Unite against COVID-19

PHU Contact Tracing "Deep Dive"

Auckland Regional Public Health Service – Rapid Report

4 May 2020

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1.   BACKGROUND AND INTRODUCTION

1.1.   COVID-19 and Contact Tracing

- Contact tracing is one of the most critical components of New Zealand's response to the COVID-19 pandemic, alongside testing and public health risk communication.

- 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. It also involves the appropriate follow-up of contacts who may become symptomatic and require testing. Linking these cases together is key to undertaking cluster management.

- Public Health Units (PHUs) undertake contact tracing as part of their core business to manage communicable diseases. In light of the significant increase in contact tracing workload caused by the COVID-19 pandemic, the Ministry of Health (the Ministry) set up the National Close Contact Service (NCCS) on 24 March 2020 to provide surge capacity for PHUs.

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

1.2.   Scope

- The Ministry contracted *Allen + Clarke* to provide assurance through an independent assessment of how well PHUs are positioned for successful rapid contact tracing and to review the operating models used in different PHUs to determine national consistency.

- The review is driven by:

  - the identification of issues associated with the transfer of information in both directions between PHUs and the NCCS;

  - the inability of the Ministry to obtain a consistent national picture with key performance indicators of the contact tracing being conducted;

  - the inconsistent reporting from PHUs with regards to confirmed or probable cases and their management;

  - the continued difficulty by PHUs and the NCCS in finding some contacts; and

  - the need to identify how an equity lens is applied over the contact tracing process.

- The Ministry identified three PHUs for "deep dive" reviews that represent diversity in population characteristics and have dealt with a cluster of cases:

  - Auckland Regional Public Health Service (ARPHS), which covers a large urban area;

  - Public Health South (PHS), which covers a large rural and remote area; and

  - Hawke's Bay District Health Board (HBDHB), which has a high percentage of Māori residents.

1.3. Approach

- *Allen + Clarke*'s approach is guided by assurance review and audit processes. Through engagement with each of the PHUs, we sought to identify links from policy to practice and outcomes through document review and stakeholder interview.

- The review involved a blended team from *Allen + Clarke* and the Ministry (the review team), who visited each of the PHUs during the week of 20 April 2020. Visits, each lasting approximately eight hours in total, were undertaken to:

  - Public Health South on 21 April 2020;

  - Auckland Regional Public Health Service on 22 and 23 April 2020; and

  - Hawke's Bay District Health Board on 24 April 2020.

- While the approach aims to ensure "line of sight" from evidence to practice, the approach is also guided by the rapid nature and continued complex operational response environment in which this review is taking place.

1.4. Report

- The information collected during the review is presented in a series of three PHU-specific "Rapid Reports", together with a summative "Rapid Report" presenting findings across the PHUs and including recommendations.

- This "Rapid Report" presents the findings of the review in relation to the Auckland Regional Public Health Service (ARPHS).

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2.   OPERATING MODEL

2.1.   Overview

- On 24 January 2020, ARPHS held a SCRUM meeting to discuss COVID-19 events being observed in China. A working group was established as a result. The working group later concluded that the events warranted the establishment of an incident management team and the standing up of an Emergency Operations Centre (EOC) in accordance with ARPHS's Coordinated Emergency Management System (CIMS) framework.

- The EOC Incident Controller is supported by a Response Manager and six key functions, including the Operations Function (and sub functions). The operations function is responsible for Case Management, Contact Tracing and Symptom checking.

- The operating model has evolved and changed over time. Early in the pandemic the model had a high focus on the border. At the end of January 2020 operations had been established at Auckland Airport and the Port of Auckland.

- The increase in case volumes experienced in mid-March 2020 reflected the need for the model to scale to create additional capacity and respond more effectively to the surge demand. An external incident controller was appointed, and senior management resource was redeployed to lead the operations function. As a result of these and other changes the COVID-19 Ops Function Model was established.

- The structure entails an operations management overlay, called the Case & Contact Operations Leadership Team, a business support function (Ops Business Support) and two separate sub functions: Case & Contact and Symptom Checking.

- The Case and Contact sub function is comprised of up to eight teams, six of which are currently operational. Each team is led by a Lead Senior Medical Officer (SMO) who is supported by a Lead Public Health Nurse (PHN) or a Lead Health Protection Officer (HPO). Each team is comprised of a further five-to-six staff, typically operating in cells of two.

- The significance of the latest iteration of the ARPHS model is that it entails a modular design for scalability purposes.

- The Symptom Checking sub function is also led by a SMO, also supported by a Lead PHN.

- The growth of the team and the desire to continue practicing social distancing has been addressed by acquiring additional office space and reconfiguring office layouts. Zoom is also being utilised for this purpose.

- There has been close coordination and collaboration at a regional level, between the three Auckland DHBs and Northland. The Northern Regional Health Coordination Centre (NHRCC) has met (virtually, and then as a physical entity) regularly, with a strong focus on supporting ARPHS's front-line response.

2.2.   Approach to Equity

- ARPHS has established cultural engagement protocols and resources it is able to access during COVID-19. This includes, for instance, access to a Māori liaison advisor.

- ARPHS's planning [*Requirements for a Sustainable COVID-19 Auckland Regional Public Health Response (22/04/20)*], notes that "communities in high socioeconomic deprivation will be a particular risk, because of reduced access to timely diagnosis and the ability to spread through overcrowded living and working situations. In the Auckland region, this includes our Pacific and Māori communities."

- The planning document does not go on to explicitly address the particular risk posed to Pacific and Māori communities by COVID-19. Rather, the planning document focusses on the broader capacity issue and how it resources to manage reduced case numbers while maintaining capacity to address surges in cases.

- ARPHS has commenced planning to boost the number of Pacific health care professionals deployed to undertake case management and contact tracing. A training package for 20 Pacific healthcare professionals has been proposed to increase the ability of ARPHS to better support Pacific families with case(s) of COVID-19. The proposal is part of ARPHS's equitable approach to outbreak management. Recent training has focused on Pacific Health Professionals but the tapering off in cases has not necessitated their deployment.

- For Māori, it is similarly proposed that there be training of Māori health professionals in Case Management and Contact Tracing in anticipation of possible outbreaks requiring targeted support for Māori communities. It was not clear to the review team how far this planning has progressed.

- Recognising and responding to welfare issues has been factored into the operational approach and is formalised through the *Referring Cases for Welfare and/or Cultural Support SOP.*

- ARPHS also has access to interpreter services should staff encounter language barriers or difficulties.

2.3. Capacity

- ARPHS has redeployed 80% of its workforce to the COVID-19 response. Over time, ARPHS has continued to build and grow its capacity. The latest operations model utilises a modular design to enable scalability. The team is led and supported by a SMO and a Lead PHN/HPO.

- The operations model was designed to accommodate and process 20-40 cases per day. The intention is that the model is scaled up or down to respond to changing demand.

- The ARPHS COVID-19 response team is comprised of GPs, PHNs, HPOs, EHOs and support staff. Fifty-four additional staff (e.g. Council EHOs, nurses, etc) were added to the ARPHS team at its peak. ARPHS trained some 89 staff to assist with case and contact management.

- A Business Support team was established within the operations model to support the development of policies and procedures, manage spreadsheets and to provide training. The team is responsible for facilitating the review and improvement of operating protocols.

- General training on COVID-19 is given to all staff as they join the team. Ongoing training needs of individual staff members are assessed and addressed. In addition to the training, new staff members are assigned a buddy who they shadow and learn through

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observation. Early case management and contact tracing activities are conducted under the supervision of the buddy to build confidence and familiarity with the SOPs.

- ARPHS advises that its workforce planning has aimed to achieve a balance between the necessary quality and consistency, whilst managing staff welfare.

- The Case and Contact Tracing teams are led by senior experienced health professionals to provide clinical leadership in managing cases and an epidemiological focus to contact tracing.

- Case Management interviews are conducted by two staff members, normally a GP and a nurse. ARPHS indicated that by conducting the interview in pairs, the team can better manage the emotional impacts and then obtain the necessary information from the case. The pairing also enables mentoring and shadowing, so that junior or less experienced staff can learn from their colleague.

- The symptom checking team conduct the daily symptom check for confirmed cases, probable cases, and close contacts. ARPHS elected to deploy clinical staff to monitor symptom development so that they can recognise both symptoms and the necessary course of action and convey appropriate information. The symptom checking team is comprised of two GPs, a lead PHN and the remainder are registered nurses.

- ARPHS has utilised the National Close Contact Service (NCCS) to refer contacts for further tracing. In particular, the NCCS was used to support the over 800 close contacts identified as part of the Marist cluster management.

- In addition, ARPHS has utilised external resources from a variety of sources including NRHCC, Auckland Council, and Auckland University. ARPHS has also recruited and contracted resources (such as senior medical officers and project management specialists for the business support function) directly.

2.4. Managing Surge and Scale

- ARPHS has maintained a forward planning approach throughout the pandemic. The approach has been documented with planning papers setting out key assumptions that inform its modelling and subsequent planning. The latest planning document sighted by the reviewers, dated 22nd April 2020, assumed that the Northern Region was approaching 'the Dance' phase of the pandemic. ARPHS anticipates that in the Dance phase it could expect up to eight case notifications per day, with no more than two new clusters per week and a maximum of eight clusters active at any time.

- ARPHS forecasts that a workload of this nature would only require 3-4 of the modular Case/Contact teams to be actively deployed along with a single Symptom Monitoring team.

- However, the approach recognises the possibility of further outbreaks, and while it is anticipated that some staff will return to BAU functions, ARPHS is seeking to retain some 100 FTE positions. Of those, it is proposed that 20 of the trained surge workforce will be deployed on a 2-3 week rolling basis to maintain training currency. This surge capacity is sufficient to enable the model to expand from 3-4 Case Management and Contact Tracing teams to seven.

- While in theory the modular design would enable further teams to be added, there are other constraints, including the physical limitations of the building. With social distancing, the available office space is effectively completely consumed by ten teams.

- ARPHS recognises the value of the NCCS for surge management. However, ARPHS has made a decision that, assuming there is not a surge of cases, it will manage all close contacts until such time as there is a properly documented end-to-end process document from the NCCS. ARPHS also considers that it will be best for them to manage cases and contacts in any rest home clusters in the future, where people are being redefined as close contacts each time a new case presents.

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3.   CASE MANAGEMENT AND CONTACT TRACING

3.1.   Standard Operating Procedures

- The *Quick Guide to COVID-19 Case and Contact Assessment and Management Reponses for Public Health Nurses and/or Health Protection Officers* provides an overview of ARPHS's approach to Case Management and Contact Tracing. It includes guides, report forms, call scripts and system instructions, as well as useful resources and information links.

- ARPHS utilises a suite of Standard Operating Procedures (SOP), copies of which were provided to the review team. ARPHS advises that the procedures have been developed rapidly and are subject to frequent change. It advises that they are now beginning to focus on consolidation, review and improvement.

- The SOP development relies heavily on the advice from the Ministry, in particular around case definition and close/casual contact definitions. Ministry guidance has continued to change, requiring adjustment of SOPs.

- ARPHS has a SOP for *Referring Cases for Welfare and/or Cultural Support*. Where there are language issues, teams are able to do a three-way phone call with interpreter. If welfare is offered, the symptom team can follow this up to make sure it has been actioned.

- ARPHS advised that it was looking at training a core group of both Pacific and Māori health professionals in Case Management and Contact Tracing in anticipation of possible outbreaks in each of those populations and as part of ARPHS's equitable approach to outbreak management. The review team sighted a paper proposing the training of 20 Pacific Island healthcare professionals.

- ARPHS has used the NCCS for close contact tracing extensively to date. The *ARPHS COVID-19 Case Management with External Relationships* flow chart identifies a decision point for appropriateness to send contact management to NCCS, but no document identifies any criteria for this. Rather, the clinical opinion of the Operations team appears to be the driver of the decision.

- Based on its experience, ARPHS indicated that it was reluctant to send close contacts to NCCS because of the lack of visibility of those contacts once they have gone to NCCS. ARPHS advised that it recently received access to the National Contact Tracing Technology Solution (NCTS) (22 April 2020) but had not yet verified that this would provide the necessary visibility. ARPHS also advised concerns about the lack of consistency between NCCS SOPs and those used by the PHUs, noting that PHUs did close contact checking daily.

3.2.   Process Description

- The Case Management and Contact Tracing steps followed by ARPHS are set out below. Our description is based on a review of process documentation, advice by management, and confirmation of practice advised by contact tracing staff:

    1.   Direct Lab notifications start at 6am and are received as the lab completes testing. ARPHS advises that it moved away from batching to interval processing. The lab

batches but only in small sets. This approach enables continual flow all day so processing can commence as soon as the notification is received.

2. The Surveillance Support Officer (SSO) receives the notification and gathers the demographic information for the case [existing SOP]. The SSO updates EpiSurv and generates a file in the Notifiable Disease Case Management System (NDCMS) (see section 4.1). The SSO creates the paper file.

3. The case is provided to the Operations Team, who assign the case to the Case and Contact Management Team (CCM). The CCM team reviews the file to identify possible links with a cluster(s) and then assigns the case to a CCM team member.

4. The CCM team conducts the scoping activities including notifying the case's GP if the GP organised the test [existing SOP]. The CCM team interviews the case, confirming the test result, providing guidance and advice regarding isolation, and collecting the information required, including contact details. The CCM team enters the contact groups into ARPHS's NDCMS. The SSO updates the Case Report Form electronically and enters the exposed contacts into NDCMS. Consideration is being given to an SSO joining the two case interviewers to promote timely data entry.

5. The CCM team discusses the scoping findings with the Operations Team. They flag high risk contacts, clusters and outbreaks. The Operations Team confirms any contact groups that are to be sent to NCCS (ARPHS refer to the NCCS as the Hub) and the CCM team sends the relevant Contact Group information to NCCS. This excludes the case, household close contacts and any group specified by the Operations Team.

6. The SSO prints the COVID-19 Exposed Contact Tracing and Symptom Check form for the CCM team to complete. The CCM team scopes close contacts and provides self-isolation advice and education.

7. If not part of a cluster, the CCM team sends the close contacts to the Symptom Checking Team. The Symptom Checking team calls the close contact daily and completes the COVID-19 Exposed Contact Tracing and Symptom Check form. Subject to suitability criteria, contacts are offered the option of automated follow-up through REDCap.

• The process involves the production of paper forms and report templates for completion, just so that data can then be entered into the system by someone else. There would appear to be opportunities to improve efficiencies by entering data directly into the system as [say] the scoping interview was being conducted.

• The utilisation of two highly-trained health professionals to conduct the scoping interview is a resource-intensive approach. Obviously, this approach is intended to optimise the quality of the interview process, which is critical to successful contact tracing. However, if the process and training can enable a single team member to conduct the interview effectively (perhaps with occasional pairing to check consistency and to audit quality), it would appear that ARPHS could effectively almost double its contact tracing capacity.

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3.3. Cluster Identification

- ARPHS has an SOP on cluster management that is in draft format. The SOP includes both a section on "Recognising a cluster" and sections on managing, closing and reporting on clusters.

- The draft SOP defines a cluster as two or more COVID-19 cases linked to a common setting or institution, to an event, or to a returned overseas traveller/group trip overseas. For Aged Residential Care Facilities (ARCF), ARPHS defines a cluster as one or more COVID-19 cases within the facility confirmed by laboratory testing.

- The Case and Contact Management (CCM) team is responsible for identifying links between cases, undertaking an initial risk assessment and scoping the potential cluster. The CCM Team Lead SMO advises the Operations SMO who decides whether or not it is a cluster and its priority level.

- Notably, the cluster management SOP is silent on how CCM Teams are to identify links between cases. Based on interviews with ARPHS staff, the review team understands that this is primarily through the body of knowledge of the CCM SMOs. However, NDCMS is also able to identify links between cases such that the system is able to flag that a new case is the close contact of an existing case.

- Given ARPHS is operating across eight CCM Teams, the body of knowledge of SMOs is not a reliable source of information to identify clusters and the availability of the NDCMS functionality is therefore critical, particularly if the case load were to increase substantially.

- However, NDCMS can only support cluster identification where a Close Contact record has been created in the system. As this is only done for contacts that are managed by ARPHS, there is no ability to use technology to identify cluster where contacts were sent to NCCS for follow-up.

- It would be useful if the SOP was more specific on how NDCMS together with the knowledge of staff can be used to identify clusters. The ARPHS team advised us that there have been initial internal discussions about how it might better use NCDMS and EpiSurv to assist with cluster identification.

3.4. Defining Close and Casual Contacts

- ARPHS uses the Ministry's published definitions to define Close and Casual Contacts.

- ARPHS indicated that its approach to symptom checking is predominantly done by phone. A few cases are done by REDCap where the case or contact prefers to be engaged in that manner. Welfare and checking in is emphasised at the scoping, contact tracing and symptom checking stages.

- According to the *Cluster Management* draft SOP, identification of clusters, also referred to by ARPHS as 'outbreaks' is predominantly a manual exercise, requiring the CCM team to recognise the links between two cases (not confined to single household). The ARPHS SOP protocol is to establish a COVID outbreak team who then set about scoping the cluster, triaging and prioritising the approaches based on the assessment of risk. A strategy is developed and the cluster is managed to minimise the spread.

3.5. Closing off cases and clusters

- Closing off cases and clusters is covered in three separate SOPS.

- The *Releasing Cases and Close Contacts from Isolation* SOP provides clinical guidance on when cases and close contacts can be released from isolation. A flow chart for both cases and close contacts identify decision criteria for release. The decision appears to rest with either the symptom checking or CCM team who is managing the case or contact. Only immunocompromised cases need to be discussed with the lead SMO or other specialist.

- There is an SSO-specific SOP on *How to close cases and contacts in EpiSurv and NDCMS.* In addition to providing step-by-step guidance for SSOs on the documentation required and the steps required for closing off cases and contacts in the system, the SOP specifies that "the first" (Parent Index) case should not be closed in either EpiSurv or NDCMS until all contacts, secondary case, tertiary case and cases involved in an outbreak have completed assessment management and the outbreak is over."

- The draft *Cluster Management* SOP includes a placeholder for determining the end of a cluster and debriefing to identify lessons learned. The decision making process has not yet been finalised but draft language suggests this may be when there are no new epidemiologically-linked cases in the cluster after two incubation periods (i.e. 28 days) have elapsed following the end of the last case's infectious period.

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4. INFORMATION MANAGEMENT AND DATA COLLECTION

4.1. Information Management

- ARPHS uses its custom-built NDCMS together with EpiSurv and REDCap and other information sources from the Ministry, Auckland Airport, and Johns Hopkins University amongst others. All data is processed and analysed in Serval, a virtual server on the healthAlliance infrastructure.

- NDCMS is a Microsoft-based system for case and contact management. For most diseases, NDCMS has a form that overlays the EpiSurv Case form and is used as the primary data collection document. Before ESR released the COVID-19 Case Form, ARPHS was able to use the generic disease form in their process. However, ARPHS has not been able to replicate this functionality for the COVID-19 EpiSurv form as the time (4-6 months) and cost of development is prohibitive. In addition, one of the IT suppliers is based in Austria and therefore largely unavailable due to the pandemic situation there.

4.2. Data Collection

- Despite having a custom case management system, data collection is still entirely manual on hardcopy forms. These are transcribed into EpiSurv and NDCMS primarily by Surveillance Support Officers (SSOs).

- Daily symptom checking data is not captured uniformly for all cases and contacts. Those deemed appropriate for self-reporting through REDCap are recorded only in REDCap. For those that are called daily by ARPHS, daily progress notes are added to the contact record in NDCMS. There is no central single source of truth for the status of all cases and contacts.

4.3. Performance Indicators

- While ARPHS has confirmed it would technically be able to compute the indicators included in the terms of reference, limited or no data has been provided to the review team. In part, this relates to the investment in analysis required to develop these new indicators. ARPHS intimated that should the Ministry want updates on these indicators regularly they could set up reporting against them much like they have done for the other indicators previously requested by the Ministry.[1]

- **Time from PHU notification of case to case interview:** It is unclear to the review team whether ARPHS can readily assess this indicator.

  - *Time and date of notification:* When ARPHS receives a notification, SSOs either manually create an EpiSurv record for manual notifications or acknowledges an EpiSurv record for Direct Laboratory Notifications (DLN). ARPHS SSOs confirmed that DLNs tend to be received approximately 40 minutes after the email notification. While a case record is created in NDCMS when the SSO acknowledges

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[1] Reference M1 – M4 PHU View of Close Contact Tracing.

the EpiSurv record, it currently only captures the date but not the time. Further investigation is required on whether EpiSurv data could provide a useful proxy.

- *Time and date of case interview:* NDCMS includes fields for date and time of first contact with case and date and time of initial interview, the standard ARPHS Scoping Form that is used during the case interview does not. While these fields are presumably updated following the phone call, this was not clear to the review team during the interviews.

Anecdotal evidence from discussions with ARPHS SSOs indicates that for a notification received by DLN at 8am, the file with all hardcopy forms is provided to the Case and Contact Management (CCM) team by 9am and SSOs receive the completed file back for updating EpiSurv and NDCMS by about 3pm. This indicates a typical 7-hour turnaround, noting that the case interview would likely have happened prior to the file being handed back to SSOs.

- **Time from case interview to quarantine of close contacts:** As with the indicator above, it is unclear whether this indicator can be readily assessed. While NDCMS includes a field for date and time of the initial interview of an exposed contact, it has not been enabled for COVID-19 to date.[2] ARPHS is currently using "Progress Notes" to capture information relating to the first contact and subsequent follow-ups. Though these can be reported against there are limitations relative to a dedicated field as their timestamp does not always reflect the actual time of contact interview. Further, for any contacts sent to the NCCS for management, ARPHS would not have any ability to identify this metric as there is no feedback loop from NCCS back to ARPHS.

- **Number and distribution of close contacts:** Following the scoping interview, the CCM team creates "contact groups" in NDCMS. The contact groups that are tracked in NDCMS include: (i) Household Member; (ii) Other Family/friend (not household member); (iii) Flight or Ship; (iv) Healthcare Setting; (v) Workplace; (vi) School; and (vii) Not entered. In addition, contacts are classified as close or casual within these contact groups, and their "exposure type" (Continuous, One-Off, or Not entered) is also recorded. Based on data received by the review team, a total of 2,827 contacts had been entered for 507 confirmed and probable cases up to 21 April 2020. Of these, 51% were close contacts. Assuming that all contacts in the "Household" contact group are also classified as close contacts in NDCMS, 46% of close contacts were household contacts. The review team does not however have access to sufficient data to estimate average contacts per case.

- **Proportion of contacts who have been traced:** For close contacts that are managed by ARPHS, data for this indicator can be derived by proxy analysis of "Progress notes" where either a lack of notes or a note relating to a failed contact could identify any contacts not traced. There is no tick box or equivalent to confirm that contacts have been traced.

ARPHS staff confirmed that, to their recollection, there have not been any instances where close contacts managed by ARPHS have not been successfully traced. However, for any contacts sent to the NCCS for tracing, ARPHS is not able to have any confidence in successful tracing as there is no feedback loop.

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[2] ARPHS advises that it will be enabled overnight 4-5 May 2020 with accompanying changes in data collection processes

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5. ADDITIONAL FUNDING FROM THE MINISTRY

- To date, a total of $741,000 has been spent, primarily on overtime and additional contracted staff.

- Other significant costs have been incurred for office space fit-out to accommodate the additional staff required (ARPHS has taken on an additional floor at Greenlane Hospital) and for IT for these staff, as well as videoconferencing equipment to enable increased social distancing.

- There is also a potentially large pending liability of inter-department costs to cover staff from other areas that have been seconded to ARPHS for COVID-19.

- Work is underway to fully account for the expenditure of the additional funding.

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