

Unite against COVID-19

PHU Contact Tracing “Deep Dive”

Summative Rapid Report

8 May 2020



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CONTENTS

EXECUTIVE SUMMARY	1
1. BACKGROUND AND INTRODUCTION	3
2. PHU OPERATING MODELS	3
3. CASE MANAGEMENT AND CONTACT TRACING	5
4. INFORMATION MANAGEMENT AND DATA COLLECTION	7
5. ADDITIONAL FUNDING FROM THE MINISTRY	9

EXECUTIVE SUMMARY

A rapid review of COVID-19 contact tracing at three Public Health Units (PHUs) was undertaken 20-24 April 2020. Its purpose was to provide the Ministry of Health (the Ministry) assurance of how well PHUs are positioned for successful and rapid contact tracing, and to determine the level of national consistency in operating models. While the findings in this report relate to the PHUs visited, the recommendations relate to opportunities for systemic improvements across all PHUs, their respective District Health Boards (DHBs) and the Ministry.

The PHUs are all operating under various forms of a Coordinated Incident Management System (CIMS) framework that reflect their regional demographics and institutional environment. Following initial planning starting in late January 2020, PHUs have rapidly scaled their operational response as COVID-19 case numbers increased. This has required staff redeployment within PHUs, from across the DHB and other public agencies, and short-term contracting of staff. Training programmes have been required to build this contact tracing capability. These additional staff costs form the bulk of the use of additional funding from the Ministry.

PHUs have sought to include an equity lens on case and contact management. Through their CIMS frameworks they have provided welfare support and have planned cultural equity initiatives, though these are in different stages of development and deployment. Some PHUs were able to adapt existing initiatives while others had to develop new approaches.

The operating models are functional rather than perfect, but PHUs are better placed now to respond to a surge in COVID-19 cases than they have been previously. While planning is underway for potential future surges, the sustainability of the models remains in question. Centralised support will be required for the foreseeable future.

Within each of the operating models, the approach to case and contact management is broadly similar. The PHUs have developed robust Standard Operating Procedures (SOPs) that draw heavily on Ministry guidance. Variations in each step of the process relate largely to the profile of the personnel involved (medical vs. investigative) and the reliance on technology.

Use of the National Close Contact Service (NCCS) has also varied, with some PHUs making routine use of the service for all non-household close contacts and others having made very limited use of NCCS. The lack of a feedback mechanism from NCCS to PHUs has proved troublesome and limited the ability of PHUs to have a complete view of contact tracing of cases in their jurisdiction.

The main limitation across all PHUs relates to information management and data collection. While one PHU has a proprietary Public Health Information Management System (PHIMS), the others rely largely on Word and Excel, together with nationally available tools such as EpiSurv and REDCap. Cluster identification in this context has relied on largely manual approaches based on the accumulated case history knowledge of Medical Officers of Health (MOsH) and Public Health Nurses (PHNs). While this appears to have worked relatively well, it is not a reliable approach should case numbers increase substantially.

Data definitions and collection have also varied, though this is improving. As a result, PHUs are currently limited in their ability to report performance against indicators. Significant retrospective data capture has been required and multiple datasets have had to be merged. Reporting has also been limited to contact tracing performed by PHUs, not including any contacts transferred to NCCS. The ability of the Ministry to gain a complete picture of contact tracing based on PHU reporting is therefore limited and would require significant additional analysis.

A nationally led approach is therefore essential to provide a consistent view of contact tracing in New Zealand. This approach should:

- clearly identify the expectations of PHUs in responding to a pandemic
- include a detailed workflow of the PHU-NCCS interface
- provide PHUs and NCCS access to a common technology solution
- ensure greater visibility regionally and nationally
- identify how surge can be dealt with both within and across regions.

Recommendations:

1. The Ministry should work with PHUs to develop a nationally led approach to contact tracing, that includes common access to a technology solution, and agreed approaches to accessing additional capacity from the centre as well as from other PHUs.
2. The Ministry should work with PHUs to define a common set of assumptions by COVID-19 Alert Level that the PHUs can use to model capacity and surge implications. This modelling should include a focus on ensuring an equitable response for Māori, Pacific and the elderly.
3. PHUs should complete the reviews of their COVID-19 response that they have commenced. A priority for the reviews should be identifying the critical components of each role in the model to estimate FTE requirements to trace a case completely and adequately.
4. Based on the modelling and FTE requirements, capacity deficits under different scenarios should be used to undertake contingency planning. This includes consideration of how NCCS can work better with PHUs.
5. Clear guidance and a defined workflow for accessing NCCS must be established. This includes a feedback process of data from NCCS to PHUs.
6. PHUs should be provided access to the National Contact Tracing Technology Solution (NCTS) as an interim measure, regardless of whether it becomes the longer-term technology solution. Where PHUs already have a proprietary PHIMS, consideration should be given to data exchange protocols rather than adoption.
7. The Ministry should define how technology-based approaches to identifying clusters supplement clinical knowledge. This includes consideration of including casual contacts in the technology solution.
8. A set of performance indicators for contact tracing should be agreed with PHUs. The current set in use together with those in this review's Terms of Reference provide a good starting point.
9. Data collection protocols and common data definitions in line with the agreed performance indicators must be developed to enable cross-PHU comparability.

1. BACKGROUND AND INTRODUCTION

Contact tracing is the process of identifying individuals who have been in contact with a confirmed or probable case of COVID-19, communicating with them, and directing them to self-quarantine for a period of 14 days from their last date of exposure to the case. This limits the risk of onward transmission from the contact to others. Linking cases together, through appropriate follow-up of contacts who may develop COVID-19, is key to identifying and managing clusters. Rapid and comprehensive contact tracing is therefore one of the most critical components of New Zealand's response to the COVID-19 pandemic, alongside testing and public health risk communication.

In New Zealand, there are 12 Public Health Units (PHUs) that undertake contact tracing as part of their core business to manage communicable diseases. PHUs are staffed by Medical Officers of Health (MOsH), Public Health Nurses (PHNs) and Health Protection Officers (HPOs), supported by analytical and administrative staff, to undertake this role.

Considering the significant increase in the contact tracing workload caused by the COVID-19 outbreak, the Ministry of Health (the Ministry) set up the National Close Contact Service (NCCS) on 24 March 2020 to provide surge capacity for PHUs. While case management remains the responsibility of individual PHUs, they can transfer contacts of the case to NCCS for tracing and follow-up. NCCS staff come from a variety of backgrounds and are trained in the use of standardised scripts to guide communication with contacts. Since 6 April 2020, NCCS has used a National Contact Tracing Technology Solution (NCTS) to store case and contact details linked by exposure events to support contact management.

The effectiveness of New Zealand's pandemic response is therefore reliant on the ability of PHUs to conduct rapid and comprehensive contact tracing and their ability to make use of NCCS when appropriate.

Building on the findings of the *Rapid Audit of Contact Tracing for COVID-19 in New Zealand*¹, the Ministry contracted *Allen + Clarke* to provide assurance through an independent assessment of how well PHUs are positioned for successful and rapid contact tracing, and to determine the level of national consistency in operating models.

On 20-24 April 2020, a team from *Allen + Clarke*, together with a representative of the Ministry (the review team), visited three PHUs for "deep dive" reviews. The PHUs were selected by the Ministry for their diversity in population characteristics and because each PHU had dealt with a cluster of cases. The review team also interviewed representatives of NCCS. This report provides a synthesis of findings and makes recommendations for improvements to contact tracing in New Zealand. While the findings discussed in this paper relate to the three PHUs visited for the review, the recommendations are proposed as system-wide changes that would apply to all PHUs, their respective District Health Boards (DHBs) and the Ministry.

2. PHU OPERATING MODELS

In response to the COVID-19 pandemic, PHUs have activated their emergency response plans and stood up forms of Coordinated Incident Management System (CIMS) frameworks. The core elements of the CIMS frameworks are fundamentally consistent across PHUs and typically include

¹ Verrall, Dr Ayesha, *Rapid Audit of Contact Tracing for COVID-19 in New Zealand*, University of Otago, 10 April 2020

planning, intelligence, communications, logistics and operations functions under an overall incident controller. Contact tracing is undertaken within the operations function. The PHUs also coordinate with the relevant District Health Board (DHB) or regional Emergency Operations Centre (EOC), in particular in relation to accessing support services such as emergency housing that may be necessary to enable quarantine of cases and contacts.

How each of the PHUs has resourced each of the CIMS framework functions varies and reflects differences in population size, demographic composition, and geographic spread, as well as differences in PHU resourcing, existing capability, and access to existing systems. PHUs responded quickly to the evolving COVID-19 pandemic, typically initiating their response in late January 2020. The form and function of their response has evolved over time as caseloads grew and new information on COVID-19 became available. The lessons learned from the 2019 Measles response provided a good basis on which to scale their response. As COVID-19 case numbers have fallen recently, providing some breathing room from the emergency response, PHUs indicated that they have initiated reviews of their response to identify lessons that can be drawn upon should there be a renewed surge in cases.

Through their CIMS frameworks and building on existing programmes and capability, PHUs have sought to include an equity lens on case and contact management. In coordination with the local EOC, PHUs have provided welfare support, including housing, food, and mental wellbeing support. They also have COVID-19 cultural equity initiatives planned but they are in different stages of development and deployment. Where needed, PHUs have also made use of DHB interpreter services. While some PHUs were able to adapt existing programmes that focus on equity of public health responses, others have had to develop new approaches, and those have typically only been developed more recently.

Building a contact tracing workforce with the right skillset to provide a balance of medical and investigative skills for rapid and comprehensive contact tracing has been challenging. PHUs have filled these roles with staff from a variety of backgrounds, including existing PHU MOsH, PHN, and HPO resources as well as other medical (general practice and dentistry), nursing, or generalist staff. This has relied on redeployment of staff from within the PHU or DHB, directly contracted staff, or staff loaned by other agencies such as Environmental Health Officers (EHOs) from the council. There has also been some targeted recruitment of Māori and Pacific staff.

PHUs have developed rapid training programmes for new staff and often relied on buddy systems for new and more junior staff to build the capability for contact tracing. Case and contact management relies on relationship- and trust-building, rather than a more enforcement-focused approach, and soft skills are therefore essential. That said, investigative skills are also a crucial part of comprehensive contact tracing, which has not necessarily featured as prominently in training provided by PHUs. This is a skill set that should be built as operations are consolidated and capability matured.

The PHUs have accessed NCCS for surge capacity to varying degrees. Some have routinely sent all close contacts to NCCS for tracing, while others have made very limited use of NCCS. In all cases, the PHUs indicated that the management of cluster cases and contacts should be retained by the PHU, as a greater understanding of the local region is seen as important for comprehensive contact tracing in those instances. The PHUs reported significant concerns and reservations in using NCCS, particularly in relation to information management and data exchange. This is discussed in detail in Section 4.

While the operating models are functional rather than perfect in design, the PHUs are better positioned now to respond to a surge in COVID-19 cases than they have been at any other stage of

the pandemic. The sustainability of the models remains in question. This is due to the high workload that has been required of staff during the operational response and to increasing pressure for both redeployed staff and PHU staff to return to business as usual (BAU) as the Alert Level is lowered. Maintaining the currency and operational readiness of the COVID-19 surge workforce as staff return to BAU will also present challenges, given the dynamic nature of the medical guidance and operational policies as they continue to evolve to respond to the COVID-19 pandemic.

PHUs are developing plans for responding to a potential future surge. These plans are based on historic case numbers rather than plans for a larger-scale surge. Based on a set of agreed assumptions on potential case numbers and the characteristics of different Alert Levels, the Ministry should work with PHUs to identify potential capacity deficits and prepare plans to address those deficits. This could include:

- localised investment in PHU capability and capacity
- centralised support for PHUs, such as that available through the NCCS
- models and arrangement for PHUs to share capacity across regions in the event of regional differentiations in case numbers.

The NCCS will remain necessary for PHUs to confidently have sufficient capacity to respond to an increase in cases in a timely and effective manner. Better coordination between NCCS and PHUs is therefore critical.

A nationally led approach is essential. This should:

- clearly identify the expectations of PHUs in responding to a pandemic
- include a detailed workflow of the PHU-NCCS interface
- provide PHUs and NCCS access to a common technology solution
- ensure greater visibility regionally and nationally
- identify how surge can be dealt with both within and across regions.

PHUs are supportive of a national approach, while recognising the need for regional variations to adapt to demographic differences. A nationally led approach could also include arrangements for contingent capacity in PHUs not under surge conditions to be applied to support PHUs experiencing a surge. It could also include access to dedicated NCCS capacity, ideally with an existing relationship to the PHU and knowledge of the demographic characteristics.

3. CASE MANAGEMENT AND CONTACT TRACING

The three PHUs have all developed Standard Operating Procedures (SOPs) that describe their end-to-end process. Case and contact management processes across the three PHUs largely follow the same approach with variations primarily in the roles and responsibilities for each task. This reflects the complexity of the operating model, the size and dispersion of the PHU workforce, and their access to systems.

PHUs have leaned on each other, adopting elements of SOPs or templates from other PHUs, and on experience, such as the SOPs developed for the 2019 Measles outbreak. The SOPs include instructions for accessing welfare through EOCs. The depth of the SOPs and supporting programmes in relation to cultural equity varies and reflects the regional demographics.

The SOPs align closely to guidance from the Ministry, which has been used extensively to inform the case and contact management process. In particular, the PHUs all reference and regularly update their SOPs in line with the Ministry's *Updated advice for health professionals: novel coronavirus (COVID-19)* and definitions of close and casual contacts. The criteria for closing cases and clusters likewise follow the latest Ministry guidance, though the process varies across PHUs; some include a medical discussion and the final call resting with MOsH or PHNs, whereas others simply close the case or cluster once the criteria are met. The Ministry's guidance is either integrated in the SOPs, linked to the Ministry's website, or provided in hard-copy update to case and contact management teams. Staff confirmed that they are expected to remain up-to-date with the latest advice and do as part of their daily routine.

In developing and updating their SOPs, PHUs have also engaged directly with the Ministry to confirm the proposed approach or specific criteria is in line with expectations. Access to the Ministry's Technical Advisory Groups (TAGs) would be beneficial, particularly for smaller PHUs, as responses can be slow. Given many PHUs are likely to seek guidance on similar matters, a nationally led approach would reduce the need for extensive local development of processes.

The case management and contact tracing process broadly follows the following steps:

- *Notification:* While all three PHUs receive Direct Laboratory Notifications (DLNs) from the laboratories that undertake testing of samples in their region, some rely instead on email notifications to the MOsH. This is due to an identified lag between the email notification and DLN, which can be as long as a day. Some PHUs also receive their notification in batches at set times while others receive notifications as and when the results are available. The time elapsed from sample collection to notification also varies widely, due in part to the geographic dispersion of the population but primarily due to access to a laboratory locally.
- *Case Interview:* Two of the PHUs undertake the case interview in teams of two, either completely medically led (PHN and/or general practitioner) or joint medical and investigative (PHN with an HPO). At the other PHU, a Lead PHN undertakes the interview alone. The information collected at all three PHUs is largely similar and based on a template with supporting guidance. All three PHUs noted that contact tracing does not always start at the first contact with the case, as they may need some time to absorb and accept their positive test result. A follow-up call is typically within a matter of hours in these cases.
- *Case Presentation:* Following the case interview, all PHUs have a process for presenting the case to the MOsH and Lead PHNs. This is either done on a case-by-case basis or in a group to discuss all cases for the day. The presentation of cases provides an opportunity to identify clusters or complex cases prior to allocating cases for contact tracing, to ensure sufficient capacity is allocated.
- *Contact Tracing and Symptom Checking:* The approach to contact tracing and symptom checking varies widely both across and within the three PHUs. Some have specialised contact tracing and symptom checking teams. Others use the same team that did the case interview for both contact tracing and symptom checking. Some PHUs use a combination of both approaches, depending on the type and complexity of the case. The PHUs generally have scripts or guidance templates for contact tracing and symptom checking. While some PHUs take a household approach to contacts, speaking to only one household member, others require contact tracers to engage directly with each adult member of the

household daily. The latter approach is likely preferable as experienced contact tracers can identify where contacts may require testing even when asymptomatic.

- *Use of NCCS:* As already noted, the PHUs have made use of NCCS in different ways. Some have routinely sent all non-household close contacts to NCCS, while others have made very limited use of NCCS. Information transferred to NCCS has varied in depth, including both “raw” information (e.g. the name of a workplace) and complete information (e.g. the names of individuals at a workplace that have been identified as close contacts). The PHUs all noted that the lack of a feedback mechanism from NCCS is problematic, leaving the PHU largely blind to progress on contact tracing of their cases.

The biggest difference in approach across PHUs is their access to and use of IT. While some PHUs primarily manage cases and contacts manually based on hardcopy files supported by Word documents and Excel spreadsheets, one has a proprietary Public Health Information System (PHIMS). All PHUs enter cases on EpiSurv, the national notifiable disease surveillance database, though restrictions on access to only local PHU cases can be problematic when cases or contacts move across regions. The three PHUs have all made use of REDCap, an online survey and database tool, for contact management. The approach to use of REDCap has varied significantly.

As noted above, the “Case Presentation” step is used to identify clusters. This, however, is a significant point of weakness in the system and process across all PHUs. Cluster identification in all PHUs is manual and relies primarily on the accumulated knowledge of case histories held by MOsH and Lead PHNs. Where the PHU has access to a PHIMS, it can typically flag a new case as a contact of an existing case. This functionality has been limited by the use of NCCS as non-household close contacts have not been entered into the PHIMS. Though the manual approach appears to have worked relatively well, it is not a reliable source of identification, particularly if case numbers were to increase. Where cases are managed by different teams within a PHU or across different regions by different PHUs, cluster identification is even more complicated. This is a significant risk.

From the perspective of the review team, the end-to-end process at all three PHUs is generally appropriate and robust and is well documented with training resources available. Regional variations are understandable and reflect the institutional environment of each PHU. However, the lack of a common system presents risks and limits the ability of the Ministry to obtain a consistent national view of contact tracing. A national integrated technology solution for case and contact management is necessary and would be welcomed by the PHUs.

4. INFORMATION MANAGEMENT AND DATA COLLECTION

The approach to information management across PHUs is driven by their access to systems. Regardless of whether a PHU has access to a PHIMS, information is kept across a number of sources and PHUs need to merge datasets to undertake analysis. PHUs have also struggled to respond to Ministry requests for data against performance indicators both before this review and for the indicators included specifically within the scope of this review. This is because PHUs were not always collecting the data required for these reporting requirements as the indicator had not previously been developed. In addition, there are variations in the data definitions across PHUs that make comparability difficult. This should be remedied through the development of agreed performance metrics and common data definitions for future reporting.

Even if the PHUs had been collecting data for the indicators, they would not be able to provide a complete report for cases in their region as large chunks of data would be with NCCS rather than

with the PHU. While some PHUs have recently been given access to NCTS, or have received limited information back from NCCS, there is currently no complete dataset of cases and contacts. It would therefore be a very labour-intensive process for the Ministry to gain a complete picture of contact tracing in New Zealand, and this would likely have some limitations. This reinforces the need for a national integrated case and contact management technology solution that provides ready access to data for planning and analysis.

In parallel to consistent information management, consistency in data collection would be beneficial. The PHUs currently rely on largely manual, hardcopy forms for data collection that is then inputted into their various systems. The process for data entry in EpiSurv and REDCap is different across the three PHUs, sometimes relying on support officers transcribing data from the hardcopy forms. Though relatively minor, these differences in the use of common systems make like-for-like comparison of data challenging. In addition to a national technology solution, a nationally led process with consistent approaches to data capture and entry would be beneficial.

This review included assessing performance of PHUs against four indicators. As with previous requests from the Ministry, the PHUs would have to undertake a process of retrospective data collection to report against these indicators. PHUs have tended to update their data collection tools to respond to future requests from the Ministry and the review team has seen evidence of this in response to the indicators in this review. However, despite PHUs being sympathetic to Ministry's interest in measuring performance, the review team has not been provided with sufficient data by any of the PHUs to undertake analysis to include metrics in this report. Nevertheless, brief commentary is made against each indicator below:

- **Time from PHU notification of case-to-case interview:** PHUs that do not rely on DLNs for case notification have not documented the time and date of notification. This would require retrospective analysis of MOsH's email logs. While data and time of case interview is now collected by all three PHUs, this has not always been the case so only partial analysis would be possible.
- **Time from case interview to quarantine of close contacts:** PHUs have not recorded the time and date of the first call with a close contact, though the review team saw evidence of one PHU changing this as a result of this review. Had data been available, it would be skewed and not useful for planning purposes. PHUs have typically only dealt with household close contacts who, during Alert Level 4, would usually already be in self-isolation with the case. Household close contacts have therefore typically been instructed to quarantine during the initial case interview.
- **Number and distribution of close contacts:** This indicator should be readily available from the PHUs. The review team has only received partial data from two of the PHUs, however, and this points to a lack of comparability. Though the PHUs are consistent with their classification of household close contacts, the categories for non-household close contacts differ. Analysis on a PHU-by-PHU basis could therefore be done but would require additional analysis and interpretation to provide a national picture. It is also likely that this data is skewed, with household contacts over-represented due to Alert Level 4.
- **Proportion of contacts who have been traced:** PHUs do not currently track data necessary to assess this indicator. While proxy indicators could be developed, the anecdotal evidence from the PHUs is that they have successfully tracked all contacts that they managed. There is, however, a large information gap related to contacts sent to NCCS for tracing.

5. ADDITIONAL FUNDING FROM THE MINISTRY

The focus of the three PHUs has been on the operational response and ensuring there is sufficient capacity to deliver high quality case management and contact tracing. While none of the PHUs have actively planned how the additional funding from the Ministry would be used, all reported that it was relieving to know that there was specific funding allocated to cover the additional expenses they were incurring.

All three PHUs are currently in the process of reconciling expenses with funding sources. Through this process, they will finalise how the additional funding from the Ministry has been allocated. In general terms, funding has or will be used for:

- covering significant overtime obligations for PHU staff
- funding staff from other parts of the respective DHB that have been seconded to the PHUs for COVID-19 response (where backfilling has been required)
- additional staff recruited by the PHUs on a contract or short-term basis
- staff wellbeing support whilst rostered onto the COVID-19 response
- fit out of additional office space - one PHU has taken over an additional floor to accommodate the additional staff brought on for the response
- IT and telecommunications costs, including additional computers, videoconferencing equipment and phones for case managers and contact tracers.

Though the funding has provided a useful safety blanket to the PHUs to ensure they are able to resource the COVID-19 response, PHUs mentioned that they were typically operating at a deficit already. There were also concerns expressed that PHUs will not meet performance targets for BAU work, which may impact funding in the next budget cycle.