

# Rapid implementation of a community monitoring service for COVID-19: Staff and patient experiences and perceptions

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## Research Article

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# Abstract

## Background

The coronavirus pandemic (COVID-19) has put unprecedented demand on health services. Provision of support and monitoring for patients with mild to moderate illness who are at risk of deterioration may allow hospitals to reduce the risk of exposure for health care workers, assist with reducing community spread, and improve capacity to accommodate those with more severe illness.

## Methods

This is a data-based triangulated qualitative study using staff interviews and patient surveys to explore the experience of implementation and delivery of a COVID-19 community monitoring service. Interview questions were guided by the Consolidated Framework for Implementation Research (CFIR). Interviews were coded and analysed using a grounded inductive approach and final themes were related back to the CFIR. Patient experience was captured using a survey and descriptive statistics were used to describe categorical responses while content analysis was used to analyse free text responses.

## Results

All 15 staff in the service were interviewed and 271 patients were surveyed (42%). A total of four final overarching themes emerged, service commissioning enablers, service delivery benefits for patients, fragmentation of care, and workforce strengths, with subthemes aligned with 18 CFIR constructs in the staff interviews. Staff perception of patient experience was supported by results of the patient survey.

## Conclusion

Rapid commissioning of this community monitoring service was enabled through shared resources, engaging a ready-to go workforce of furloughed staff, dividing tasks amongst senior personnel and having a flexible approach that allows for ongoing improvements following implementation. Benefits for patients included early identification of deterioration, as well as provision of accurate and trustworthy information to isolate safely at home. The main challenges experienced by both staff and patients was the multiple agencies involved in patient monitoring, which may be addressed in the future by attributing responsibility for monitoring to a single agency.

## 1.0 Background

The coronavirus pandemic (COVID-19) has seen unprecedented demand for health care services. This has required providers to trial, develop and evaluate new ways of responding to the increased number of patients seeking care. COVID-19 is a mild viral illness for most patients (~ 85%) but may cause severe pneumonitis/pneumonia and death in a small percentage of cases (1). Provision of appropriate support and home monitoring for patients who are experiencing mild to moderate illness, and who have risk factors for clinical deterioration (based on medical history or age), may allow hospitals to reduce the risk

of exposure for health care workers, assist with reducing community spread and improve capacity to accommodate those with more severe illness (2).

Community monitoring aims to provide an alternative to hospital care. It provides an avenue for health providers to monitor symptoms and identify clinical deterioration as well as allowing patients to seek advice and support for managing their own care safely at home (3). Community monitoring can also identify additional social support needs including urgent food and housing needs, domestic violence support, drug and alcohol issues and mental health care.

There is limited research available on the different models of community monitoring for COVID-19 that have been instituted worldwide. Most models to date use different strategies including home monitoring of biometrics to detect deterioration using technology, interactive chatbots, health professional telephone support, or community health workers who provide in person care (4–9). A number of studies have looked at the impact of electronic Short Messaging Services to monitor patients and have found this effective in reducing time to presentation to hospital for deterioration, and reducing mortality (2, 10). However, a rapid review found that cost-benefit analysis is lacking, and overall effectiveness of different models in detecting deterioration is unknown due to a lack of standardisation in reporting (10, 11).

There is also limited evidence available on the challenges associated with rapidly establishing community monitoring services during a crisis, the experience of patients managed by these services, or the experiences of staff working in new workforce roles. There is a gap in knowledge around perspectives of clinicians and patients on the challenges of implementing and running a community monitoring program during a pandemic. Addressing this gap may inform the implementation of rapid models for future pandemics. The aim of this study is therefore to describe the experience of staff and patients involved with a rapidly implemented telephone-based community monitoring service for COVID-19 and to elucidate any key learnings using the Consolidated Framework for Implementation Research.

## 2.0 Methods

This is a triangulated qualitative study using staff interviews and patient surveys to explore the experience of staff and patients in the implementation and delivery of a COVID-19 community monitoring service. Specifically, we chose a triangulated qualitative mixed method as we wanted to 1) gain a comprehensive understanding of the experience of staff in the implementation and delivery of a rapidly changing, low technology COVID-19 community monitoring program and 2) use patient experience data to determine whether staff perception about the value for patients was validated by patient reported experience.

### Setting and context

In Australia, the largest outbreak of COVID-19 in 2020 was in Melbourne, accounting for 75% of Australian cases (n = 20,330 on 24th October 2020), and 90% of all deaths (n = 817). In response to rising COVID-19 case numbers, a state of emergency was declared in Victoria on the 16th of March 2020. On

the 23rd of March Stage 3 restrictions were implemented that limited travel out of the home. These were lifted for a short period of time from the 13th of May to the 8th of July, when a second wave commenced in Melbourne. On the 2nd of August the Victorian government-imposed Stage 4 lockdown, adding a night-time curfew, further restriction of daytime activities (including imposing a 5km radius for essential shopping and exercise), and large financial penalties for breaches. The number of daily incident cases in Victoria peaked on the 5th of August (13). The state of emergency was extended 7 times and remained in place until the 8th of November, 2020.

Northern Health (NH) is the key provider of public health care in the northern region of Melbourne, Australia. Residents living in the catchment are culturally and linguistically diverse, originating in over 180 countries, and speaking over 106 different languages (14). Social determinants of health such as language barriers and poor health literacy, together with a lack of culturally appropriate communication and engagement strategies, have contributed to health inequity, with the catchment disproportionately impacted by COVID-19. While NH's catchment accounts for approximately 10% of Victoria's population; however at the peak of the pandemic, one third of COVID-19 cases resided in the catchment.

The community monitoring service was a rapidly developed low technology model that provided telephone contact by trained health professionals to patients with COVID-19 who were self-isolating at home. Isolating at home meant that individuals were not permitted to leave the home for shopping or exercise (but could leave to seek medical care). The community monitoring service was proposed on the 15th July 2020 and was implemented on the 21st July 2020. Clinical staff, predominantly nurses and allied health staff, who had been furloughed due to medical risk issues were engaged to work in the service. Policies and procedures were developed rapidly, initially based on a procedure that was shared by another health service that had already established a community monitoring program. This procedure was adapted to fit the local context, approved by local infection control teams, and refined over the first four weeks of the service.

Patients were monitored by phone during the acute phase of their illness which was typically up to 14 days. This was a low technology service and did not include remote monitoring of biometrics. All patients with COVID-19 in the North East of Melbourne were managed on this program and were referred following a positive PCR result by the Victorian Department of Health (DoH). The DoH is the central health system and aged care funding body for Victoria. Participation in the community monitoring program was optional but highly recommended, and approximately 98% of COVID-19 positive patients agreed to be enrolled in the program. A clinical assessment using a script, including a checklist of risk factors that fed into a risk stratification (Table 1), was used for all patients on entry into the program. Social and welfare needs assessment were also undertaken, and patients experiencing issues such as domestic violence or drug, suicidal ideation or drug and alcohol concerns were referred to the hospital social work and/ or psychology service for immediate care and referral if required.

Patients stratified as at risk of deterioration were offered ongoing monitoring via a daily phone call; those at lower risk were offered second daily phone calls or SMS. In follow up phone calls, patient symptoms

were categorised as stable or deteriorating. For patients with deteriorating symptoms, escalation of care involved either consultation with a medical officer, referral to the general practitioner or hospital emergency department, or calling an ambulance. An analysis of outcomes for the service has been published previously (12).

The service did not have the ability to issue clearance from isolation for individuals to return to normal activities – this could only be issued by the Victorian DoH. While this community monitoring service operated, DoH concurrently conducted compliance monitoring of COVID-19 positive cases, so many patients experienced phone contact from multiple agencies.

## **Ethics approval**

This study was approved by the NH Human Research Low Risk Ethics Committee (reference number 68253).

## **Measures**

### **Staff experience**

Staff experience was measured using semi-structured interviews. All staff involved in establishing the program and/or providing direct patient telephone support were invited to participate via email and consented to participate verbally over the phone prior to their interview. Participation in the interviews was voluntary, and staff were informed that they could choose to end their participation at any time and could withdraw participation up to two weeks post interview, after which time the interviews were transcribed and de-identified. All interviews were conducted by the same researcher (RLJ) who was experienced in conducting qualitative interviews. An interview guide was used with question areas based on the Consolidated Framework for Implementation Research (CFIR). The CFIR is a theoretical framework for implementation research considered well-suited to health service studies. The CFIR assesses both the effectiveness of implementation within one context and the factors that might affect implementation within other contexts (4). The CFIR contains 39 constructs grouped within five domains: 1) Intervention characteristics, 2) Outer setting, 3) Inner setting, 4) Characteristics of individuals, and 5) Process. The interview guide and associated domains and constructs are provided in Table 2.

### **Patient experience**

All patients were invited to provide feedback on their experience of receiving the service via a patient satisfaction survey. The survey was voluntary and anonymous - patients were informed that no identifiable information would be collected, and responses would not impact on future care. This was considered important by the service for ensuring a high response rate. Consumers were included in the development of the survey, which included five questions using a Likert scale response format (strongly agree, agree, neither agree nor disagree, disagree, strongly disagree). Questions included frequency of calls, and whether the service helped with the management of symptoms, home isolation, and general advice. Two open ended questions asked participants if they could provide an example of where they

found advice helpful, and whether they would like to provide any additional comments about their experience.

Completion of the survey was considered implied consent to participate which was made explicit in the survey preamble. Patient participants were asked to complete the survey at end of treatment and were given the option of responding over the phone or via a link sent to their phone or email. All data were collected using REDCap®. Where the patient opted to complete the satisfaction survey over the phone this was completed with the support of a NH staff member that was independent to the service team. Interpreters were used for the phone interviews where required.

## **Analysis**

### **Staff experience**

As the CFIR framework can present some limitations when applied to complex adaptive system interventions (15, 16), we chose to use a grounded exploratory (inductive) approach to analysing the interview data. We therefore did not use the CFIR framework to create pre-defined codes, but instead linked the final themes back to the CFIR constructs. Figure 1 provides an overview of the thematic analysis process. To ensure that the conclusions accurately reflected the content of the interviews, and to ensure trustworthiness of final inferences, two researchers (RJ and NA) independently coded all data using the constant comparative method (17). An audit trail was kept, and final themes were sent back to interviewees as a form of member checking (18). The coding process involved three steps - an initial inductive open coding step, a second axial coding step to reduce overlap and redundancy of coding, followed by a final selective coding step to identify and refine final themes. Cross-checks between the two researchers to compare emerging themes was performed at each step. A pragmatic approach was adopted when drawing final inferences in the final step of this study, with a focus on the development of useful knowledge directly related to implementation of community monitoring services during a pandemic. Saturation was pre-defined as three consecutive interviews where no new theoretical categories are identified past the initial minimum sample of twelve (19). A minimum sample size of 12 was identified based on the literature (20–22).

### **Patient experience**

For patient experience data, Likert scale responses were analysed using crosstabs to provide descriptive statistics. Content analysis was used to analyse two open ended questions “Can you give an example of advice you received that you found helpful” and “Are there any additional comments about your experience with the Coronavirus (COVID-19 Community Monitoring Service) that you would like to share?”. Two reviewers (RLJ and AC) created pre-formulated codes following an initial read through of responses (17). The same two reviewers then independently applied the coding. Cohen’s Kappa was used to determine inter-rater reliability, with 0.81–1.00 considered almost perfect agreement, 0.61 to 0.80 considered substantial agreement, and 0.41–0.6 considered moderate agreement (23). We therefore

considered an acceptable level of agreement to be greater than 0.41. Where agreement was less than 0.41, the two reviewers met to compare coding and to see if higher agreement could be achieved.

## 3.0 Results

### Staff experience

All fifteen staff in the program participated in the interviews (Table 3). Four of these staff were responsible for development, implementation, and management of the service, four staff were involved in both the development and implementation as well as provision of service, while the remaining seven staff were part of the direct care team involved only in provision of service. Interviews were conducted from 15th of September to 29th of November 2020 and were between 17 and 55 minutes in duration.

Across the 15 interviews, thematic saturation was reached. A total of four final themes, with 19 subthemes emerged, and these sub themes aligned with 18 CFIR constructs. Table 4 provides an overview of each of the final themes, CFIR constructs and supporting quotes. These themes are discussed further below.

### Theme 1: Service commissioning enablers and challenges

#### INNER SETTING: Leadership engagement

Leadership engagement was essential to the success of this program, all the way from the hospital executive to the leadership within the team itself. The senior executive leadership team at NH requested a community monitoring service be implemented within a week. To help facilitate this rapid establishment, key implementation tasks were divided up across four senior personnel within the team, referred to in the interviews as the 'command centre'. This 'command centre' division of labour was allocated across the following: workforce, telecommunication, patient management systems and policies and procedures. Telephone systems were set up in a call centre style with one central phone number that enrolled patients could ring to access support. Patient management systems were established to track patients and ensure reporting capability.

#### INNER SETTING: Relative priority

The potential risks to both the individual (management of deterioration) and the community (spread of infection) created a sense of urgency and the service was given high priority within the organisation. The DoH provided a specific funding stream to the health service to support establishment of the service.

#### INNER SETTING: Available resources

One of the key success factors for rapid implementation was being able to draw on existing staff as a resource. Frontline healthcare staff with pre-existing medical conditions who had been furloughed due to exposure risk, were approached and redeployed into the direct care team.

INNER SETTING: Readiness for implementation/ PROCESS: Planning

While the program benefited from being able to engage furloughed staff and quickly induct them into the program, the rapid implementation requirements meant that initial staffing levels were still not adequate to meet the demands of the program. Staff engaged early reported feeling overwhelmed by the volume of patients. Those responsible for training new staff reported feeling frustrated by having been removed from monitoring patients to onboard new staff in at sporadic and irregular intervals. The program would have benefited from more time to forward plan, and onboarding staff in a consistent manner.

OUTER SETTING: Patient needs & Resources/ INNER SETTING Network and communications, Available resources and Access to knowledge and information

Once again, this program benefited from access to existing resources, this time in the form of written resources, and was able to utilise a policy procedure that had been developed by another hospital as a basis for the program and adapted it for use locally. Telephone scripts were developed to ensure consistency of approach, and SMS links to trustworthy information about important aspects of self-care, including identification of deterioration, were created that could be sent through to patients.

INTERVENTION CHARACTERISTICS: Adaptability

The first four weeks were crucial to the success of the service, with staff having to apply a dynamic and flexible approach to manage constant change, reorganisation, and progress over time. During these first weeks, the service adapted in response to feedback from patients and staff working in the program, with additional features added. This included text messages as an alternative to telephone calls for those at low risk of developing complications.

Theme 2: Service delivery benefits for patient

CHARACTERISTICS OF INDIVIDUALS: Knowledge and beliefs about the intervention

In all 15 interviews, the main reported strength of the service was its ability to adapt to provide personalised support and education for patients. This allowed staff to build rapport and trust. In some cases, staff reported that this was what made all the difference when it came to convincing a patient that they required an ambulance review or hospital attendance.

CHARACTERISTICS OF INDIVIDUALS: Self-efficacy, Other personal attributes and Access to knowledge and information

Staff reported that initially they were tasked with symptom and welfare checking, with the primary aim of early detection of deterioration. However, it quickly became evident that an information vacuum existed and that many enrolled patients were struggling to find information about how to safely manage COVID-19 in the home. Staff reported that they regularly responded to questions about how to safely isolate one family member within a large household, including how to manage used crockery and cutlery, shared

bathrooms and interaction within the home (for example, wearing masks when talking to family members through an open door, even when socially distanced). Having access to interpreters to assist with translating information for patients from migrant backgrounds was essential, and staff often had to provide clarification of misinformation in other languages. Overall, staff reported that supporting large households to understand isolation requirements played a crucial role in reducing community transmission of the virus.

PROCESS: Engaging and executing

One of the reported benefits of running a community monitoring program within the hospital setting was the ability for improved co-ordination of care. When staff identified that a patient was deteriorating and required a hospital attendance, they were able to contact the emergency department to provide a handover. Staff also had ready access to infectious disease specialists as other important specialists for high risk patients (e.g., obstetricians). Patient management and clinical systems were also linked, so medical staff managing deterioration had access to information about the patients' health over the preceding days.

### **Theme 3: Fragmentation of care**

OUTER SETTING: External policy and incentives

Consistently reported across all interviews, the greatest challenge experienced by staff was the fragmentation of services and division of roles between the hospital network (NH) and the centralised DoH. Staff reported that patients (and sometimes even the staff themselves) struggled to understand the difference between the work being carried out by the two agencies, or to recognise who was contacting them, and some reported that they felt burdened by the number of contacts they received.

The DoH also monitored patients' symptoms with the purpose of assessing their COVID-19 status and for providing clearance for them to return to normal activities. NH were unable to provide this clearance for patients, however, staff were able to act in an advocacy role when patients failed to meet the criteria for clearance.

Finally, a number of staff also reported that duplication of care could also occur across health services, with a number of health services potentially being involved with a single household, depending on the test site for individual members. Staff reported that a regional approach to provision of monitoring services would be an improvement if similar services were operationalised in the future.

### **Theme 4: Workforce strengths**

INNER SETTING: Implementation climate

Rapid implementation of this service was made possible by the ready access to experienced and knowledgeable clinically qualified staff who had been furloughed from other active clinical roles within

the health service. These staff brought a variety of skills and abilities and complemented one another. The staff mix included medical (respiratory physician), allied health (physiotherapy and exercise physiology) and nursing (paediatric, emergency and palliative care). Staff identified that this skill mix meant there was always someone in the team who could answer a question if another team member was uncertain.

The team reported a strong sense of pride about their 'contribution to the war effort'. Working in the community monitoring service felt like a privilege when they were unable to work in their normal roles and still wanted to be able to contribute to the management of the pandemic.

#### INNER SETTING: Learning Climate

All staff that were interviewed reported they felt well supported by their peers in the service and by the leadership team, and that they were given opportunities to contribute to the direction of the service (including through improving the telephone scripts, and policies and procedures). None had ever delivered services in this manner and this meant they were a little nervous initially.

#### Patient experience

A total of 850 patients were enrolled in the service. Due to the speed of implementation, ethics approval was gained after the service had already been implemented and patients enrolled. Therefore, only those who were enrolled following ethics approval and who responded to a post discharge phone call (n = 646) were eligible to participate. No demographic information was collected as part of this data collection, however demographics for all service users are available in a previous publication (12). Data was collected from the 12th of September to the 9th of November 2020.

Most participants who responded to the survey received phone calls either daily or second daily (Table 5). 271 patients participated in the survey (response rate 42%). Overall, surveyed patients were highly satisfied with the care they received (Fig. 2). 96% of surveyed patients felt the service was helpful (n = 261, agree and strongly agree response options), 92% felt that they were able to get the help they needed from the service (n = 250), 98% felt supported to understand how to isolate at home (n = 266) and 97% felt supported to manage their symptoms (n = 263). In response to the question would you recommend the service to a friend or family member if they had COVID, 236 (87%) of respondents said that they would.

The two open ended questions were coded across 19 predefined themes. These themes, the number of respondents and the inter-tester reliability for the initial coding and re-coding are provided in Table 6. Only two themes had a poor level of agreement (below 0.41) and were recoded. When discussed, 100% agreement was reached.

Thirty-one patients chose not to respond to the question on examples of advice and 77 had no comments to provide about the service. The most frequently reported example of advice received was on how to

isolate at home (n = 23, 12%). The most common open-ended response about experience related to feeling supported by the service (n = 56, 30%).

A small number of patient participants (n = 13) supported the findings from staff interviews when they identified frustrations associated with fragmentation of care between DoH and the NH service.

Ten (5%) respondents identified that the service recognised deterioration quickly and managed the transition to hospital for which they were grateful, while a further four (2%) identified that the service facilitated clearance to return to normal activity for them. Overall, the service escalated 30 individuals (3.5% of all) for urgent medical care (12). These findings also support the findings from staff interviews. Additionally, responses initiated by patients demonstrated the importance of advice on how to safely isolate at home (n = 23) and how to reduce household transmission (n = 7) support the feedback from the staff interviews that this was a very important part of the service.

## Discussion

This study provides important learnings from the experience of both staff and patients involved in a low technology COVID-19 community monitoring service. Community monitoring services have been established in many countries to provide an important and effective alternative to hospital care for low risk patients with COVID-19. Our study found that while this service provided an essential role in early detection of deterioration, it also ensured that enrolled individuals had adequate access to locally relevant information and supports in order to safely isolate at home and manage their condition.

Access to accurate and trustworthy information about how to manage COVID-19 when isolating at home, and how to protect other family members, was a key issue for patients recruited onto the service. At the time the service was implemented, Australian government agencies and public health experts responsible for communicating information had necessarily focused on engaging the public with health protective behaviours as this is one of the most important strategies for reducing the transmission of COVID-19 (24). Our findings suggest that once infected, access to accurate, easy to understand information about isolating within households was not easy to find. The COVID-19 pandemic has resulted in an infodemic (an excessive amount of information that makes it difficult to identify correct information) and this created difficulties for patients in accessing reliable, trustworthy information.

Strong community engagement is considered one of the most important strategies to combat infodemics (25). As in other countries, the COVID-19 pandemic in Melbourne disproportionately impacted those living in socially and economically vulnerable communities (26, 27). These populations are exposed to significant vulnerabilities, including poverty, overcrowded and/or large household sizes, insecure employment, and poor access to accurate information in preferred language. This means that they may not be able to respond to COVID-19 in a way that limits the spread and personal impact of the virus (28). This study suggests that community monitoring services play a vital role in ensuring that information provided to patients is tailored to their individual needs, that it originates from a trustworthy source and that is culturally appropriate and in preferred language. In addition, these services can provide social

welfare supports (e.g. food packages). In this way, community monitoring services may contribute to the protection of entire communities by supporting and ensuring that individuals understand what is required of them when someone within their family or household contracts COVID-19.

Individuals who are receiving home monitoring prefer to receive this from a single agency. Provision of monitoring phone calls from multiple agencies (in this case, the hospital as well as the DoH) added to confusion for both the patients and staff involved in the service. In Victoria, public health units managed by hospitals have now been established that aim to provide a single local response and leverage community connections to keep future outbreaks contained (29). Ensuring that one agency only is responsible for managing all monitoring will reduce fragmentation of service delivery and improve the experience for both staff and patients. Another important finding from the study was that rapid implementation is enabled when health services that provide community monitoring share resources. The community monitoring service in this study was able to rapidly implement a service within a week because it was adapted to existing policies and procedures from another health service so that they were contextually appropriate for the Northern Health community.

Even though the NH service was a low technology service, our previous publication showed that it was effective in detecting deterioration and ensuring no deaths were recorded by the service (12). This study adds to these findings in providing further evidence of the value of the service, as well as some of the challenges experienced in rapid implementation. It further reinforces the point that a low technology, high touch approach with continuity of care from skilled clinicians operating a call centre is both effective and highly valued by staff and patients alike. This finding is important for future implementation, particularly in low resource settings where biometric monitoring is not possible. Implementation in other settings would benefit from strong leadership and commitment, shared resources, and a single point of contact for patients to provide support, education and manage clinical deterioration.

### **Utility of the CFIR**

Our study found that only 18 of 31 potential constructs were represented in the data from the 15 staff interviews. We found it challenging applying the CFIR, with some overlap across constructs for a single theme, while other constructs were not represented in the data at all. This may be due to the type of intervention that was implemented. The community monitoring program was a newly created, rapidly implemented, time-limited program for patients experiencing a short-term acute illness. Many of the constructs focus on implementation of program that will be sustained, and where an evidence base exists and implementation staff and organisations may compare models and choose one that best fits their needs and available resources. The model described here was previously untested, and will be sustained no longer than the life of the pandemic.

In addition, many of the constructs under the 'characteristics of individual' domain measure patient readiness to engage and motivation for change that more appropriately relates to interventions for chronic disease management rather than short-term acute illness. In addition, when it came to the theme of 'fragmentation of care', while we identified multiple sub-themes, we felt that all of the sub themes fitted

into a single construct within the CFIR: external policy and incentives, and even that did not quite feel like the right fit. If we had utilised the CFIR to conduct the analysis with pre-determined themes, we may therefore have missed some nuances in the data.

## **Strengths and Limitations**

A strength of this study is the triangulated design with the patient responses supporting the findings from the staff interviews. An additional strength is the use of the CFIR. However, our study is limited by several considerations. One is that these findings are from a single hospital network in Melbourne and so the results may not be generalisable to other hospital networks or other populations. In addition, due to the lag time between implementation of the service and ethical approval to conduct this study, approximately 2/3rds of the patients were not surveyed about their experience of the service. Although there is no suggestion that the sub sample of surveyed patients was otherwise biased in any way, there is always the possibility that if all had been surveyed the responses may have been different. As demographic data was not collected as part of the survey, it was not possible to determine if the survey sample was representative, or to identify whether there were any associations between patient experience and demographic variables.

## **Conclusions**

This study suggests that enablers of rapid commissioning COVID-19 community monitoring services include sharing resources, engaging a ready-to go workforce, dividing tasks amongst senior personnel and having a flexible approach that allows for ongoing improvements following implementation. Early identification of deterioration and provision of person centred, accurate and trustworthy information were the main benefits of the service. Experienced by both staff and patients was that responsibility for care was divided between multiple agencies (health and welfare provided by the hospital, compliance with government regulations and clearance by DoH). Implications for practice and policy are that future programs should be delivered by a single agency who can manage both deterioration and clearance from isolation. Future research should determine whether the program is effective in reducing hospitalisation and bed-days and ideally should include a cost-benefit analysis.

## **Abbreviations**

CFIR

Consolidated Framework for Implementation Research

DoH

Department of Health

NH

Northern Health

SMS

Short Messaging Service

## **Declarations**

### **Ethics approval and consent to participate**

This study was approved by the NH Human Research Low Risk Ethics Committee (reference number 68253). All staff participants provided informed verbal consent, all patient participants provided implied consent with completion of the survey, which was made explicit in the survey explanatory statement. The ethics committee approved the procedure for implied patient consent and verbal staff consent. These consent methods were approved by the committee during the COVID-19 pandemic in line with the move to virtual interviewing. This was aimed to reduce the risk of research adding to the COVID-19 burden. Each verbal staff consent was recorded separately, including the date and time of recording and the responsible person for gaining the consent.

### **Consent to publish**

Not applicable.

### **Availability of data and materials**

De-identified participant data from this research will be shared upon reasonable request with the corresponding author.

### **Competing interests**

The authors declare that they have no competing interests.

### **Funding**

No funding was received to conduct this study.

### **Authors contributions**

All authors participated in the design of the study. RLJ conducted the data collection and RLJ and NA conducted the analysis and interpretation. RLJ wrote the draft paper and all authors participated in editing.

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## Tables

Table 1 Community monitoring program risk stratification

<p><b>High Risk</b></p>	<p>Any of:</p> <ul style="list-style-type: none"> <li>• Age 60 or over</li> <li>• Presence of one or more co-morbidities associated with increased mortality (cardiovascular disease, chronic lung conditions, hypertension, diabetes mellitus, cancer, chronic kidney disease, obesity).</li> <li>• Immunosuppression</li> <li>• Aboriginal or Torres Strait Islander</li> <li>• Pregnant women</li> <li>• Socially isolated / vulnerable (including individuals who are psychosocially complex or have limited self-management skills)</li> <li>• Frailty</li> <li>• A person discharged after an acute inpatient admission at NH (this does not include patients discharged directly from the Emergency Department)</li> <li>• A person who has had a 000 call due to COVID-19 symptoms</li> <li>• Moderate to severe COVID-19 symptoms</li> <li>• A person whom clinical judgement/clinician worry identifies at being at higher risk (e.g. shortness of breath associated with infection)</li> </ul>
<p><b>Low Risk</b></p>	<ul style="list-style-type: none"> <li>• Under 60 years of age</li> <li>• No co-morbidities</li> <li>• Nil known immunosuppression</li> <li>• Mild COVID-19 symptoms</li> </ul>

Table 2: Staff Interview guide

Question Prompts	CFIR Domain & Construct/s
Can you describe your role in the COVID-19 Community Monitoring Service?	Process; all constructs
How confident are you that the COVID-19 Community Monitoring Service is responding to individual and community needs during the pandemic? What gives you that level of confidence (or lack of confidence)?	Characteristics of individuals; all constructs
Did the service work for all patients that were approached? Why/ why not?	Process: planning + reflecting and evaluating
Tell me about the supports, materials, or toolkits that were available to help you in your role within the service? How do you access these materials?	Intervention; design quality Outer setting; patient needs & resources
What are the most important benefits that have been achieved with this service? To what extent has the patient/clients' needs been met? How do you know these are benefits? Have there been any unintended consequences? Can you tell us any stories about the patient experience that stand out for you?	Intervention characteristics; all constructs
Do you believe the majority of the staff on the team are happy with how the service operates? Describe	Characteristics of individuals; all constructs Inner setting; culture + compatibility
Do you believe the majority of the patients that were provided care were happy with the service? Describe	Intervention characteristics; all constructs
If the COVID-19 pandemic continues at current numbers can this service change continue to be delivered in this format consistently moving forward? Why/why not (Prompt) Does this intervention fit within our health service/ health system? Is it feasible to continue?	Intervention characteristics; adaptability + structural
What kinds of changes or alterations did you need to make to the service to work more effectively (as telehealth delivery/other) as the service has evolved?	Process – executing, reflecting, evaluating

Table 3 Staff interview participants

<b>Discipline</b>	<b>Number of participants (n = 15)</b>	<b>% female</b>	<b>% direct care team</b>
<b>Allied Health</b>	5	80%	60%
<b>Nursing</b>	9	100%	78%
<b>Medical</b>	1	0%	100%

Table 4: Thematic analysis of staff interviews and content analysis from patient surveys

Theme	Sub-theme	Example quote	CFIR Domain	Construct
<b>THEME 1:</b> <b>Service commissioning enablers</b>	Command centre/ Division of labour	<i>'I played to people's strengths or areas and used a command centre approach [to service establishment].'</i> Interview 11	Inner Setting	Leadership engagement  Relative priority
	Redeployment of frontline personnel furloughed due to health concerns	<i>'We were able to redeploy staff who were pregnant or who had health concerns that would put them at risk if they staying working on the front line.'</i> – Interview 13	Inner Setting	Available resources
	Dynamic and flexible approach to change	<i>'We had huddles twice a day with the group as well as the leadership team... it was through those huddles we [made] continual changes to that procedure.'</i> – Interview 14	Intervention characteristics	Adaptability
	Rapid development of policy and procedures and centralised access	<i>'They created a shared drive which the majority of our information went into; introduction packages that we sent to patients [etc]. The policy itself is on Prompt [hospital intranet], templates we used when speaking with patients, so that its consistent ... was emailed ... and was on the [shared] drive so you could access it yourself, and as they got updated, they emailed all of us so that way if there were any changes we knew straight away.'</i> – Interview 1	Outer Setting  Inner Setting	Patient needs and resources  Networks and communications + Available resources + Access to Knowledge & information
<b>THEME 1:</b> <b>Service commissioning</b>	Inadequate staffing initially to meet demand	<i>'One of the memories that I have is when we started it was right sort of as that peak was</i>	Inner setting	Readiness for implementation

<p>challenges</p>		<p><i>really hotting up and we had three staff at that point.’ – Interview 13</i></p>		
<p><b>THEME 2: Service delivery perceived benefits for patients</b></p>	<p>Sporadic commencement of staff</p>	<p><i>‘We had staff starting on different days. This meant I kept being taken away from the call centre to train the new staff when we were really busy. This could be improved by having staff all start on the same day.’ - Interview 4</i></p>	<p>Process</p>	<p>Planning</p>
	<p>Managing deterioration</p>	<p><i>‘When I called to talk to him his wife answered the phone and she said he can’t talk at the moment, he’s really sick and I’m trying to get him to the hospital, can I talk to you later on. I said no I can actually help you, do you need some help? She explained the situation ... that she was trying to get him to hospital and she couldn’t. I offered to speak to her husband and managed to have bit of a conversation with him and built a rapport. I built up enough trust with him that he then let me call an ambulance for him.’ – Interview 1</i></p>	<p>Characteristics of individuals</p>	<p>Knowledge and Beliefs about the Intervention</p>
	<p>Support to self-isolate safely and reduce household transmission</p>	<p><i>‘We were providing ... advice ... around how to isolate safely at home away from other people, like good hand hygiene, separation from other members of the household, when and wear a mask, how to safely move about the house to reduce the risk of household spread.’ – Interview 2</i></p>	<p>Characteristics of individuals</p>	<p>Self-efficacy</p>
		<p><i>The service was the best service- because we had</i></p>		

*no friends or family support, you gave us good advice on how to isolate to prevent the spread of the virus.*

*- Patient survey respondent 168*

Welfare checks	<i>'I had one patient that I'd been following up every day for a good 4 or 5 days and one of the days that I rang her, probably about 15 minutes later than normal, she said "I've been waiting for your to call. You make my day."' – Interview 6</i>	Characteristics of individuals	Individual stage of change
Provision of information and clarification	<i>'There's a lot of people who don't know what to do. Information is very limited so even when we tell them to do this and that, sometimes they would get surprised and go "oh I can go out" and I say no because you're a close contact of this patient so basically you need to be home as well until that patient is cleared. There was some confusion...' – Interview 7</i>	Characteristics of individuals	Other personal attributes
Information provided in language	<i>'We focused on [people] who don't speak English and got a person ... to interpret. Sometimes one of the family members interprets and that is not appropriate so we provided telephone interpreting services and [translators] locally through Northern Health. That worked very well.' – Interview 1</i>	Characteristics of individuals	Access to knowledge and information
Improved co-ordination of care and patient flow	<i>'We would call the emergency department if the patient was coming in just to let them know that a Covid+ patient was</i>	Process	Engaging + Executing

coming in.' – Interview 4

**THEME 3:  
Fragmentation  
of care**

Navigating  
multiple  
systems

*'[There was] a gap  
between us and the  
department [DHS] ... we  
have no [ability to  
provide] clearance so  
the patient was still  
hanging on between us.'*  
– Interview 8

Outer setting

External policy  
and incentives

Disjointed care  
leading to  
delays and  
reduced quality  
of care

*'People who were in  
isolation for a long time  
had secondary  
respiratory issues. From  
what I understood they  
[DHS] have a very binary  
metric or if you're still  
symptomatic you're  
going to stay in  
isolation....they wouldn't  
then go and do anything  
about that in terms of  
'ok lets get one of our  
doctors to come out and  
assess you or get you  
back to ED and figure  
out what's going on with  
you'. One patient had  
over 40 days of  
isolation. We had to  
fight for him.'* –  
interview 2

Outer setting

External policy  
and incentives

Single point of  
contact for  
patients would  
improve care

*'If it was to happen  
again I think each  
healthcare service  
should be responsible  
for their local area but  
there would need to be  
better co-ordination  
between health  
services.'*

– Interview 2

*'Thankyou for the daily  
phone calls to see how  
my husband was... but  
there were too many  
phone calls everyday  
from "everyone"- Patient  
survey respondent 23*

Outer setting

External policy  
and incentives

**THEME 4:**

Mix of  
disciplines

*'The ED and ICU guys  
understand that acute  
medical deterioration,*

Inner setting

Implementation  
climate

<p><b>Workforce strengths</b></p>	<p><i>but then people like physios and other allied health who work in the community understand the broader contextual needs from a social wellbeing point of view or access.’ - Interview 2</i></p>		
	<p>Meaningful work</p>	<p><i>‘I think it goes to that idea of people having meaningful work, and I am important’ – Interview 4</i></p>	<p>Inner setting      Implementation climate</p>
	<p>Peer support</p>	<p><i>‘Initially I was very hesitant to work here because I’ve worked in ED for almost 10 years and I hate change but because ED is not safe for me at the moment, I was offered... I mean they wanted me to get redeployed in this job and initially I thought oh my god, I don’t know I can do it. From day one they have been welcoming and I didn’t get intimidated at all because my suggestions were always welcome, they would always listen and stuff so yeah I’m just... I’m thankful that I have been redeployed here.’ – Interview 7</i></p>	<p>Inner setting      Learning climate</p>

Table 5: Method of contact with Community Monitoring Program for patients participating in survey

Type of contact	No. of responses (%)
Daily phone call	107 (39)
Phone call every second day	67 (25)
Mix of phone calls and texts	53 (20)
I received text messages	20 (7)
Did not respond to this question	24 (9)

Table 6: Themes and inter-rater reliability for content analysis of free text responses

\* the two first round items that were <0.41 were subsequently 1.0 after discussion

## Figures

Figure 1

Thematic analysis process

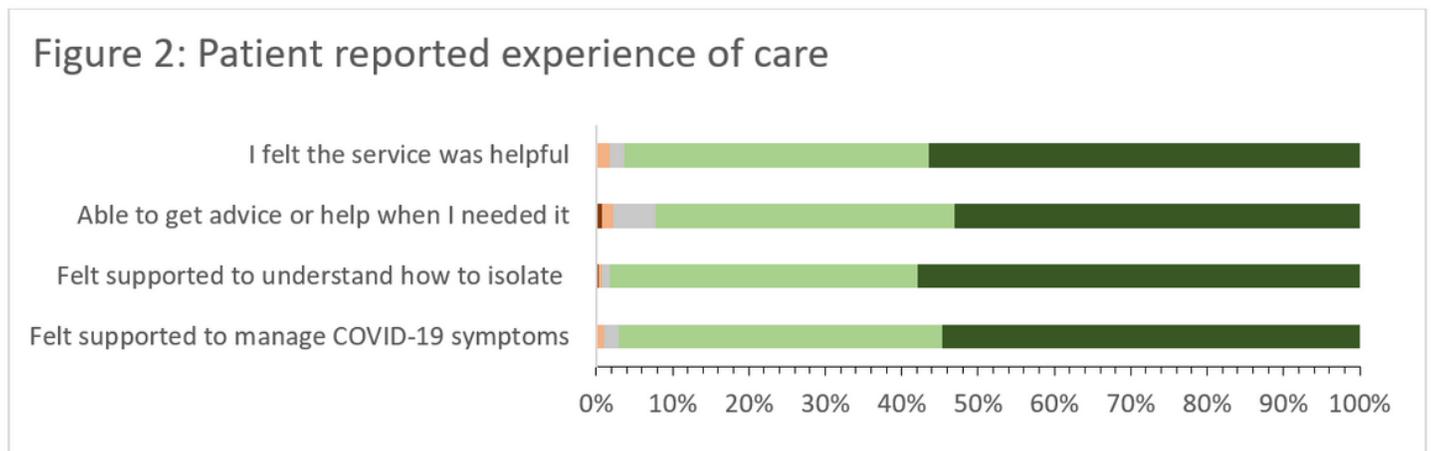


Figure 2

Patient reported experience of care

Content analysis	n	%	Cohen's Kappa first round coding
<b><i>Responses to 'Can you give an example of advice you received that you found helpful?' n= 230</i></b>			
General advice was helpful about COVID-19	18	8%	0.74
Advice on how to monitor my health	17	7%	0.5
Advice on how to reduce household transmission	7	3%	0.81
Advice on how to isolate at home	23	10%	0.84
Advice and provision of PPE	11	5%	0.87
Advice on how to access to essential supplies	8	3%	0.89
Advice on how to manage my symptoms	8	3%	0.72
<b><i>Responses to 'Are there any additional comments about your experience with the community monitoring service that you would like to share?' n=186</i></b>			
Service was easy to contact / access	10	5%	0.43
Service made too many calls to me	3	2%	0.66
Service was able to answer my questions	16	9%	0.81
Service identified deterioration and helped me	10	5%	0.86
Too much duplication between providers	13	7%	0.33*
Service provided me with mental health support	10	5%	0.68
Introduction of SMS option was good	5	3%	0.83
Regular phone calls were helpful	36	19%	0.68
Felt supported by the service	56	30%	0.49
Grateful to have someone to talk to	4	2%	0.56
Welfare check important/ felt cared for	11	6%	0.52
Service facilitated clearance	4	2%	0.33*

## Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [ISSMCOREQChecklist.pdf](#)