

# Mid-Term National Testing Strategy: COVID-19 Testing

JUNE 2020

## Executive summary

New Zealand has a goal of elimination of COVID-19. Since a low prevalence of COVID-19 has already been achieved, this means that the focus of surveillance in the medium term will be to target risk mitigation at the border, and to support extremely robust investigation around any case identified within Aotearoa New Zealand. This strategy must be effective and equitable for Māori as Te Tiriti o Waitangi partners. If prevalence is higher and or maintenance of elimination is not the goal, a different testing strategy will be needed. There are five surveillance components that must interact in a flexible way with feedback loops to precipitate timely action at local and national level. These components both individually and together act as triggers for more intensive investigation in response to outbreaks of disease, or where there is identified to be high risk of un surveilled disease. The five components are:

1. The national notifiable disease surveillance system, in which people presenting under the case definition for COVID-19 are tested by local health services. A key issue for this stream is that Māori, Pacific peoples and people with disabilities experience a range of access issues in primary health care settings. An equitable approach must consider alternative methods of testing beyond fixed primary health care facilities. This is complemented by hospital based Severe Acute Respiratory Infection (SARI) surveillance. This involves virological investigation of all hospitalised severe respiratory cases, whether there is a priori suspicion of COVID-19 or not. Unplanned hospital presentations of respiratory infection may indicate gaps in primary care detection.
2. Case definitions and cluster management guidance. In response to a positive PCR test contact tracing is precipitated both forwards and backwards from the exposure date, to identify the source and limit forward spread. Close contacts are tested, and contacts with negative tests results who develop symptoms are retested. Testing of casual contacts depends upon the local context and may be considered particularly where no source has been identified or the situation is high risk.
3. Syndromic surveillance<sup>1</sup> of respiratory symptoms presenting in primary care and in the community provides information that could indicate early warning of disease presence, particularly as the clinical testing criteria for COVID-19 tighten<sup>2</sup>. Changes in syndromic surveillance can trigger escalation for each of the testing components, complementing local outbreak surveillance undertaken by Public Health Units. Action based upon syndromic surveillance information must be considered in light of careful interpretation of testing information. Syndromic surveillance mechanisms include FluTracker, Healthstat, and GP Sentinel Surveillance. Additional measures including electronic notification from general practice of mild respiratory illness, and text mining of GP clinical notes are under consideration.
4. Border testing supports the containment of infection at the border. This element is focussed on those crossing the border, and on those who are in contact with people who cross the border. The current policy setting is that people entering New Zealand are quarantined for 14 days, although exemptions are

<sup>1</sup> Syndromic surveillance means using health data to detect the potential presence of a disease without a diagnosis.

<sup>2</sup> Please note that the suspect case definition is under review as we have now moved down alert levels, and in anticipation of an increase in respiratory illnesses as winter approaches.

granted in some circumstances. Whether exempted or not, PCR testing is suggested for people entering New Zealand. If a traveller is symptomatic on arrival, they will be tested. Enhanced passive surveillance is required for people in regular contact with international arrivals, including aircrew, customs and biosecurity staff, and port workers.

5. Supplementary data streams support the interpretation of test data, and decisions on the escalation of testing for high risk communities. These include monitoring of the international literature, and the use of serology tests at the population level once these become available. Other novel forms of testing for the presence of COVID-19 will be considered as evidence for their effectiveness emerges.

Operationalising the use of information from these components involves the weekly collation of data and interpretation by a surveillance panel, with participation from ESR and the Ministry of Health. Ministry input includes at least the Pacific Insights team, the Māori Health directorate, the Office of the Director of Public Health, COVID-19 Intelligence, and the Communicable Disease team. The intelligence generated by the panel will be considered by an operationally focussed Technical Working Group, that will liaise with DHBs, including Public Health Units.

## 1. Introduction and background

Laboratory testing across populations for specific infectious diseases needs to consider a series of factors, including characteristics of the laboratory test and prevalence of the disease in the population. If the prevalence is extremely low as is the case for COVID-19 in New Zealand, no design except a census with a perfectly sensitive and specific test would provide conclusive statistical evidence that disease is absent entirely from the population. This is clearly not a realistic strategy. Thus, in New Zealand (where all evidence points to limited numbers of cases that can be located by contact tracing from those with recent travel history or known cases) alternate approaches must be taken.

The testing data we have collected includes symptomatic testing across the population and asymptomatic testing in high risk groups<sup>3</sup>. Going forwards in Level 2 and Level 1, New Zealand requires a mid-term testing strategy that generates data in a timely way for analysis to inform rapid action at local and national level. The surveillance system must include multiple concurrent components that generate data at different levels of resolution across the population to allow us to detect early warning signs of emerging community spread. Two categories of testing are available; the detection of viral ribonucleic acid (RNA) by polymerase chain reaction (PCR) testing and the detection of antibodies by serology. While PCR testing is currently the most appropriate strategy in the short to midterm, serological surveillance will prove a useful tool in the medium to longer term.

The system relies on ongoing analysis of data from defined components, rapid and comprehensive outbreak investigation in the event of a case (including knowledge of operational performance locally and nationally) and a thorough understanding of circumstances at PHU/DHB level to be functional. These ongoing streams of information must be integrated with 'one off' findings from research and international experience and emerging evidence.

Before such a system can be stood up, the ongoing surveillance components must be identified and agreement must be reached on roles and responsibilities, timing and frequency of data receipt, how the data are interpreted and how the intelligence used to inform operations locally and nationally. A team must be identified that will receive the data feeds at the specified times, interpret and discuss the triggers and the actions triggered and report on these activities. Finally, but most essentially, those in the field who will

<sup>3</sup> High risk must be clearly defined. Risk = Likelihood x Consequence. Likelihood includes those with recent epidemiological characteristics for example travel history and those with clinical symptoms meeting the case definition. Consequence can be divided in severe health impacts to individuals or populations for a variety of reasons (lack of access to healthcare, pre-existing conditions) as well as spread consequences (flight crews) and consequences to society (medical frontline staff).

implement any activity changes must be aware of the plan, understand their role and be able to implement policies. Only then can data be fed back into the system for assessment and ongoing refinement of the surveillance system.

## First-term testing strategy – (mid-April – last week of May)

The current testing strategy includes two streams of testing. One to diagnose cases from those with clinical symptoms and the public health actions associated with those identified cases (component 1 and 2 below) and one to identify any asymptomatic cases in high risk groups unlinked to the known network of disease.

The data from the first week of the asymptomatic testing was analysed and assessed for coverage of higher risk population groups with a focus on equity. This included but was not limited to targeting testing of asymptomatic people at high-risk of exposure as has been documented on **COVID-19 testing in Alert Levels 3 and 2 to support New Zealand's elimination strategy (Ministry of Health, 2020)**. Weekly data from each DHB/PHU has helped to inform the plans for the week ahead to ensure that coverage of asymptomatic testing is equitable, and that adequate representation of all groups is achieved.

The finding of a positive test result triggers an immediate and thorough disease investigation (as in midterm strategy component 1, see 'Section 4. Surveillance components and triggers' below). Results need to be interpreted in the light of the knowledge regarding viral shedding and PCR testing limitations<sup>4</sup>. DHBs/PHUs have been reminded of the higher risk groups previously identified. Those DHBs/PHUs where plans require extra support or strengthening have been contacted and engaged in discussion on how to optimise their plans to ensure that asymptomatic populations are appropriately tested. Data has been analysed on a weekly basis and DHB/PHU specific guidance provided where needed. Analysis is only possible if the data can be associated to the relevant stream of surveillance. We will present a report on the extent of the testing completed in the current testing strategy and how it informs our decision making on ongoing surveillance design.

## Midterm testing strategy – (First week of June – last week of August)

If data from the first-term testing strategy indicate that elimination can be confirmed, New Zealand will require a midterm testing strategy to maintain confidence that there is no active infection in the population. If new clusters are identified and/or unexplained and unlinked cases continue to be identified by active surveillance, the strategy will have to be amended to include a longer period of risk-based surveillance.

We have identified a five-component system to implement our midterm testing strategy. This strategy makes use of adaptable components of New Zealand's existing health surveillance system. We plan to use data from these components in agile feedback loops to trigger altered public health action. Triggers for deploying more intensive measures nationally or locally are defined in the relevant sections below. In addition to three adaptable components, a fourth component focussed on the border is required if there are no active infection chains in the population. The fifth component is ongoing information gathering from New Zealand and overseas.

An essential building block of our strategy is the clinical presentation required to apply a COVID test (and if epidemiological criteria are to be included or not). The importance of this cannot be overstated as the sensitivity<sup>5</sup> of the whole surveillance system is controlled by these presenting clinical cases. That said, our strategy of agile feedback loops and reactive data gathering makes use of the ability to apply COVID-19 tests to patients with clinical symptoms that do not fall within the prescribed national clinical criteria for testing and

<sup>4</sup> Both false negative and false positive test results are possible. A positive test does not immediately imply that disease transmission is currently present but finding no positives implies that transmission is unlikely in groups that have been tested, acknowledging however that false negative results are possible.

<sup>5</sup> The ability of the system to detect SARS-COV2 should it be present.

to test those without clinical symptoms. While all testing is considered part of surveillance, this system requires extremely clear communications to be maintained to all stakeholders and for the message about the reason for testing (diagnostic purposes vs active surveillance only) to be clearly passed on. In addition, the data attached to the test result related to the reason for applying the test is essential information to make analysis meaningful.

A keystone of the midterm surveillance system is a COVID-19 technical working group (TWG) that will offer support and direction to the DHBs/PHUs on working through scenarios as they arise. This group will provide ongoing guidance on the principles of surveillance for infectious disease in a situation where elimination is the objective. This COVID-19 surveillance TWG will include representatives from Māori Health Directorate, the Pacific Insights team, ESR, COVID-19 Public Health Intelligence, Communicable Disease and the Office of the Director of Public Health and provide operational advice and support on a day to day basis. This TWG will maintain a close link with the Epidemiological Sub-group of the Technical Advisory Group.

## 2. Objectives of testing

### 2.1 Strategic context

The Government's overall public health strategy in respect of the COVID-19 pandemic affecting New Zealand is **elimination**. That is, to apply a range of control measures in order to stop the transmission of COVID-19 in Aotearoa New Zealand. Elimination does not mean eradicating the virus permanently from New Zealand; rather it is being confident we have eliminated chains of transmission in our community for at least 28 days and can effectively contain any future imported cases from overseas.

It is accepted that this approach will be needed in the long term i.e., for many months or longer, depending on the emerging epidemiology and evidence around the disease and its management and progress with developing safe and effective treatments and/or vaccines.

This strategy is a sustained approach to keep it out, find it and stamp it out. This document describes the testing elements (linked to wider surveillance activities) that underpin this strategy.

### 2.2 Overall principles and purpose

The purpose and objectives of deploying testing are:

- Rapid identification of all cases of COVID-19 to assess and clinically care for them as well as stopping any ongoing transmission of infection by isolation, tracing and quarantining their contacts
- Identification and minimisation of any undetected community spread in New Zealand
- Monitoring for COVID-19 in people at higher risk of exposure to ensure that safety systems in place are working
- Ensure that the testing strategy is effective and equitable for Māori as Te Tiriti o Waitangi partners

Our principles and research questions have been documented in the overarching Surveillance Plan. These include:

- Understanding the disease
- Ensuring that all public health strategies are effective and equitable – for Māori and Pacific people and other priority groups, as well as across the country
- Understanding the health impacts of the disease and the response to the disease

These overarching surveillance questions provide the framework for the analysis of the specific datasets that support surveillance of COVID-19. The strategy for testing across the population of Aotearoa New Zealand is fundamental to the overall surveillance approach, since it defines the circumstances in which COVID-19

testing occurs and sets the background for the interpretation of the results of that testing for surveillance purposes.

## 3. Risks and Issues

The New Zealand Health system is comprised of multiple DHBs and PHUs with variation in capability and capacity to implement such a surveillance programme. To ensure that the Ministry can have oversight of a national surveillance strategy, a specific work programme of implementation, local support, quality assurance<sup>6</sup> and quality control<sup>7</sup> is required. This will require ongoing optimisation and fine tuning. Results of surveillance activities are interpreted locally by DHBs and PHUs (with support as required from the national level, and national aggregation of data) and nationally by the COVID-hub (ESR and Ministry of Health).

Once data are actively collected, they need to be analysed at the local level with input from DHBs and PHUs to both ensure changes are made to get optimal surveillance coverage at each location and interpreted at the national level so that the Ministry of Health can present a view of district-specific risk profiles to inform action. This collaborative working relationship will need to be nurtured and this is part of the role of the COVID-19 surveillance TWG.

Good quality data are essential to be able to answer the surveillance questions. Much work has gone into improving data quality to allow the identified priority questions to be addressed. As data reporting templates are further refined and expertise is built up around using the available solutions, reporting will be iteratively improved. This requires engagement, trust between partners, flexibility and focus on problem solving. It is a requirement that all testing data captures ethnicity as a core variable and output - at both a national and local level. This is a requirement across all asymptomatic, clinical presentations and syndromic surveillance. The reason for a test being performed is also essential metadata. Without this information, the surveillance system cannot function.

Testing capacity and supplies must be monitored with care and continuous liaison with laboratory colleagues will be essential.

An outbreak of another infectious disease could significantly affect the capacity of this system to operate effectively.

<sup>6</sup> Getting it right in the first place

<sup>7</sup> Checking that we've got it right & learning

## 4. Surveillance components and triggers

### 4.1 Surveillance system structure

With the strategic goal being ongoing elimination of transmission, then COVID-19 prevalence in the population will be expected to be extremely low. Testing must be targeted to early detection, mitigating risk at the border and very robust investigation around any case found. Figure 1 illustrates the concept.

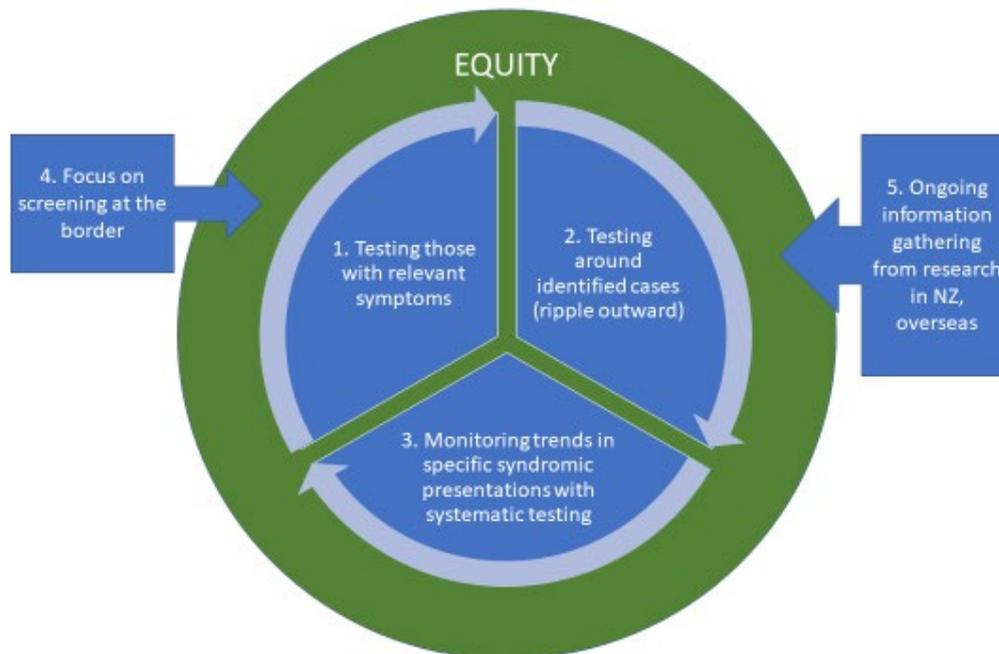


Figure 1: conceptual model of the elements of the surveillance system that precipitate testing.

There no automated way to mechanistically integrate all these data sources. This programme requires dedicated strategic oversight from a team of technical experts who understand both the New Zealand public health system and infectious disease control.

If component 1 and 2 had perfect sensitivity and the border was perfectly controlled, then no additional streams would be required. But since there is no reliable way to ensure that gaps do not exist, additional syndromic surveillance trends can be monitored, triggers identified where appropriate, and cues gathered from other sources to precipitate intensive responses either regionally or nationally.

The COVID-19 pandemic is evolving rapidly internationally. New test methods are being developed and new information being distributed by researchers all over the world on an ongoing basis. Our strategy has to be able to adjust to incorporate new information and tools as they become available.

### 4.2 Component 1: Testing those with relevant symptoms

Clinical consultations address testing for any person presenting with clinical symptoms associated with the specified COVID-19 case definition. Māori, Pacific peoples and people with disabilities experience a range of access issues in primary health care settings. An equitable approach must consider alternative methods of testing beyond fixed primary health care facilities which may include community hub and spoke approaches to testing. These models are at the discretion of the DHBs and PHUs and can be suggested as part of the actions based on analysis.

Primary Health Care (PHC) includes CBACs (currently available but phasing out) and GPs. These test result data are available from the Eclair solution<sup>8</sup>. These data are analysed on a rolling basis with weekly updates to decision makers. Secondary Health Care (SHC) includes hospitals and SARI surveillance. SARI is the application of virological identification methods to those hospitalised for severe acute respiratory illness. *Trigger:* analysis indicates that testing coverage is not equitable and that key demographics are underrepresented.

*Action:* Engagement between the surveillance TWG and DHBs/PHUs to address the coverage and/or imbalance. This could take the form of enhanced passive surveillance with more messaging locally or deployment of mobile testing stations to particular communities or stratified random sampling of underrepresented demographics. Testing models to address this may include community hub and spoke approaches to testing.

*Trigger:* case is identified.

*Action:* as for component 2

*Trigger:* analysis indicates that hospital admissions are not equitable and/or admissions are not tracking as expected and that key demographic groups are overrepresented in secondary care but underrepresented in the community.

*Action:* Engagement between the surveillance TWG and DHBs/PHUs to ascertain if the change in coverage and/or imbalance is expected or unexpected and if it could be due to data inconsistency. Over representation in secondary care is an indicator of lack of access to primary care and should result in discussion of how to improve primary care coverage in the population group.

In addition to the triggers identified in component 1, serosurveillance could be used to answer questions related to populations with insufficient coverage of testing and levels of infection that could have been present in these subgroups in the past. These populations could be defined geographically or by ethnicity, but the purpose and expected follow up actions from the cross-sectional surveys should be well defined prior to implementation.

## 4.3 Component 2: Testing around identified cases

The second component also builds on the national notifiable disease surveillance system<sup>9</sup>, case definition and case/cluster management guidance. New Zealand's notifiable disease system is well established with existing processes and procedures and includes the national surveillance database 'EpiSurv'.

### *Trigger*

Identification of a positive PCR test precipitates confirmation of positive test status<sup>10</sup> and if appropriate, declaration of a case. The declaration of a case precipitates immediate contact tracing to prevent onwards transmission, which includes monitoring and testing of contacts. Source ascertainment is also conducted if possible, in order to control any source of ongoing infection. As the investigation progresses, public health specialists will have recommendations about other community groups that may require testing.

### *Action*

<sup>8</sup> The Institute of Environmental Science and Research (ESR) and Sysmex New Zealand established a national clinical data repository (CDR) for all COVID-19 test reports from testing lab facilities across the country. real-time lab testing data is received and stored in ESR's Eclair CDR and can be easily extracted to provide a full and complete national view of COVID-19 testing. This, in turn, means quicker and easier access to testing volumes and the percentage of positive results versus number of tests undertaken on a daily or ad-hoc basis.

<sup>9</sup> sensitivity for disease detection is determined principally by access to health care and the COVID-19 case definition

<sup>10</sup> Including WGS for phylogenomics to aid tracing activity

Extensive forwards and backwards contact tracing<sup>11</sup> of both close and casual contacts continues as is currently the case. This means the contact tracing team work backwards from the date when the person was infected to see where it may have been caught from, and then forwards to see who may have exposed whilst that person was infectious. All close contacts, even where the source of infection is known (e.g. a case is part of a cluster at a rest home), should be tested and quarantined. Where the first test for a contact is negative but they subsequently develop symptoms while in quarantine, there will need to be a rapid review of their close contacts and testing of their contacts to reassess the risk posed by previously ruled out traces (feedback loop inside the DHB/PHU tracing/testing system).

At the local level, the threshold for re-testing those who develop symptoms following a negative test<sup>12</sup> should be very low (negative predictive value of a negative PCR test in a high-risk individual). In an environment where there are no active chains of transmission in the community and the strategic objective is to maintain that state, those at high risk because of their contact with known cases may require testing regardless of clinical symptoms as transmission from asymptomatic individuals cannot be ruled out.

Testing of casual contacts depends on the result of the investigation to identify the source of the infection. Casual contacts may be tested if no source can be identified or if the situation is high risk. In some cases, repeat testing at an appropriate interval will be required. Consultation on these details from the Ministry's Technical Advisory Groups is ongoing.

Additional screening at the DHB/PHU level of identified risk groups will be required in most circumstances when a case is identified. The rationale for this is that a case of infectious disease must have an origin somewhere, either originating at the border or from transmission within the community. It is essential that where possible the source of the infection is investigated, and that the infection source is positively identified as this will allow any other infection chains to be identified and broken. Based on the results of these investigations, risk-based surveillance may be required, tailored to the specific circumstance. This may require the deployment of mobile testing stations coupled with stratified random sampling of underrepresented demographics.

These thorough disease investigations are done in close collaboration between the Office of the Director of Public Health, ESR and the PHU and can result in stratified random sampling of relevant populations, risk-based sampling based on expert epidemiological input and knowledge of the communities at risk. Whole genome sequencing (WGS) of isolates plays a role here as comparison on phylogenomics with epidemiological investigation (where samples or RNA product are available from labs) may result in reassessment by the PHU and ESR of contact tracing and reclassification of cases. Testing during cluster investigations at the DHB/PHU level that is not linked to tracing activity should be discussed in detail taking into account the local situation and information from the primary health care investigation by the surveillance TWG. Options include, but are not limited to:

1. PHUs engaging with GPs to be able to increase testing of patients presenting with mild respiratory illness (systematic random)
2. Testing healthcare workers (rolling weekly until risk in region is understood)
3. Testing of those with pre-existing conditions and high risk of severe health outcomes
4. Testing the caregivers of vulnerable people ensuring equity across all subgroups including those with disabilities

<sup>11</sup> Reporting on the operational efficacy of contact tracing is not an activity for the testing plan, however analysis of contact tracing data for risk factors is identified as a supplementary data source that is able to inform the further refinement and development of testing strategies. That said, a knowledge of operational efficiency at local level is essential as it informs the tactics that can be used locally for case finding in cluster investigation.

<sup>12</sup> The case reported recently is a good example of uncertainties regarding accuracy of testing: a Marist student who had previously been symptomatic, and had a negative test, picked up through voluntary follow-up testing almost two months later

5. Testing of staff and residents in aged care facilities (rolling weekly until risk in region is understood)
6. Testing of those with inequitable access to health care (targeted locally)
7. Those populations with an elevated risk of harm from COVID-19, with consideration also to groups with documented inequities in terms of health system performance
8. Testing domestic flight crews who pose risk of spread out of region (rolling weekly until risk in region is understood)
9. Testing those in high density housing (targeted locally) and crowded housing conditions.
10. Testing prisons (targeted locally)

## 4.4 Component 3: Monitoring trends in specific syndromic presentations with systematic testing

Existing 'background syndromic influenza like illness (ILI) surveillance streams' provide essential information that allows us to respond promptly to signals that could be early warnings of disease presence. As the case definition for testing at GPs and CBACs tightens, it will be essential to increase the sensitivity of the surveillance system by adding streams of surveillance that target milder respiratory presentations across the country. These new streams<sup>13</sup> could mirror the function of the Healthstat and GP sentinel surveillance in collecting coded data and virological samples for mild respiratory illness.

Changes in syndromic surveillance should be able to trigger local operations to escalate but all streams and local information must be considered. These streams should be regarded as cues for discussion and investigation rather than triggers. At a national and local level, this complements ongoing local ILI/ARI outbreak surveillance undertaken by Public Health Units<sup>14</sup>. This is particularly important in the setting of testing constraints e.g. supply chain issues or a severe influenza season.

Elements v and vi are under development based on changes to the testing criteria for clinical presentations to a primary care health provider.

- i. Healthline – ESR led stream. Patients self-identify to call Healthline. This interaction between the patient and the Healthline call service influences (depending on the case definition and testing priorities) whether people present to healthcare services for assessment. A sub-trigger from this component is required to assess changes in call patterns that cannot be explained
- ii. FluTrackers – Ministry of Health led stream. Online survey with about 60 000 weekly participants across New Zealand reporting information on influenza like illnesses with some specific COVID-19 questions added this season. Participants are self-identified to complete the survey.
- iii. Healthstat – ESR led stream. This year 380 (up from ~120 previously) practices across NZ are participating in the GP software based syndromic stream that tracks coded instances of ILI.
- iv. GP sentinel surveillance – ESR led stream. Approximately 90 GPs across New Zealand participate annually and collect samples from ILI presenting patients for microbiological testing and isolation. This year the test will include a COVID-19 test. Recruitment is ongoing. Once distribution (geographical and demography) has been identified, additional practices can be identified if needed.
- v. HealthLink form for mild respiratory illness (MARI). Practices need to be enrolled to collect syndromic information on COVID presentations that would not be flagged by the ILI syndromic surveillance streams. The distribution of practices needs to be spatially and ethnically representative. These data would provide information on trends of those presenting to GPs with mild respiratory illness

<sup>13</sup> Initially one programme (mild respiratory illness – MARI), the coded subset of which would be replaced by the textmining stream once that is set up. The virology subset would have to continue.

<sup>14</sup> COVID testing should remain a component of institutional outbreak investigations of acute respiratory illness undertaken by PHUs even if the acute respiratory illness presentations fall outside a narrowed case definition.

- vi. Virological sampling from those presenting with mild respiratory illness. A systematically collected subset of cases presenting to MARI should be tested.
- vii. Text mining - A text mining application that can be rolled out across Primary Healthcare providers to provide additional sensitivity to the system will enable the total number of presentations of mild and acute respiratory infections (MRI and ARI) as well as ILI to GPs to be monitored. This should allow us to track fluctuations of different syndromic respiratory presentations across the primary health care system, although previously untested for COVID-19. A business case is in development. Key benefits include the coverage of the GPs, ease of use for GPs, ability to increase the sensitivity of the whole surveillance system for detection of COVID-19 cases of varying severity and investment in future surveillance programmes. Items v and iii could be replaced by this more flexible solution with better coverage.

*Triggers:* The trigger point for escalating to action from information in the syndromic surveillance component is not a single trigger for the component or even a single sub-trigger for each stream. Rather, information from each of the streams must be considered along with recent information from each of the 4 components by epidemiologists who understand both the structure of the streams and the overarching components. Any significant increase must be discussed at the weekly epidemiological/surveillance meeting, documented and presented to the surveillance TWG and DHB/PHU.

*Action:* Minuted and retrievable discussion of any increase in any of the syndromic streams must occur at the weekly epidemiological/surveillance meeting and reporting on decisions reached in the weekly reporting stream

*Action:* Discussion with PHU/DHB to clarify changes noted and establish if action is required. Engagement of the surveillance TWG

*Action:* Deployment of risk based or stratified random surveillance as appropriate based on consultation

## 4.5 Component 4: Focus on entry pathways

An essential part of New Zealand's strategy is the focus on the border. This component must ensure that any infection is contained at the border and does not enter New Zealand communities where it may spread undetected. This element must be focussed on those crossing the border and people whose jobs require them to be in contact with this population.

The focus on the border is on:

- Incoming travellers
- International air and maritime crew
- Border facing workers

Those entering New Zealand as travellers present a significantly different risk to New Zealand's elimination goal when compared with those people working at the border. Travellers are at higher risk as they may be coming from countries with high transmission of COVID-19 and may have been exposed there.

People working at the border, who are based in New Zealand are at lower risk due to the very low levels of community transmission in New Zealand but may be exposed as part of their work to travellers who may be infected with SARS-CoV-2. The air border is higher risk than the maritime border due to the number of travellers coming through and the interaction that the air border workers have with them.

International air crew are exposed to SARS-CoV-2 during international layovers. However, there are strict protocols in place to minimise their exposure and therefore their risk of COVID-19 is potentially similar to that of border-facing workers.

## Travellers entering New Zealand:

Due to the high risk that international air travellers present, all those entering New Zealand are required to be isolated (if unwell) or quarantined (if asymptomatic) for 14 days on arrival in a managed facility.

In addition to this, PCR testing of this group is suggested at day 3 and day 12. The days selected to test represent an alignment with the policy of Australia. As the average incubation period is 4 days and RNA is detectable 2 days prior to onset of symptoms, a person with the average infection course could be reasonably expected to be detected by PCR testing on day 3 of isolation (as this may have been 5 days from exposure, taking into account travel time). Day 12 would be expected to catch those with a longer incubation period. In addition to the PCR test result, WGS should be performed so that should any future cases be identified in New Zealand, molecular information can be used to identify possible sources of the infection and assess the efficacy of measures at the border.

Any person with clinical symptoms while in a managed facility should immediately be tested regardless of preceding negative tests. Any positive test result must be whole genome sequenced (so that information on onward transmission can be gathered). Those exempt on compassionate grounds from quarantine require the same testing strategy to be applied as those in managed facilities. This is in conjunction with the case by case risk mitigation measures that will continue (for example the use of PPE and the test taken on day 6 or 7 for those who need to apply to leave from a managed facility to grieve).

This testing is voluntary except in exceptional circumstances where there is a high index of suspicion and a medical officer of health may require testing. Work is ongoing to make the maritime pathway consistent with the air pathway where appropriate and feasible.

## Those who cross the border as part of their work:

Testing of NZ based international aircrew<sup>15</sup> (regardless of symptoms) is required if they are regarded as high risk based on a risk matrix approach<sup>16</sup>. For those in the high-risk category, testing will be done 2-3 days after their arrival in New Zealand and these individuals are required to voluntarily isolate until the test result is known.

Maritime crew are at lower risk of exposure and vessels are required to undertake health declarations on arrival as part of the arrival clearance processes therefore enhanced passive surveillance is recommended for this cohort (that is any symptomatic marine crew must be immediately tested).

Should any of these individuals have clinical symptoms, they would be required to be tested under component 1 and they should be regarded as higher risk than those with clinical symptoms not working at the border. A programme of enhanced passive surveillance<sup>17</sup> for these individuals, both maritime and aircrew is required with intensive communications about the availability of testing, and the removal of any disincentives for testing. This testing is voluntary except in exceptional circumstances where there is a high index of suspicion and a medical officer of health may require testing.

Once serological testing is available, structured surveillance of airline crew may be used to assess whether the measures in place to manage their exposure to SARS-CoV-2 are sufficient and whether additional risk mitigation measures are needed during layovers. Results would not be interpreted at the individual level.

<sup>15</sup> Any airline; private charter and freight

<sup>16</sup> Low risk is no overnight stay and crew stay airside or managed airside overnight stay; medium risk have managed landside stays two nights or less; high risk have landside overnight stays longer than two nights and the transport/accommodation is less tightly controlled.

<sup>17</sup> Intensive messaging about the relevant clinical symptoms that could be present with COVID-19 and ready availability of testing

## Those who face the border as part of their work

Screening of all asymptomatic border facing staff would represent a zero-risk approach, however given that risk mitigation measures are in place at the border, the invasive nature of the available test and the fact that the role of asymptomatic infections in the spread of disease cannot be verified this approach is not thought to be viable. Sampling a random sample of the border facing staff would not provide enough ability to detect every case as the prevalence of infection in this group is expected to be very low (based on the existing measures in place).

This group includes but is not limited to managed facilities where arriving travellers are housed, those working in the shipping industry, at ports and in frontline contact roles with international arrivals (e.g. customs, biosecurity, aviation). Border agencies and stakeholders based at international airports are at higher risk than maritime agencies where travel times and existing declarations provide assurance.

There should be proactive communications in these workplaces to encourage testing of any clinical signs (however mild). No disincentives should exist for accessing testing in these work places and this testing is voluntary<sup>18</sup>.

Once serological testing is available, structured surveillance of selected higher-risk border facing groups may be used to quantify the levels of exposure experienced thus far and to put in place additional risk mitigation or controls at the border. Results would not be interpreted at the individual level. These surveys would be structured based on consultation with the border agencies and other employers or union representatives who have a presence at the border and should be targeted to the exposure risk of the workforce.

All test results must be returned clearly marked with metadata related to their origin at the border and the border subset they originate from including a single unique identifier for those who do not have NHI (presumably some international travellers do not).

## 4.6 Component 5: Ongoing information gathering from research (Supplementary data streams)

There are additional sources of information that could have the ability to inform the weekly surveillance report and precipitate actions in the field to ramp up testing activities. These include the interpretation of disease spread modelling and the results of intermittent surveys on attitudes to health services. In addition to this, there is a need to monitor the international literature and research findings. These are not continuous data streams, but they do provide additional intelligence to inform activities.

An additional source of supplementary information is the use of serosurveillance. This is not currently available as test performance is still being established. The application of serological tests must be carefully considered as the results may not have meaning at the individual level but only at the population level. The use of serology has been mentioned at the relevant components i.e. part of component 4 and as part of component 2.

Another emerging stream of surveillance information is detection of SARS COV2 in waste water. This is a promising stream of surveillance in other countries, however in our context, the tool must be optimised for early detection of very low numbers of cases (rather than monitoring prevalence). This work is ongoing.

<sup>18</sup> In exceptional circumstances where there is a very high level of suspicion, and they are symptomatic, a Medical Officer of Health may require them to be tested.

## 5. Operational policies for responding to triggers and how the system will function

### 5.1 Surveillance and epi team weekly rhythm and reporting related to the five components

1. Weekly data (including information) on active clusters, field activity associated with the investigations (high level), syndromic data feeds, supplementary data feeds, border activity and testing of those presenting with clinical symptoms is provided to the COVID-19 Surveillance Technical Working Group (TWG)
2. The TWG discusses the data and generates intelligence (on this panel are representatives with relevant skill from across the Ministry of Health and ESR including but not limited to Pacific Insights team, Māori Health directorate, the Office of the Director of Public Health, COVID-19 Public Health Intelligence, the Communicable Disease team and ESR).
3. The weekly surveillance intelligence report is distributed to DHBs/PHUs and other stakeholders including the COVID-19 Surveillance TWG.
4. DHBs/PHUs engage with the surveillance COVID-19 Surveillance TWG as needed depending on their local situation. This will be done by scheduled teleconference when the COVID-19 Surveillance TWG examine the weekly reports and may require additional in person meetings, teleconferences and phone calls. COVID-19 surveillance TWG consults with epiTAG as required.

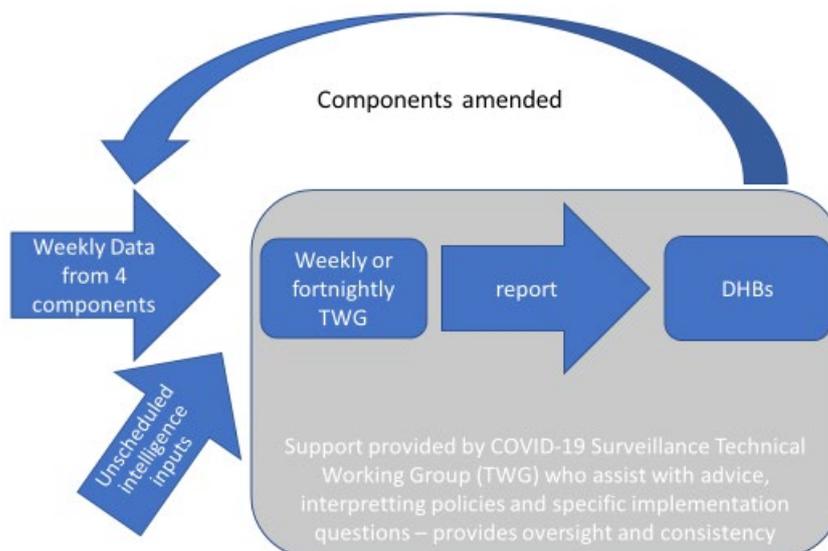


Figure 2: working model of how the surveillance system functions.