearoa New Zealand will continue to need an agile and robust COVID-19 testing strategy for diagnosis and surveillance to support plans to reconnect the country.

Scope of the Rapid Review

On 20 September 2021, a rapid review was commissioned by the Ministry of Health to ensure the ongoing and efficient delivery of high-quality, equitable, scalable, and adaptable COVID-19 diagnostic testing to support the objectives of New Zealand's pandemic response and reconnection plan.

To this end the scope of this review is:

1. To evaluate the
    a. Coordination of COVID-19 testing activities and work streams.
    b. Processes by which COVID-19 tests and testing innovations are assessed and adopted.
2. To identify opportunities to ensure ongoing sustainable and fit for purpose COVID-19 testing within New Zealand, including testing modalities not currently in use.
3. To make recommendations on the above.

Methodology

During 24-28 September, interviews were conducted by COVID-19 TAG members with a wide range of stakeholders, including Ministry of Health staff, representatives from public and private laboratories, Māori health providers, rural general practice, public health units, the Institute for Environmental Science and Research, business, clinical microbiologists, hospital clinicians, and data and information technology specialists.

Given the very short time frame of the review, it was impossible to have more extensive consultation. However, efforts were made to interview a representative range of stakeholders broadly involved in COVID-19 testing.

Interviews were semi-structured and conducted either in person and/or by Zoom. The panel Chair attended all interviews, with most other COVID-19 TAG members attending when they were able. A small number of interviews were conducted solely by the chair, usually when specific information was sought. Ministry of Health, ex-officio members of the TAG were not present unless being interviewed, in order to maintain the independence of the review. The COVID-19 Science and Technical Advisory provided a minute-taking function for the review. Interviewees were also invited to provide written submissions if they wished, either before or after the interview.

In total, 23 interviews were conducted involving about 70 people.

Current COVID-19 Testing System

The Ministry of Health's (MoH's) Testing and Supply Group, led by the Testing and Supply Group Manager, operates within the COVID-19 Health Response Directorate, led by the Deputy Chief Executive. Its work stream has a key central operational role in coordination of the national COVID-19 testing programme. A major initial focus at the start of the pandemic was the maintenance of critical laboratory supplies at a time of increased global demand, and the operational emphasis of this work stream has developed from this focus.

The Testing and Supply work stream interacts with and seeks advice as needed from a variety of sources, including internally from the Science and Insights Group and through Managers and Principal Advisors in Testing and Supply, and externally through the New Zealand Microbiology Network (NZMN), Clinical Oversight Group, the Saliva Testing Clinical Governance Group, the Institute for Environmental Science and Research (ESR), and other medical laboratory networks. The current policies and procedures for seeking advice are largely unstructured.

A clinical microbiologist was employed part-time by the MoH from March 2020 to August 2021 to support the testing programme, although the role was not well-defined. This role was largely a technical advisory role with no direct connection with the COVID-19 Technical Advisory Group (this is different from the COVID-19 Testing Technical Advisory Group, which has only recently been formed) or input into strategy.

There is currently no leadership role in the MoH that is across all testing activities, including testing strategy, test evaluation and adoption, information technology and reporting, and logistics.

The laboratory groups and networks associated with COVID-19 testing include:

- National Laboratory Network Group
- COVID Testing IT Governance
- Covid-19 Labs IT Project
- Paperless COVID
- New Zealand Microbiology Network
- National Saliva Testing Technical Advisory Group
- External public health experts on border settings
- COVID-19 Technical Advisory Group
- New Zealand Point of Care Technical Advisory Group

This list may not be exhaustive. These groups were either largely established in haste or co-opted with minimum scope early in the pandemic, and have a mixture of operational, governance and information sharing roles. The groups are typically large in size and endeavour to obtain wide representation across the diagnostic laboratory sector. Some groups have been established in response to a very specific issue, e.g., Saliva Testing Technical Advisory Group.

The NZMN has been heavily relied upon by the Ministry of Health for expert advice during the pandemic. This network of clinical microbiologists from across the country have been outstanding in their support for the national response. NZMN has willingly responded to calls for assistance on all aspects of COVID-19 testing and have taken on many informal roles.

ESR also provided support to the COVID-19 testing programme through the development of a quality assurance programme for COVID-19 PCR for use across the laboratory sector, and through performance of evaluation studies on new testing approaches. ESR also played a critical role in

providing the whole genome sequencing service to support national contact tracing activities, and with wastewater testing.

There was universal commendation for the collegiality developed among medical laboratories brought about by the pandemic. District Health Board and community laboratory representatives repeatedly commented on the willingness to help one another and share resources and information. The efforts to secure supplies by the MoH were greatly appreciated during the early stages of the pandemic when laboratories were ramping up capacity and supplies were in great demand globally. Public health units have felt well-supported by laboratories throughout the pandemic.

There was a general view from the current MoH team that things were going well, albeit with stretched resources. The pandemic has been characterised by the need to rapidly respond to new surges. The frequency of these changes has meant there is relatively little dedicated time to focus on future planning.

Diagnostic laboratories are concerned about their ability to effectively plan for the coming months without a clearly articulated testing strategy, particularly if the current community transmission continues in Auckland. As a result, planning is underway across many regions, with duplication of effort and a lack of consistency, and without clear direction around what volumes of testing will be required to support Public Health efforts and hospital capacity. Laboratories foresee that potentially large increases in capacity are needed for a sustainable response, as has been highlighted separately to the MoH and by the NZMN. Laboratory infrastructure, space, equipment, information technology and workforce investments are needed and will take time to develop.

Diagnostic laboratory staff and those involved with surveillance activities also highlighted the need to maintain testing capability for viruses other than SARS-CoV-2, such as influenza, which are likely to re-emerge with the eventual relaxation of border restrictions.

Assessment and Adoption of New Tests and Testing Innovation

The elimination strategy adopted by Aotearoa New Zealand has been characterised by zero tolerance of community transmission of COVID-19. This has required the deployment of tests with the highest available sensitivity in order to maximise the detection of cases. For this reason, nucleic acid detection methods (e.g., PCR) have been the diagnostic method of choice and have been widely deployed throughout the country, including in laboratories that had no previous molecular diagnostic capability. Nasopharyngeal swabs were already in use for respiratory virus PCR testing pre-pandemic, fit well into established high throughput laboratory testing systems and have been the preferred sample type both due to increased sensitivity and the ability to detect multiple viruses in New Zealand and in many other countries.

As the COVID-19 pandemic has progressed, a range of testing technologies and approaches for detection of SARS-CoV-2 have become available internationally. These include the use of new sample types (e.g., saliva or anterior nasal swabs to increase acceptability and provide an alternative sample type due to lack of nasopharyngeal swab supplies), the innovative use of limited supplies and maximising use of existing technology (e.g., sample pooling, as explained in detail below), and the development of rapid tests (both molecular and antigen detection).

As the testing strategy responds to Reconnecting Aotearoa New Zealand and increasing rates of vaccination, the detection of SARS-CoV-2 will need to be supported by diagnostic serological and cellular immune assays to help assess immune protection, past infection, and guide therapeutic decisions. Testing strategies will also need to respond to changing case/contact management

requirements and the likelihood that zero tolerance of COVID-19 may persist longer in some settings (e.g., hospitals and aged residential care facilities).

Wastewater testing is being used as a surveillance tool to help monitor for COVID-19 in Aotearoa New Zealand. Samples of wastewater are collected from sites around the country and may be able to give an early warning of COVID-19 cases in the community. Detailed assessment of wastewater testing was out of scope for this review, but is an activity that should be the focus of independent review.

Sample pooling

Pooling samples involves mixing several samples together into a single pooled sample, then testing the pooled sample with a diagnostic test (in this case for COVID-19). This approach increases the number of individuals that can be tested using the same amount of resources. If the pooled sample tests positive, the original samples in the pool are tested individually to find out which ones are positive. If the pooled sample tests negative, no further testing is required. This method of pooling samples works well when there is a low prevalence of cases, meaning more negative results are expected than positive results.

The pooling of multiple nasopharyngeal samples was adopted relatively early in the pandemic and is now an established and well-validated method of optimising use of supplies and increasing testing capacity with PCR. Multiple laboratories in Aotearoa New Zealand now have pooling capability. However, manual pooling methods are not sustainable and investment in automation is needed in order to maintain this capability. This methodology is only useful in low prevalence settings and the ability to stream samples into low and high prevalence probability is needed in order to preserve pooling as a means of improving test volume capacity.

Saliva testing (as a sample type for PCR)

Saliva collection is generally regarded as causing less discomfort than a nasopharyngeal swab. Consequently, it is an attractive alternative sample type that can be used to increase acceptability, particularly when frequent testing is required. The testing of saliva for SARS-CoV-2 has been the focus of considerable research from early in the pandemic. There is now a substantial body of evidence supporting PCR testing of saliva, with diagnostic accuracy close to nasopharyngeal samples when appropriate protocols are used, although it can be more challenging to process in the laboratory.

Aotearoa New Zealand has been slow in preparing for and adopting saliva testing, largely because of concerns about reduced sensitivity of this modality and, consequently, about maintaining the elimination strategy. Saliva is now widely accepted as an alternative sample type for PCR. Additionally, the delta variant of SARS-CoV-2 is associated with greater amounts of virus in the upper airway, making it easier to detect in saliva.

Saliva testing lends itself particularly well to surveillance testing, because of the need for frequent sampling. The advent of the delta variant of SARS-CoV-2 has meant that surveillance strategies require more frequent testing, preferably at least twice weekly, or even daily in high-risk environments.

In Aotearoa New Zealand, considerable pressure has come from business, the media, commercial diagnostics providers, and other sources keen to adopt saliva testing as part of the national COVID-19 response.

There is also now a common misperception that saliva tests are “rapid tests” (i.e. providing a result within 30 minutes) rather than simply another sample type for PCR. Indeed, this sort of misperception about COVID-19 testing is also relatively common among non-laboratory health professionals.

Rapid antigen tests (RATs)

RATs, which usually test anterior nasal swab samples (that can be self-collected, or collected by a healthcare worker), are able to provide a much quicker turnaround time for individual tests (<1 hour) than most PCR-based tests (typically 1-2 days) and some have the potential to be deployed as point-of-care or self-tests without the need of a laboratory. While these are highly desirable characteristics, the main disadvantage of RATs is reduced sensitivity when compared with PCR testing.

RATs typically have sensitivities that are significantly lower than PCR tests, depending on the stage of illness, the viral load of the individual case and the experience of the operator, but potentially as low as 40%. Sensitivities have been reported to be as high as 90% for some RATs, although this is likely to be in selected populations with high viral load. This means that their use requires acceptance that a proportion of true COVID-19 cases will be missed, which may be regarded as inadequate for an elimination strategy. Additionally, even though RATs have good specificity, use in a low prevalence population will still result in false positive tests, often more false positives than true positives, meaning confirmation by PCR is required.

RATs have been widely deployed in other countries in a variety of settings in order to mitigate the impact of COVID-19 on the health system. Typically, RATs have been used in high prevalence settings when a positive result is likely to be a true infection, and in low prevalence settings in order to identify those who are highly infectious.

It is almost inevitable that RATs will have a role in the reconnection strategy for Aotearoa New Zealand and it is critical that the country is prepared for this. We understand that some pilot projects to evaluate operationalisation of RATs have just started and would encourage further piloting to understand how these might best work in our context. Other work is needed on the requirements for clinical oversight, reporting and monitoring of RATs, as well as regulatory systems and processes.

Rapid molecular tests

Rapid PCR and PCR-related tests have been developed with some point of care tests capable of turnaround times <1 hour for individual samples. The majority of these tests are still performed in a laboratory and are not a high-throughput solution, as tests can only be run one at a time. It is anticipated that technology will improve greatly in this area, with the realistic hope that rapid molecular tests will soon be available with turnaround times similar to RATs and the ability to be deployed at point of care, while retaining the high sensitivity of standard PCR tests.

Accreditation of new tests

There are different regulatory and accreditation requirements that the COVID-19 testing technology must meet in order to classify as ready for deployment:

1. Must be accredited by the International Accreditation New Zealand (IANZ)
2. Point of Care Committee (for point of care tests) must be consulted, and the test must be approved under the COVID-19 Public Health Response Act 2020 by the Director-General of Health
3. Patient Management Systems need to be implemented for result reporting and integration into the laboratory/health network

Given the central role of tests with high sensitivity in the country's elimination strategy and the potential swamping of unregulated devices into the national market, the MoH placed additional controls on the deployment of diagnostics. This involved both restrictions on importation and on

accreditation with International Accreditation New Zealand (IANZ). The current approach for regulation and funding of tests would benefit from being more clearly articulated.

New commercial test products

There has been a steady increase in the number of new commercial entities offering COVID-19 tests since early in the pandemic. A sizeable proportion of these tests have been poorly evaluated by the manufacturers or internationally and many have been heavily promoted to health professionals, government agencies, politicians, business, and others. There is no clear system for managing requests to implement these services.

Testing innovation

There is a pressing need to keep abreast of both new developments in testing methods and innovative ways of using tests in order to support the pandemic response. While details of the strategy beyond the elimination phase are unclear, it is essential to plan for future potential scenarios.

While ESR played a role in horizon scanning new commercial diagnostics and the NZMN members frequently scan the literature for new tests or new approaches to testing, there is no systematic assessment of new diagnostic products within the MoH.

In addition to keeping abreast of new testing products, it is essential to learn about innovative approaches to use of tests, which other countries are using or abandoning. While we understand that there is systematic horizon scanning for different approaches to testing within the MoH and other agencies, more engagement and communication of such approaches with the laboratory sector is needed.

The panel heard accounts of the willingness of businesses to be involved in and, potentially, fund the evaluation of innovative use of COVID-19 tests for staff surveillance and to assist in the reconnection of Aotearoa New Zealand. There is considerable frustration in many parts of the wider community about the slowness to approve saliva as a sample type for PCR testing and introduction of RATs, especially given the more widespread use of these approaches overseas where community transmission of SARS-CoV-2 is prevalent. Indeed, there is risk that failure to adequately educate and engage on use of tests and sample types in different contexts with these communities will result in independent efforts to deploy COVID-19 tests outside the national COVID-19 pandemic response. This is independent of pressures from commercial manufacturers and providers promoting their products, which is also occurring.

Children are a vulnerable group who have faced considerable harm and disruption to their education and wellbeing throughout this pandemic. Testing requirements and tolerance are likely to be different for different age groups. Innovative testing approaches may be needed in our school and tertiary environments to ensure young people have equitable outcomes.

Community teams trying to engage with hard-to-reach communities to improve testing and vaccination uptake, and to enable contact tracing, are finding mainstream healthcare approaches not adaptive and would welcome partnerships with them to improve testing strategies for these crucially important populations.

Opportunities

The need for strengthened leadership in the testing space

We believe that there is need to strengthen the leadership capacity and capability for testing within the MoH to ensure the ongoing and efficient delivery of high-quality and adaptable COVID-19 diagnostic testing. This strengthening would provide a critical link between operational and strategic activities, rationalise policies and procedures for seeking advice on testing, help break down the silos that have developed within the testing space, and strengthen external engagement.

The need for future planning

A common theme expressed by MoH staff was the heavy workload and the inability to focus on future planning. Shortage of dedicated time and a lack of details about future stages in the pandemic response were stated as reasons for this inability to forward plan and research tests and their application in sufficient detail.

A consistent message from diagnostic laboratory staff from around the country was the difficulty in future planning of resources due to a lack of information about next steps in the pandemic response. In addition, enormous pressures were placed on a limited workforce during surge testing and there is concern about how they might cope if this volume of work was not accompanied by lockdowns that restrict business as usual testing volumes. Hospitals, both large and small, are likely to need considerable support from laboratories with testing for SARS-CoV-2 for the purpose of staff surveillance and to maintain safe patient care, which may curtail ability to perform community surveillance without sufficient planning and investment.

Currently all medical laboratories have large peaks and troughs in COVID-19 test volumes. Base levels of staffing, supplies, technology, and test volumes is required for all laboratories to remain in this state of readiness to deliver sustained and maintain staff wellbeing.

All medical laboratories reported they can continue to scale and build capacity as needed, with advanced modelling and information from the MoH. All the laboratories need certainty to support investment and reassurance about cost recovery for the investments. Alternatively, a different funding model could provide more certainty that would enable readiness to ensure equitable testing service access in all regions.

Consolidation and rationalisation of laboratory networks, working groups and sources of advice

The panel thought it was timely to review the roles and responsibilities of the various laboratory networks, working groups and sources of advice with view to ensuring the most efficient structures.

The panel were concerned about the continued reliance on the NZMN's good will at the expense of the building of more robust, structured, and resourced systems. The NZMN is a good vehicle for information sharing, brainstorming, tapping specific expertise and the writing of consensus statements but agility and innovation would be better served by smaller, structured, resourced and more diverse expert panels.

Introduction of innovation into the testing strategy

The testing strategy to date has been reactive and conservative, the latter largely due to the focus on an elimination strategy that requires tests with highest sensitivity. Introduction of saliva testing and preparation for use of RATs has been slower than other countries. As we move through the next

phases of the pandemic response for reconnecting Aotearoa New Zealand, there is urgent need for greater investment planning, innovation and flexibility in testing methods and testing approaches.

There are opportunities to learn from the experiences of other countries and to get ideas from a wide variety of community groups in order to develop fit for purpose and adaptable testing strategies as we move towards reintroduction of Aotearoa New Zealand. This includes Māori, Pasifika, rural and business communities. For example, a "flipped model" being used in the Auckland region focuses on the immediate needs of an individual or whānau to build relationships and trust as a pathway to testing access in the community. Many initiatives have already emerged from the local and business communities, alongside the motivation to contribute to the national effort.

Clearer processes

The process for accreditation and approval of new tests needs greater clarity with leverage off proven approaches for all accredited medical laboratories. The development or clarification of a standardised process and criteria would greatly simplify the process.

Improved communication

A common theme from discussions with people involved in all aspects of the COVID-19 testing programme was the need for better communication of the testing strategy and about changes in testing strategy.

Some communication to the public has the potential to drive unintended actions. This includes provision of potentially identifiable information about an individual, which results in stigma within their community, or broad statements that result in an overreaction of the worried well, which misdirects testing resources. Groups are keen to support messaging in different contexts to support the right testing, in the right place, for the right cohorts of our population.

Education

Despite considerable media attention on all aspects of COVID-19, including diagnostic tests, there is a pressing need to clarify some misperceptions around tests among both the general public and health professionals.

Topics not Covered by the Rapid Review

Topics not covered by the rapid review included:

- Domestic research on COVID-19 diagnostics, such as research funded by the Ministry of Business, Innovation and Employment or the Health Research Council.
- The quality of current COVID-19 testing or formal assessment of the national performance of COVID-19 testing.
- Detailed recommendations about the use of specific tests.
- Advice on specific commercial diagnostic products.

Appendix 1 - COVID-19 Testing Technical Advisory Group Members

- Prof David Murdoch (Chair) – Dean and Head of Campus, University of Otago, Christchurch
- Kirsten Beynon – Medical Laboratory Scientist (Virology), General Manager, Canterbury Health Laboratories, Canterbury District Health Board and West Coast District Health Board Laboratory
- Dr Tim Blackmore – Infectious Diseases Physician and Clinical Microbiologist, Wellington Southern Community Laboratories, and Capital and Coast District Health Board
- Dr Maia Brewerton – Clinical Immunologist, Allergist and Immunopathologist, Auckland District Health Board
- Pisila Fanolua – Charge Nurse Manager, Managed Isolation Quarantine Facilities
- Dr Susan Morpeth – Clinical Microbiologist and Infectious Diseases Physician, Counties Manukau District Health Board; Chair of the New Zealand Microbiology Network (NZMN)
- Prof Patricia Priest – Epidemiologist, Dunedin School of Medicine, University of Otago
- Dr Ian Town – Chief Science Advisor, Ministry of Health (was not involved with the rapid review to ensure independence and no conflicts of interest)