Evaluation Report

The virtual doctor model of care in the acute ward

NCN Health pilot project: using virtual care
to address rural workforce limitations

Carol Reid, Catherine Church, Viv Jeffery, & Dr Ka Chun Tse | July 2023

NCN Health | Nathalia Cobram Numurkah

Hume Health Service Partnership

The University of Melbourne

Executive summary

This document reports on the evaluation component of the pilot phase of the NCN Health, *Virtual Doctor Model of Care in the Acute Ward.* The timeframe for the evaluation was December 2022 to June 2023. The pilot project involved developing and trialing a unique virtual doctor model of care in the acute wards at NCN health's three campuses. It was developed to provide coverage in the context of a reduced local General Practitioner (GP) and Visiting Medical Officer (VMO) workforce and was to be complementary to the patient's regular, medical care team. The virtual health care service was provided by Specialist Physicians through a private provider, *Telecare*.

The evaluation was undertaken by The University of Melbourne, Rural Health Academic Network (RHAN) in partnership with NCN Health and the Hume Health Service Partnership (HHSP). The study aim was to evaluate the preparation and implementation phases of the virtual doctor model of care (MoC) for the rural acute ward setting. In addition, sustainment and scalability were included as a component of implementation. A range of stakeholder perspectives were considered in the evaluation: NCN Health staff, GPs/VMOs, regional health service stakeholders, patients and/or their carers, and the virtual health care provider, *Telecare*.

Key evaluation questions

The key evaluation questions are:

1. What successful and/or challenging features were important enablers or barriers in preparation and implementation of the pilot of the virtual model of care?
2. To what extent was the virtual model of care efficient and effective in contributing to rural access to care close to home?

Mixed methods data collection and analysis involved: process review (such as, health service procedure development); staff electronic surveys (n = 21); tracking of *Telecare* virtual service provision outputs (e.g., ward rounds, patient consultations, new admissions, weekends covered); patient reflections (n = 34); and finally, stakeholder interviews (n = 22).

Key findings

Interpretation of all evaluation results identified several unique perspectives to highlight, such as the positive impact of this virtual doctor model of care for patients, nursing staff, general

practitioners and strategically, for NCN Health and the broader, HHSP region and associated health services. The findings are reported through the two domains of Efficiency and Effectiveness and, utilising an implementation framework, the phases of Preparation, Implementation, Sustainment, and the added area of Scalability. Briefly, there are some important points to note which are further discussed in section *5. Combining all results and interpretation*, these are:

Model of Care enablers were found to be:

- Flexibility and promptness when negotiating the parameters of the virtual service
- Strategic leadership and strong foundational working relations
- Collaboration and partnerships, particularly with availability of resource support
- Positive engagement between different levels and types of relationships amongst all stakeholders

Challenges and potential barriers moving forward were indicated as:

- Awareness of the impact on nurses on the acute ward; for example, managing increases in workload
- Reinforcing the MoC is complementary and a supplementary service, not a replacement. ***"We still need to work really hard to attract GPs rurally."***
- Remaining sensitive to patients at the centre of care and equity for rural communities

Conclusion

The virtual doctor model of care for the acute ward was efficient and effective in contributing to rural access to care close to home as evidenced by positive stakeholder outcomes overall. The virtual medical care enabled patient admissions/transfers, patient consultations, ward rounds and safe clinical care and handover of medical responsibility. During the trial period, no incidents were recorded in relation to the model of care. In addition, there were the benefits of the availability of a skilled physician who provided a responsive clinical approach and delivered an empathetic and personal service. The pilot project demonstrated that the model is scalable; the NCN Health documented experience provides a package which can be replicated at other rural health services.

Contents

Figures & Tables

Acronyms

CEO	Chief Executive Officer
DMS	Director of Medical Services
EMR	Electronic Medical Record
GP	General Practitioner
HAC	Hospital Acquired Complication
HHSP	Hume Health Service Partnership
MMM	Modified Monash Model
MoC	Model of Care
NCN Health	Nathalia, Cobram and Numurkah – health service campuses
TCP	Transitional Care Program
VMO	Visiting Medical Officer

Acknowledgements

This evaluation was undertaken on the unceded lands of the Yorta Yorta and Bangerang peoples. The participating partners acknowledge the Traditional owners of the land and pay our respects to all Elders past and present.

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Evaluation team

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Report cover photo

The report cover photo, used with permission, is of Registered Nurse (RN) Hayley MacFadyen completing the first Telecare round with the virtual engagement of Dr Chris Sia undertaken at the NCN Health-Numurkah campus.

Approved Human Ethics Project

This evaluation had ethical approval 25.01.2023 from the University of Melbourne, Ethics Committee, Office of Research Ethics and Integrity. **Reference Number:** 2023-25567-36201-4. **Study Title:** *Using virtual health care to address rural workforce limitations: Evaluation of a pilot project.*

Report suggested citation

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Replication of data and images

1. Introduction

NCN Health, comprising of three health service sites within the Moira Shire in northern Victoria, began negotiations to implement a virtual doctor model of care in the acute ward in September 2022. The Hume Health Service Partnership (HHSP) Council approved the project in October 2022 and work commenced shortly thereafter. The contracted service provider was *Telecare*[1], one of Australia's largest telehealth clinics which offer outpatient consultancy in various formats. This trial is their first experience in delivering acute inpatient services. The aim of exploring this type of model was to increase internal capacity at NCN Health and to alleviate the burden on the local GP VMO workforce. In collaboration with the Rural Health Academic Network (RHAN), The University of Melbourne (UoM) and Hume Health Service Partnership (HHSP), NCN Health sought to evaluate the pilot phase of the project from December 2022 to June 2023.

Virtual care

Previous research has highlighted the many challenges with ensuring rural communities have consistent access and coverage to health care when, where and of the type needed (Entwistle et al., 2008; Schmidt et al., 2020). Rural health service delivery and access issues have been well documented, including problems of geographical distance, inadequate resourcing (including economic, equipment, facilities, and people), an aging and exhausted workforce, the ongoing struggles with attraction and retention of staff, and timely access to specialist care (Buykx et al., 2012; Carey et al., 2018). The experiences of the COVID-19 pandemic have accelerated the uptake of virtual health care to assist in addressing some of these issues.

Virtual health care encompasses all the different ways healthcare providers remotely interact with their patients. It is described as visits that take place between patients and providers via communications technology in real time from any location (Burton et al., 2022). In rural areas it has been applied, for example, in paediatric care (Luscombe et al., 2021), pharmacy services (Chambers et al., 2022), primary care (Jonnagaddala et al., 2021) and utilised to provide mental health programs and therapeutic interventions (Frueh, 2015). It is beneficial for rural health care users in terms of time, for example travel and planning time off work, fiscally, on costs such as

[1] Telecare as the contracted service provider will be referenced as *Telecare* throughout this report, to distinguish it as the service provider and avoid confusion with other terms, e.g., telehealth, telemedicine.

fuel, food, and parking and additionally, it provides an opportunity for otherwise excluded family carers to participate.

Model of Care

The term 'model of care' is frequently applied to any change action in health service delivery methods. In this evaluation we have aligned our understanding of the term with the work of Davidson et al., (2006), and the Agency for Clinical Innovation (2013). These earlier examinations of Model of Care (MoC) development view the concept as involving 'an overarching design for the provision of a particular type of health care service' (Davidson et al., 2006, p. 49), or 'it outlines best practice care and services for a person, population group or patient cohort as they progress through the stages of a condition, injury or event' (Agency for Clinical Innovation, 2013, p. 3).

Critical features of a MoC were summarised by the Davidson et al., review (2006), as requiring: an evidence base; an understanding of issues and needs from multiple perspectives; and must include, stakeholder consultation, multidisciplinary approaches, processes which can be standardised, data management systems, skill development and pilot testing. When implementing the MoC other considerations identified for success were communication and leadership, negotiation and re-orientation in-situ, the safety and well-being of health care staff involved with delivery and; that the MoC will optimise equity of access for all members of the population (Agency for Clinical Innovation, 2013; Davidson et al., 2006).

Conceptually it is important that the MoC can be captured and that the core elements can be explained and the relationships between actions and outcomes are clear (Agency for Clinical Innovation, 2013). The MoC, which can involve complex interactions, is often illustrated graphically through a diagrammatic representation (Agency for Clinical Innovation, 2013). The NCN Health virtual doctor model for the acute ward offers a medical service for medical consultation and inpatient care provided by *Telecare*, a private provider.

The NCN Health virtual doctor model of care for rural acute settings

The 'traditional' or 'usual' model in NCN Health's acute wards regarding GP and VMO use is a ward round plus an on-call arrangement. This means after-hours or weekend coverage is managed through a roster system. This might entail the local GP, who has worked during the week in their private practice, being available to attend patient consultations, review

medications, order medical tests or organise an admission or transfer of a patient into the acute ward. The introduction of a virtual care component is an innovative hybrid model that combines the GP or VMO 'usual' care and the utilisation of a physician from the private provider *Telecare*, who can deliver virtual care.

Telecare is a virtual medical service for patient care and consultations. All *Telecare* Medical Practitioners are credentialed in accordance with the Safer Care Victoria Medical Credentialing and Scope of Clinical Practice Policy. The virtual doctor model is utilised at NCN Health where it is not possible to provide care through face-to-face or on-call Visiting Medical Officer (VMO) support. This model involves the use of *Telecare* to admit patients to the acute ward, conduct ward rounds for current in-patients and provide full medical responsibility of the patient during their stay or until the patient can be handed over to the on-call VMO or the patient's GP.

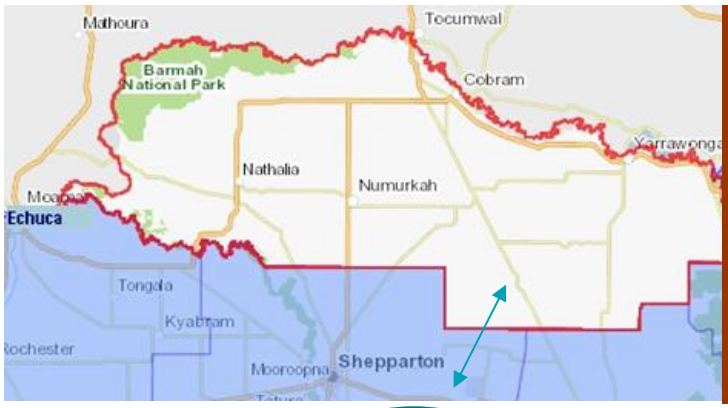
Model significance and the need for evaluation

The perceived significance of the introduction of this model of care at NCN Health was posited as firstly, assisting with rural access issues pertaining to the lack of VMOs at rural health service sites. Limited rural admissions capability has a profound impact on rural patients and health services (Petrie et al., 2021). Rural patients may have delays in their care or be separated from family if local health service access is unavailable. The impact on regional health services is a high demand for beds, which places pressure on internal resources. Patient flow from over-stretched regional services to outlying rural health services is restricted by the lack of admitting officers. Secondly, the model was posed as an option to assist with relieving local GP burden and improving their work/life balance.

This evaluation will add to the knowledge base about solutions to access and equity issues in rural health care. An evaluation of the pilot of the model is important to provide information to better support future virtual health care use and, for purposes of improvement, adaptation, and scalability of rural virtual models of health care. It is essential that quality and safety of care remain high, patient preferences are met, and the potential for exacerbation of health care disparities are considered when implementing alternate or complementary virtual models of care (Herzer & Pronovost, 2021), such as, the NCN Health virtual doctor model in the rural acute ward.

Study setting and access factors

Moira Shire, located in northern Victoria has a population of approximately 30,500 persons. The area contains Modified Monash Model (MMM) 4 and 5 zones (see Figure 1 for details). The MMM classification is used to define locations as a city, rural, remote, or very remote. People living in MM2 to MM7 areas are known to find it harder to access health and social care services and face increased costs and waiting times (Australian Government, 2023). Workforce maldistribution exacerbates these issues and increases service inequalities, resulting in poorer health outcomes for the population living in these locations (Cosgrave, 2020).



Moira Shire is part of the Goulburn Region, or commonly, West Hume when referring to service delivery areas. Moira is included in the Murray Primary Health Network catchment.

MM Categories

MM1	**Metropolitan**
MM2	Regional Centres
MM3	Large rural towns
MM4	Medium rural towns
MM5	Small rural towns
MM6	Remote communities
MM7	Very remote communities

Figure 1: Study setting

2. Evaluation aim

The aim of the evaluation was to examine the preparation and implementation of the virtual doctor model of care for the rural acute ward setting through a range of stakeholder perspectives including: NCN Health staff, GPs/VMOs, regional health service stakeholders, patients and/or their carers, and the virtual health care provider, *Telecare*.

Key evaluation questions

The key evaluation questions are:

3. What successful and/or challenging features were important enablers or barriers in preparation and implementation of the pilot of the virtual model of care?
4. To what extent was the virtual model of care efficient and effective in contributing to rural access to care close to home?

Evaluation framework

An illustrative depiction of the evaluation framework, incorporating the main areas of the key questions is provided in Figure 2, on the following page. The figure shows the phases of, Preparation, Implementation and Sustainment (and Scalability) and the domains of Efficiency and Effectiveness.

The descriptions of the Preparation, Implementation and Sustainment phases were drawn from Implementation Science which focuses on translation of evidence to practice (Nilsen, 2015). This field can assist in 'real-world' application of research results such as executing change in health and social care systems and organisations. The theories, approaches and frameworks from Implementation Science, can be used to guide the process, to understand and explain, or to evaluate implementation (Moullin et al., 2020; Nilsen, 2015).

We considered the features of efficiency and effectiveness for assessment or judgment, as important for knowledge production in evaluation of the pilot project. Efficiency; basically, considers the performance of all the activities undertaken within the pilot, and effectiveness; examines the extent of success in meeting the desired or intended outcomes (Sundqvist et al., 2014). We did not include any evaluation approaches investigating financial aspects, e.g., cost-efficiency analysis, or cost-effectiveness analysis, these are specialised areas from the field of economic evaluation and were out of scope of the evaluation.

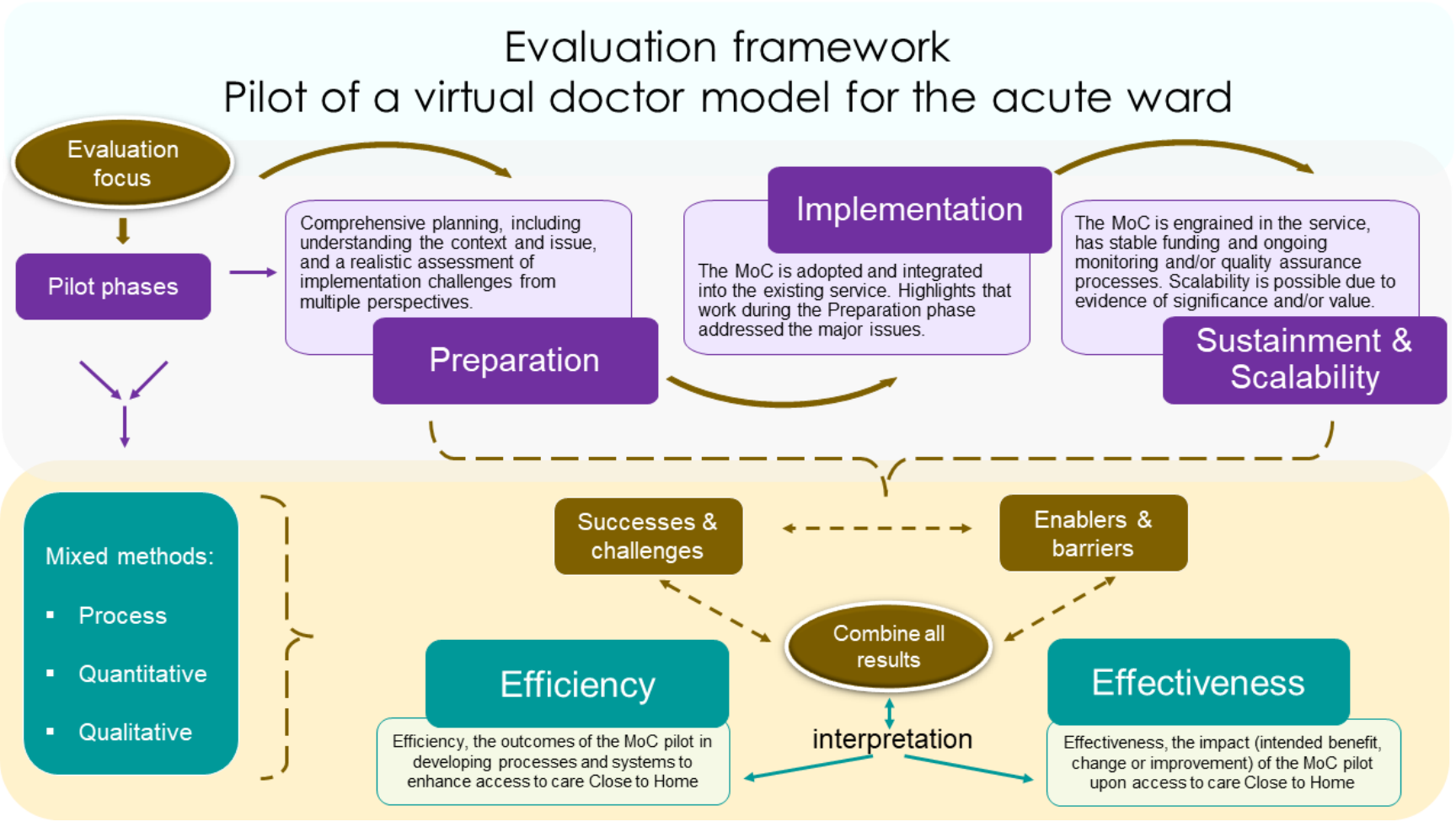


Figure 2: Evaluation framework and focus areas

3. Method

A mixed-methods approach was employed for the evaluation. This involved:

- **process evaluation methods** comprising document examination such as NCN Health development and implementation of policy, procedures, staff training, quality processes to review and adapt the model of care during implementation.
- **quantitative methods** using staff surveys, and summary descriptions of *Telecare* service provision including numbers of virtual patient consultations, virtual ward rounds.
- **qualitative methods** involving patient/ carer reflections about receiving virtual health care and interviews with health service staff, affected general practitioners, regional health service stakeholders and staff from the virtual care provider.

The features of the key evaluation questions were incorporated into our data collection tools, survey measures and interview questions (see Appendix 2) and used as an overarching *a priori* (pre-determined codes) to guide analysis and combining of all process, quantitative and qualitative information.

Data analysis

Process and quantitative results were formatted into summary descriptions. Qualitative data was analysed using the Qualitative Framework Approach (Goldsmith, 2021; Smith & Firth, 2011). Interview participants were assigned a unique identifier and referred to by that identifier in all reporting of findings to ensure anonymity. Nursing staff interviews (n = 8) were given one group identifier to further reduce the potential for individual staff members to be identifiable.

Combining all results

The results were further combined and reduced through triangulation. Triangulation is a process to combine methods and to compare and contrast all the evidence and look for points of confirmation or convergence and also to look for points where the data shows inconsistencies, difference or divergence (Patton, 2014). This process helps in interpretation and informs overall conclusions.

4. Results

4.1 Process evaluation summary

The utilisation of process evaluation methods is a way to describe and understand aspects of program development. These methods are concerned with examining the evidence about the activities undertaken before and during implementation and can support conclusions about the monitoring of quality (Royse et al., 2015). In doing this it can assist us to document the 'how' of the MoC development. A timeline and overview of key process milestones and a description of the associated activities are outlined in Table 1 (on the next page). A detailed description of process evaluation findings is provided in Appendix 1.

4.2 Virtual doctor service provision

The important areas of virtual doctor service provision from *Telecare* during the pilot timeframe are summarised in Table 2.

Table 2: *Telecare* virtual service provision summary December 2022 to June 2023

Service site	In patients	Ward rounds	Patient consultations	New admissions	Weekends serviced
Nathalia Acute beds n = 6	33	17	56	0	9
Cobram Acute beds n = 12	63	15	111	3	8
Numurkah Acute beds n = 16	78	17	163	2	9
TOTAL	**174**	**49**	**383**	**5**	

Table 1: Timeline alongside key process milestones and activities

	Milestone	Description of activities
2021 - 2025 NCN Health strategic plan, pillar 3 of the framework: **Close to Home**	Identification of the problem	Describes the need, including local and regional perspectives.
	Identification of a solution	The solution is outlined representing a hybrid model of care with virtual service to be provided by Telecare
October-December 2022 Solution negotiated with ***Telecare***	Negotiation with service providers	This milestone encompasses NCN Health's activities with the virtual health care provider.
	Establishing partnerships	All stakeholders engage in partnership connections and establishing of roles and responsibilities.
December 2022 *Telecare* physician Dr Chris Sia credentialled at NCN Health and virtual **service goes live**	Project management	Describes all the areas of project management in order to facilitate change management.
February 2023 Model of care operational at all three NCN Health campuses	Documentation developed	A suite of model of care, management and operational documents were developed.
May 2023 Second *Telecare* physician, Dr Clinton Colaco credentialled at NCN Health	Patient and staff information	Communication material was developed, distributed, and reviewed.
	Staff education and training	Staff education and training was conducted across all NCN Health sites.
June 2023 Pilot phase end. Sustainability and scalability features included	Adaptations and problems solving	During implementation iterative review and adjustments were made to enable re-orientation in-situ.
	Quality of care processes	NCN Health processes for clinical review were imbedded during the pilot to ensure the safety and well-being of health care staff involved with delivery and all patients.
December – June 2023 *Telecare* have provided **383** virtual patient consultations	Scalability	This milestone describes scalability options and development.

4.3 NCN Health staff survey results

Staff surveys were distributed electronically at two time points in the project, 1) preparation phase (month two) and 2) at the end of the pilot phase (month six). Overall, 21 NCN Health staff members responded to the invitation. Table 3 provides brief characteristics (phases one and two combined).

Table 3: Survey respondents, phase one and two

		N = 21	%
NCN Health Campus	Nathalia	5	24
	Cobram	8	38
	Numurkah	8	38
Role	Nursing staff	18	86
	Other	3	14

At the preparation phase the survey asked staff about awareness and communication, Table 4. provides these results. At this phase we also asked about training uptake, with 27% indicating training had been completed and 13% indicating they were scheduled for training.

Table 4: Preparation phase

NCN Health staff (n = 15)	Yes	No	Not sure
Awareness about the model	14	1	-
Have seen internal communication	14	1	-

At both phases the survey invited free text comments about successes and challenges for this virtual model of care. Time point comparisons are summarised in Table 5. A concern at the preparation phase was having: '*a clear plan for of medical care to enable handover and continuity of care*.' One written comment at pilot phase end captures overall success in the model of care efficiency and effectiveness: '*Virtual MO* [Medical Officer] *was excellent in term of following up with patient's conditions and needs, also great listener to both nurses and patient which made care and treatment smoother and more effective.'*

Table 5: Successes and challenges; free-text comments

	Phase one	Phase two
Successes	Potential to increase access, e.g., ▪ to enable admission ▪ to a VMO after hours	Quality of care, e.g., ▪ timely care, in ○ contact with VMO, ○ medication charts and scripts ▪ thorough assessments, ○ listened to nurses and patients ▪ prompt responses to patient concerns, condition, and needs
	Potential benefits for local GPs, e.g., ▪ decrease workload ▪ more downtime on weekends	
	Predicted benefits for patients and families e.g., ▪ to provide excellent care	
Challenges	Staff were concerned about time, e.g., ▪ nurses time and, ▪ time limits of only a pilot project to assess effectiveness Other predicted challenges were technology and, staff and consumer education	Time, e.g., ▪ time it takes to do a ward round ▪ nurses taken away from patients Technology, e.g., ▪ user confidence ▪ Interruptions (with connection) and delays (emailed drug charts)

At the end of the pilot phase, we asked staff to rate a series of statements about the virtual model of care, using a 6-point rating scale from, 1 Very poor to, 6 Excellent. The first five statements related to NCN Health, one related to patient and family responses to the model, and the last three statements related to *Telecare*. The full results are provided in Appendix 3. Briefly, to highlight the results indicated *Telecare*'s accomplishments with engagement were a critical enabler in the success of the pilot, staff rated:

- Question 7: the **care provided by *Telecare*** as very good (50%), or excellent (50%)
- Question 8: the amount the ***Telecare* doctor listened to patients and nursing staff** as very good (33%), or excellent (67%)
- Question 9: the ability of the ***Telecare* doctor to adapt care as required** as very good (17%), or excellent (67%).

4.4. Qualitative results

4.4.1 Patient and carer perspectives

In seeking patient feedback about their experiences of the virtual model of care a key data collection activity was utilising follow-up (mainly in-person) discussions. In total, 34 patients engaged in a discussion about their perspectives of the virtual service with the NCN Health project lead (author 2). Patient characteristics are provided in Table 6, followed by a summary of feedback provided in Table 7.

Table 6: Patient characteristics

n = 34	**Age groups**	
Gender	50 to 60 years	1 (3%)
Male	61 to 70 years	3 (9%)
16 (47%)	71 to 80 years	10 (29%)
Female	81 to 90 years	18 (53%)
18 (53%)	91 years plus	2 (6%)

The follow-up discussion asked patients about feeling safe, if care was appropriate, and if they would consider using virtual care again. Patients were all very positive, many comments highlighted the high regard for their own local GP and that they valued face-to-face visits (see Appendix 4 for further patient reflections).

Table 7: Patient feedback summary

Question	Example quotes
Did you feel safe using the virtual health care doctor?	*"Felt very safe, trusted doctor* [name], *found him easy to understand."*
Did you feel the care you experienced was what it should be?	*"Yes, I got information off him about my medical record that I didn't even know. Doctor* [name] *was very thorough and I felt very well cared for."*
If you were offered the virtual health care option again, would you use it?	*"Yes, but I like my GP and would like to see him, but understand he needs some time off."*

4.4.2 Stakeholder interview findings

The evaluation team undertook, individual and group, voice recorded (with consent) interviews during May, June, and July. We approached a total of 31 key stakeholders to provide feedback. Overall, 22 people accepted the invitation to share their views and experiences about the development of the virtual model of care for the acute ward. Details of recruitment of interviewees are provided in Table 8.

Table 8: Interviews with stakeholders

Key stakeholders	Invited for interview n	Participated in interview n
NCN Health staff (ranging from management to direct care nursing staff)	17	13
Regional health service stakeholders	4	3
Primary care & General Practice stakeholders	7	3
Telecare staff	3	3
TOTAL	**31**	**22**

The interview recordings were transcribed, and transcripts analysed by three authors (CR, CC & VJ). Analysis involved initial coding, refinement and reduction of codes and then grouping into categories and subcategories through an iterative process and group discussion. For the purposes of this report these findings are presented under three headings, with associated categories. The full details including exemplifying quotes are provided in **Appendix 4**.

1. The successful aspects of the MoC pilot

Stakeholder views indicated overall satisfaction with introducing the virtual model of care for the acute ward. The successful aspects of the pilot are grouped within the categories of:

1.1 Understanding the context, problem and solution

1.2 Scope, negotiation and support to execute change

1.3 Engagement: relationships, partnerships, and communication

1.4 Impact: care, people, and place

2. The challenges that arose during the MoC pilot

The challenges identified by stakeholders were seen not as negatives or that it indicated the MoC was flawed but rather, there were things that arose which needed to be addressed. In addition, our analysis identified aspects which should be continuously monitored to facilitate sustainability of the model. Categories were:

2.1 Nurse model of care and nursing staff workload

2.2 Managing perceptions

2.3 Feedback and continuous quality improvement

3. Sustaining the gains and the future

Stakeholders were cognisant that the pilot was successful but aware there are broader ongoing challenges facing rural and regional areas. The findings were grouped into the categories of:

3.1 Sustainability and replicating the MoC

3.2 The rural population and the rural workforce

3.3 Need for a rural digital health strategy

5. Combining all results and interpretation

A mixed methods evaluation requires a step to integrate all results, this involves combining the process, quantitative and qualitative findings to provide a more in-depth interpretation. This approach strengthens the evaluation (O'Cathain et al., 2010). The report has to this point presented the results separately now, triangulation will bring all findings together. We also extracted two example case studies which can be found in **Appendix 5** which showcase the concept of care close to home.

The findings are grouped under the two domains of **Efficiency** and **Effectiveness** in addition, barriers and enablers are presented across the project phases of **Preparation**, **Implementation**, **Sustainment** and **Scalability**. We have previously defined these features in the report which align to the key evaluation questions in section *3. Method*, briefly they are:

- **Efficiency** – systems and processes
- **Effectiveness** – impact or beneficial changes
- **Preparation** – considers the evidence base, and potential fit of the practice for the issue and the context
- **Implementation** – plans for integrating the practice into existing systems, includes assessment of implementation challenges
- **Sustainment** – continuing the model of care, ongoing monitoring is in place and stable resourcing and/or funding is available
- **Scalability** – added as important for replication and for strategic decision making regionally.

The following tables show the triangulated results, Table 9 provides Domain 1. Efficiency and, Table 10 Domain 2. Effectiveness. The numbered foot notes attached to the tables provide explanations and highlight areas where difference or divergence occurred as there was low identification or limited data for that finding or it was unclear. The integration of all findings is illustrated by two figures, Figure 4. and Figure 5.

Table 9: Domian 1. Efficiency findings

	Finding	Description	Evidence
Preparation			
Enablers	Problem and need awareness	Problem identification congruent with solution proposed	All data
	Engagement, project and model scope, planning and negotiation	The engagement to foster collaboration and working relationships was a strong foundation. Clear understanding of the scope of the model, planning had executive leadership support where essential, as was negotiating and pre-empting problems.	Process data, stakeholder interviews
	Communication and information access	Communication in all forms, such as information to community members, or education for NCN Health staff.	All data
	Project management processes	Efficiency was enabled through project management processes e.g., governance and clinical committees, project resources with experienced people in designated positions.	Process data, stakeholder interviews
Barriers[1]	New model	The challenges of convincing the public health system structure to consider the proposed model. This finding highlights the complexities of virtual health care, private models and public healthcare systems.	Process data, stakeholder interviews
	Managing change	Three distinct subcategories were identified as efficiency challenges to manage change: 1) logistics, such as shared data, communication platforms, 2) financial challenges, e.g., cost shifting from funding on call arrangements to a private virtual care provider, and 3) Nursing staff change management and the acute ward model of care.	All data
Implementation			
Enablers	Leadership, collaboration, partnership, relationships	This finding captures the positive views, attitudes, and regard between all stakeholders, at all levels. This facilitated all areas of the process to move into the implementation phase.	All data

	Finding	Description	Evidence
	Systems and process to manage change and provide safe care	This finding encompasses areas of collaborative problem solving which increased efficiency, the dedicated project resources (e.g., staff members from NCN Health and HHSP), and processes for patient care, staff safety, all contributing to care close to home.	All data
	Clinical processes	Implementation was successful due to enablers such as clinical assessment history, clinical knowledge and preparation, responsive care, patient safety and clinical handover.	Process data, stakeholder interviews
	Nursing staff capacity	Nursing staff were supported to increase their capacity to deliver a new model of care, and to be exposed to the skills, research and knowledge of the Telecare staff and to learn from experienced physicians	Staff survey and stakeholder interviews
Barriers[1]	Balancing old and new	All stakeholders indicated an awareness - in some form - about the challenges of balancing the 'traditional' model and the inclusion of the virtual component.	All data
	Nursing staff challenges	There was some anxiety about the workflow and workload for staff on the acute ward with the commencement of the virtual doctor service.	Staff survey and stakeholder interviews
	Operational challenges	This mainly highlighted systems and processes which required problem solving and/or adaptation when the service become 'live' (e.g., functioning of the iPad, emails blocked)	Process data, stakeholder interviews
	Clinical processes and risk	There was an awareness about potential risks during virtual clinical assessment, for example potentially missing something in engagement/consultation with a patient.	Limited identification [2]
Sustainment			
Enablers	Continuous monitoring	Highlighted the importance of having evidence about replicable systems, integration of review and continuous quality improvement cycles.	All data

	Finding	Description	Evidence
	Platforms and communication	The Telecare developed platform and its demonstrated utility is a critical enabler for sustainability.	Process data, stakeholder interviews
Barriers[1]	Governance and fidelity of the model	This finding captured concerns about corporate governance and structural challenges and ongoing fidelity of the model.	Stakeholder interviews – leadership level [2]
Gap	*"Just a pilot"* #11	A question posed by a stakeholder, it is unclear if there will be ongoing resource support and project management leadership which was indicated as an important part of success of the trial.	One interview participant – unclear[3]
Scalability			
Enablers	Engagement and promotion	The model is scalable, regional strategic engagement is in progress. The experiences of NCN Health are available as a documented package and can be promoted and shared to enable the model to be rolled-out regionally.	Process data, stakeholder interviews
Barriers[1]	Drivers needed for scalability	This finding captures the elements that must be present within organisations to replicate the model, such as strategic leadership and decision-making.	Stakeholder interviews – leadership level [2]
Gap	Rural health policy context	The rural health policy context and the need for a rural digital health strategy was raised but this area requires more in-depth examination.	One interview participant – unclear[3]

1 Barriers listed are not indicating a negative or a flaw in the model

2 Limited identification, not consistently found throughout the data

3 Unclear – divergence, difference or gap

Efficiency findings: a summary of enabling features of the MoC to enhance access to care close to home is provided below.

Preparation	Understanding of problem and solution	Negotiation, relationships and collaboration	Scope, planning and project managment
Implementation	Processes, tools and resources	Champions and leadership	Nursing staff capacity
Sustainment and scalability	Platforms and communication	Review and feedback mechanisms	Tested package for replication

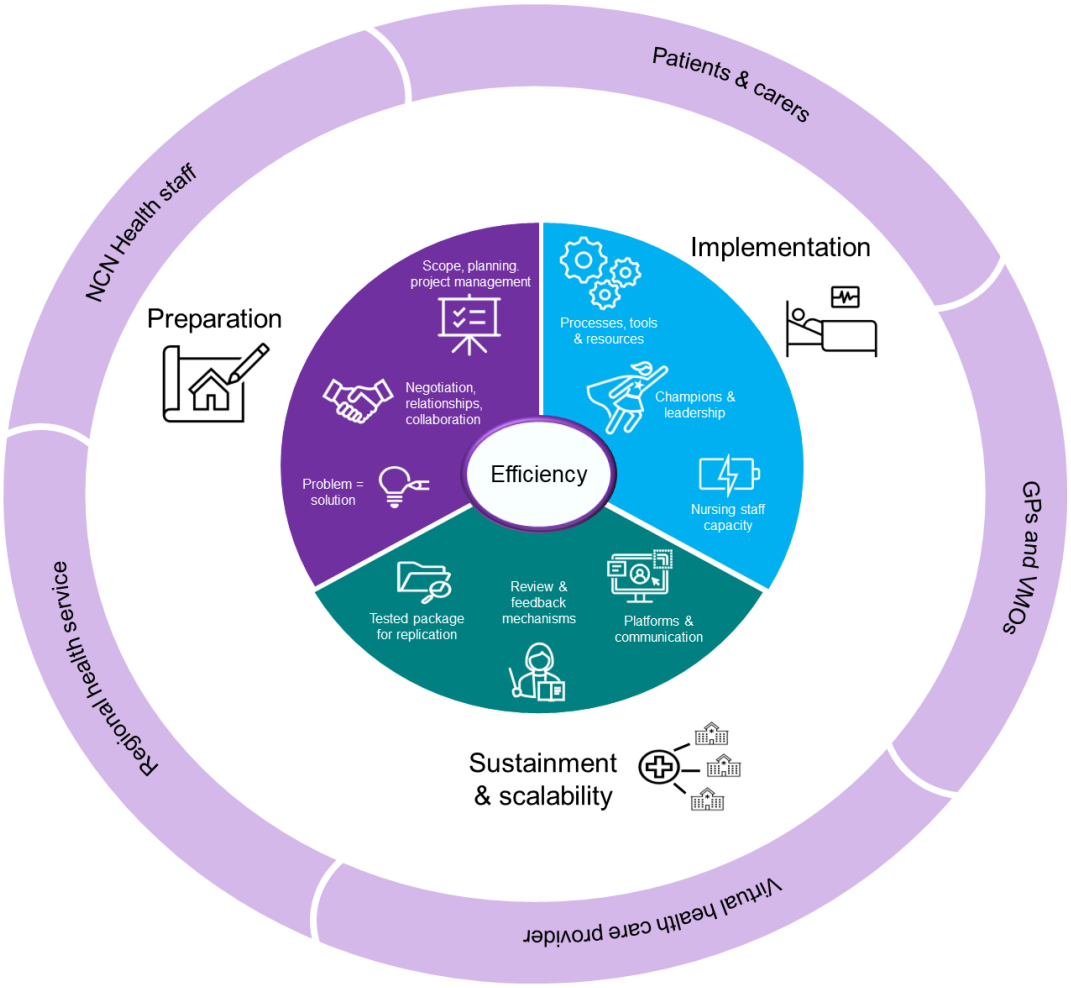


Figure 4: Efficiency findings highlighting key MoC enabling features

Table 10: Domian 2. Effectiveness findings

	Finding	Description	Evidence
Preparation			
Enablers	Understanding the context and potential impact	People and place were at the centre of planning which contributed to an effective model. High expectations for patient care effectiveness was a key element in preparation.	All data
Barriers[1]		None identified	
Implementation			
Enablers	Safe, accessible care close to home	Features of access impact included rural and community elements; using an extension of the existing system. Alongside this was the relieving of regional burden.	All data
	Patient outcomes and impact	This finding highlighted multiple positive impact for patients such as acceptance and understanding whilst maintaining their relationship with their GP; access to a specialist physician and access to responsive care on weekends.	Stakeholder interviews, patient reflections
	Virtual doctor impact of Telecare	An enabler during implementation was the Virtual doctor sensitivity to relationships and interactions with patients, local GPs and nursing staff. Characteristics listed included: approachable, observant, open to feedback, wants to improve.	Stakeholder interviews, patient reflections
	GP workforce	Positive impact on GPs were identified as: contributing to work life balance, relieving the local workforce, avoiding burnout, access to physician expertise, assisting with professional pressure.	Staff survey, stakeholder interviews, patient reflections
	Nursing workforce & care impact	The range of positive impacts and implementation enablers for nursing staff included feelings of being valued and the nurse's professional opinion listened to, having support over the weekend, increased learning, and support with complex patients. Care impact from nurse perspectives was the thoroughness in knowing the	Staff survey, stakeholder interviews, patient reflections

		patient's medical history, access to tests/medication changes, virtual doctor's engagement with patients.	
Barriers[1]	Impact concerns	The main concerns were around technology issues and increases on workload. There was a high awareness that nursing staff had to adapt their 'usual' model of care and the importance of ensuring that nurses continued to feel safe in their practice.	Staff survey, stakeholder interviews
Sustainment			
Enablers	The effectiveness of the journey	This finding highlighted the rewards for stakeholders in being part of an innovative hybrid model, the co-design process, and the engagement undertaken; all critical for sustainability.	Stakeholder interviews
	Future needs	Two main enablers for sustainment were recognised in this finding, 1) the regional need for a replicable MoC – which the NCN Health pilot has trialed successfully and 2) planning public health strategies to address persistent rural workforce challenges through partnership and a digital health strategy.	Stakeholder interviews
	Sustainment from different perspectives	The preparation phase of the MoC pilot was recognised here for strategic sustainment, along with the inclusion of community, GP and nurse workforce perspectives and the impact on them.	All data
Barriers[1]	Equity - Consumers at centre of care	This finding reiterated that the hybrid model is complementary, and that rural workforce attraction and retention will directly impact on equity. It also highlights that continued consumer involvement, engagement and feedback should be prioritised.	All data
Scalability			
Enablers	Need based	An effectiveness enabler for scalability of the model was highlighted as the need for care close to home and the potential to showcase the model and local experiences	All data
Barriers[1]		None identified	

1 Barriers listed are not indicating a negative or a flaw in the model

2 Limited identification, not consistently found throughout the data

3 Unclear – divergence, difference or gap

Effectiveness findings: a summary of enabling features of the MoC to enhance access to care close to home are as follows.

Preparation	NCN Health strategic vision: Close to Home	Co-design, people and place at the centre along with quality of care	
Implementation	Sensitive and responsive care	Nursing workforce felt valued	Relationships and interactions with GP workforce
Sustainment and scalability	Timely care	Effective care	Rural equity and patient satisfaction

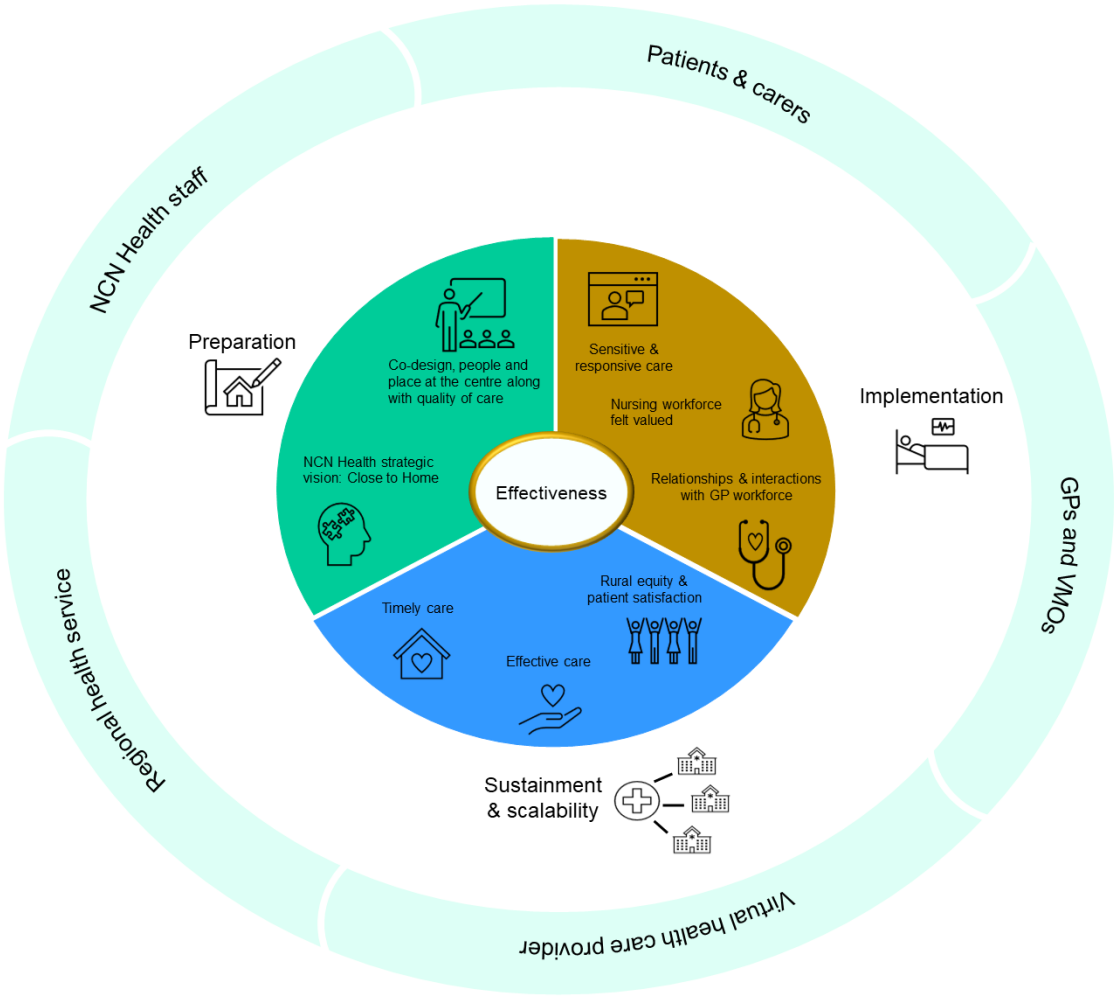


Figure 5: Effectiveness findings highlighting key MoC enabling features

6. Discussion

This evaluation of the pilot of the NCN Health, *Virtual Doctor Model of Care in the Acute Ward* was undertaken from December 2022 to June 2023. Process, quantitative and qualitative data were collected and analysed. Overall (n = 77) views and experiences were examined with, NCN Health staff survey (n = 21), patient reflections (n = 34) and stakeholder interviews (n = 22).

The findings highlighted the critical aspects at the preparation phase were the understanding of the problem and the comprehensive negotiation of a solution. Implementation was shown to be enabled through resource support and strategic and operational leadership drivers. Sustainability and scalability were inherent elements from the pilot commencement. There was an intrinsic awareness that these elements would have broader implications for virtual care in the acute ward, monitoring of the impact on GPO/VMO workforce work/life balance and, rural health care policy and strategic planning.

Virtual health models of care have expanded since the COVID-19 pandemic. Similar to the current evaluation, the Canadian study authored by Rush et al. (2022) reflected that virtual care can supplement but not replace in-person care. Interview participants in our evaluation pointed out that the hybrid model is complementary to the existing GP/VMO arrangements. Patients also stated they valued their GP and strongly desired to continue face-to-face access. Equitable access is a vital feature in the development of all models of care (Agency for Clinical Innovation, 2013). As stated earlier in the report, when introducing a model of care a critical consideration is equity for all members of society. It is therefore important that recruitment and retention strategies of the rural GP workforce remains a priority to ensure equitable healthcare for all Victorian communities.

Caffery and colleagues (2022), in their study about Telehealth use and rural access gains post COVID, pose that integration and sustainability of new models is dependent on not only policy but also how providers embrace implementation. The NCN Health experience has provided an example of how balance was achieved within the private/public healthcare environment and navigation of the public health systems. In addition, it has shown a rural digital health strategy continues to be an important policy area where consumer and workforce opinions must be included.

A strength of the evaluation was the range of perspectives we considered, we included NCN Health staff, GPs/VMOs, regional health service stakeholders, and patients and/or their carers,

and the virtual health care provider, *Telecare*. A limitation is the time period, the evaluation would benefit from the inclusion of a monitoring phase. It would be important to examine more robustly the medium- and longer-term outcomes: for local GPs, including work/life balance, impact on business models; and to gain a deeper understanding of the impact on patient health and presentation and re-presentation patterns and use of health care services.

7. Conclusion

Introducing a new model of care is a complex undertaking. The NCN Health experience has illustrated how important the preparation phase is in understanding the issues and the requirements of all stakeholders. The enablers of engagement, collaboration and partnerships were carried through to implementation and were identified as key features to lead to successful sustainment.

Efficiency successes were clearly possible through the resource support of personnel, virtual equipment (e.g., electronic medical records) and systems and processes, including governance structures and clinical care. Barriers were mirrored in reflections on if these were lacking or if the availability of leadership was not present.

Effectiveness successes highlighted the benefits to patients in safe and accessible care close to home. The impact on nursing staff and GPs was positive and included capacity building, feelings of being valued, and confidence in care arrangements.

Overall, the virtual admitting officer model of care was efficient and effective in contributing to rural access to care close to home. The model was safe and perceived to be so. The pilot project demonstrated that the model is scalable; the NCN Health documented package is potentially replicable at other rural health services.

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9. Appendices

Evaluation Report: The virtual doctor model of care in the acute ward

Appendix 1. Key milestones and activities

<table>
<tr><th>Milestone</th><th>Description of activities</th></tr>
<tr><td>Identifying the problem</td><td>
An identified need to address GP/VMO (with admitting rights to NCN Health) workforce issues. Tracking local GP movement numbers from 2017 to 2023, revealed:
<table>
<tr><th>Local area</th><th>2017</th><th>2018</th><th>2019</th><th>2020</th><th>2021</th><th>2022</th><th>2023</th></tr>
<tr><td>Cobram</td><td>9</td><td>9</td><td>8</td><td>6</td><td>5</td><td>4</td><td>3</td></tr>
<tr><td>Numurkah</td><td>9</td><td>8</td><td>4</td><td>3</td><td>3</td><td>3</td><td>2</td></tr>
<tr><td>Nathalia</td><td>5</td><td>4</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr>
</table>
In addition:

Numurkah availability for GP on call to the UCC was ceased, April 2019
Numurkah availability for GP on-call ceased for the acute ward June 2021
Nathalia availability for GP on-call ceased November 2022

Local perspective: health services with available beds, with limited admissions capacity and capability. Unable to accept admissions due to lack of admitting officers available after hours and/or all hours.

Regional perspective: high demand on internal bed pressure resources, impacting patient flow. Too many admissions for health service capacity.
</td></tr>
<tr><td>Identifying a solution</td><td>
To provide a virtual model of care, which offers alternative (off site) admitting officer capacity.

The use of the private provider, Telecare to complement health service utilisation then patients receive care closer to home, wherever and whenever possible.

Telecare is an interim model of care until discharge handover to patient’s nominated GP.
</td></tr>
<tr><td>Negotiation with service providers</td><td>
Originally, Telecare were exploring business opportunities. The initial models were based on outpatients in rural areas using telemedicine to assess a whole range of medical specialists for elective, non-urgent consultations. That was not the need, and the volume for that type of clinical
</td></tr>
</table>

	activity wasn't available. It was a process of discussions with *Telecare* to see if they would be interested in using the telemedicine platform to support other clinical activity which is more voluminous and regular and in greater need of support at NCN Health service sites. An extended process occurred to convince the public health system structure to consider alternative models of care such as this, including directors of medical and clinical services.
Establishing partnerships	The proposal for this model of care was presented to the Hume Health Service Partnership (HSSP) at a CEO Council meeting 5th October 2022, through: *Briefing Paper NCN Health and HHSP: Trial of General Physician Virtual Admitting Services to Small Rural Health Service of HHSP (NCN Health) – For Approval.* The briefing paper was prepared by Andrew Freeman and Viv Jeffery from the HHSP. **Recommendation:** The HHSP provided funding for the Virtual Admissions - Project Officer Role for six months. Regular reports on the progress of the project will be provided and a final evaluation report will be prepared and presented to the HHSP CEO Council. The HHSP involves 16 health services across the region and is funded by the Department of Health. Their remit is to support the group in various projects. NCN Health negotiated project support from the HHSP.
Project management	Project lead appointed: • NCN Health DDON responsible for strategic projects allocated as internal project lead across NCN Health in September 2023 with time dedicated to the project management. Project support: • HHSP Clinical Lead allocated to support this project within current EFT. Project governance established: • NCN Health and the HHSP provide one project resource each to work collaboratively with representative/s from *Telecare*. • Meetings held weekly, for ½ an hour duration via MS Teams at a time agreed by both parties. • Meeting frequency adjusted, as necessary, throughout project duration. Project working group confirmed:

	○ Chief Executive, NCN Health ○ Deputy Director of Nursing, NCN Health ○ Director Medical Services, NCN Health ○ Executive Director, Hume Health Service Partnership ○ Clinical Lead, Hume Health Service Partnership Working group meetings held weekly and adjusted as necessary, throughout project duration. Project operational group confirmed: ❖ DDON, NCN Health ❖ Clinical Lead HHSP ❖ Director Medical Services, NCN Health ❖ Co-founder & Chief Executive Officer, *Telecare* ❖ Co-founder & Chief Operating Officer, *Telecare* ❖ Co-founder & Chief Clinical Officer, *Telecare* ❖ Co-founder & Chief Growth Officer, *Telecare*
Documentation developed	A suite of model of care, management and operational documents were developed. An example of a service operational document is the NCN Health Procedure on *Telecare* use. The Procedure was to provide guidance and advice to nursing staff about the use of *Telecare* and the virtual doctor service at NCN Health. It was finalised April 2023. This procedure included admission criteria for the Virtual Dr use: • *Telecare* will only admit patients to NCN Health with clinical conditions that it is able to effectively manage, taking into consideration the availability of current industry recognised skills, facilities, therapies, equipment, materials and external support services at the time of the admission or stay. • Patients will only be admitted if there is appropriate medical treatment, nursing care and staff resources available to deliver the identified care needs. Patients outside of this scope will be stabilised and transfer arranged to a suitable facility. Exclusion criteria included: • No transfers straight from Intensive Care Unit (ICU) or Critical Care Unit (CCU) (unless medical/surgical patient >48 hours)

	• Complex patients with multiple co-morbidities requiring care outside the resources of NCN Health • Involuntary mental health care or acute psychiatric patients • Persons aged <18 years old. • Obstetric patients • Patients requiring surgical or subspecialist medical care. • Patient that has pre-existing health associated infections or communicable disease that is beyond the scope of NCN Health facilities (e.g. negative pressure room management). • If the patient refuses to be admitted under the *Telecare* virtual medical service. Contract negotiations commenced, with NCN Health seeking review by Health Legal and were completed within approximately one month. It is envisaged this contract template will be used for additional health services, tailored to specific requirements. A project report was written outlining the steps involved from planning to implementation. This (generic) how to guide has been shared across HHSP for health services to consider adoption of the model.
Patient and staff information	Resources were developed by *Telecare* with review and feedback provided by NCN/HHSP staff, and consumer group feedback and included: • NCN Health - Health Practitioner Information • NCN Health - Guide and FAQs Resources developed to inform patients: • Face-book posts • Community newsletter article • Information for staff developed and distributed.
Staff education and training	Staff education about the use of the *Telecare* model for the acute ward commenced with on-site visits scheduled at all three NCN Health campuses in November 2022.
Adaptations and problems solving	Throughout the trial feedback was tracked to identify issues and then problem solving occurred to arrive at viable solutions.

	One example was nursing staff on the acute ward identified that weekend ward rounds using *Telecare* were lengthy. Several elements contributed to this issue: • staff were not used to undertaking weekend ward rounds • usual GP practice did not include weekend ward rounds • not all patients needed to be routinely seen • access to patient records/histories during the ward round **Solutions:** Criteria for weekend review were developed. Exclusions for review included: TCP/long term/aged care waiting patients. This reduced the length of the ward round and prevented over-servicing of patients. Access to patient records, usually stored at the nurse's station, was solved through the purchase of equipment, a Clax Trolley to accommodate the selected patient's records. This supported nursing staff time efficiencies, so they didn't have to go back and forth to the nurse's station to retrieve files. These adaptations have been beneficial for quality improvement as the trial of this model of care evolved.
Quality of care processes	The process for clinical review followed NCN Health current procedures where anything that would normally meet the NCN current triggers for clinical reviews would be included, e.g., transfers out, adverse events such as falls, Hospital Acquired Complications (HAC).
Scalability	NCN Health have been working with HHSP and *Telecare* to discuss and develop scalability options. Achievements in this area have included: • Generic document packs developed, ready for specific health service branding to enable use by other health services • As an example timeframe, from the NCN Health experience - once the HHSP CEO council approved the trial, the project team went from planning to implementation within two months. • Board presentations to other HHSP services • Discussions with health services external to the HHSP • Six HHSP rural health services are interested in the model and are exploring bringing *Telecare* on board.

Appendix 2. Staff survey results

Pilot phase end

#	Statement (abbreviated here)	Very poor		Poor		Okay		Good		Very good		Excellent	
		n	%	n	%	n	%	n	%	n	%	n	%
1	Internal communication to staff	0	-	0	-	0	-	1	17	3		2	33
2	Education and training for staff	0	-	0	-	1	17	2	33	1	17	2	33
3	NCN Health policy developed to guide this virtual health care model	0	-	0	-	0	-	1	17	4	67	1	17
4	NCN Health procedures to support staff	0	-	0	-	1	17	0	-	4	67	1	17
5	Written information developed for patients and families	0	-	1	17	0	-	0	-	4	67	1	17
6	Patient and family's responses	0	-	0	-	1	17	2	33	3	50	0	-
7	The care provided to patients by the Telecare doctor	0	-	0	-	0	-	0	-	3	50	3	50
8	The amount the Telecare doctor has listened to patients and nursing staff	0	-	0	-	0	-	0	-	2	33	**4**	**67**
9	The ability of the Telecare doctor to adapt care as required	0	-	0	-	0	-	1	17	1	17	**4**	**67**

*Shaded cells indicate critical enablers for the pilot

Appendix 3. Patient reflections

Question	Example quotes
Did you feel safe using the virtual health care Dr? (100% yes)	*Yes, first time using, Dr* [name] *was very nice, and I felt like I could ask questions.* *Felt very safe, trusted Dr* [name], *found him easy to understand.* *Yes, Dr* [name], *great to talk to, great to use new technology.* *Yes, felt safe, Dr* [name], *looked at all aspects of care, he did see photos of my wounds but then asked to see them over the video, which gave him more perspective into what was going on.* *Yes, the doctor did use terms I didn't understand but I was able to ask him to clarify.* *Yes, it is hard for the doctor as they don't know you as well as your normal GP.*
Did you feel the care you experienced was as it should be? (100% yes)	*Yes, only the first time that I had used it but the video* [the iPad screen] *was easy to see and hear, the nurses managed it well.* *Yes, I got information off him about my medical record that I didn't even know. Dr* [name] *was very thorough and I felt very well cared for.* *Yes, surprised by getting the offer to use it, but it worked very well, Dr* [name] *very helpful.*
If you were offered the virtual health care option again, would you use it? (100% yes)	*Yes, but I like my GP and would like to see him, but understand he needs some time off.* *Yes, very impressed with service, and impressed that NCN is using new technology and thinking about using new services for patients.* *Yes, that would be fine to give my GP a break.*
Other comments	*Not as personal as having the doctor in the room.* *Dr* [name] *made changes to my medications and ordered a scan for me.* *Dr* [name] *listened to me and my issues and started me on antibiotics which has worked and I'm feeling much better. This is a wonderful idea that Dr* [name] is *sitting in Melbourne but able to look after me*

Appendix 4. Stakeholder interview findings

1. Successful aspects of the MoC pilot

Stakeholder views indicated overall satisfaction with introducing the virtual model of care for the acute ward. The successful aspects of the pilot are grouped within categories.

1.1 Understanding the context, problem and solution

Stakeholders articulated the need for health care service delivery improvement. They had a thorough understanding of the need, potential solution and the case for change.

"The project has been a way to provide medical cover in the ward. This has come at a time when we are really facing care not being delivered due to the decreasing GP workforce in rural health services." #04

1.2 Scope, negotiation and support to execute change

This category highlights the features that firstly, assist to prepare for change and then, assist in the implementation. These included resource support of personnel and funding and project planning and management aspects.

"Setting the project up to succeed about what was its scope, what were we trying to achieve, how we're trying to achieve it." #11

"I think having project resources, with the project lead, has been instrumental in its successes as you have got someone to coordinate the effort." #01

The negotiations which assist with planning to introduce change were vital, as one stakeholder stated:

"We were able to pre-emptively solve a lot of problems before they came up. The feedback allowed us to design the technology and the service so that we had already anticipated many of the streams and the content of the communication that was required to be able to run the service." #05

1.3 Engagement: relationships, partnerships and communication

The importance of engaging and connecting at different levels and by various means was stressed by interviewees. The professional interactions highlighted collaboration and commitment and the care interactions emphasised sensitivity and responsiveness.

"I think stakeholder engagement is a very key and integral part of rolling out a new model of care like this. #06

The care interactions highlighted respect for staff and patients.

"A very positive aspect is the Telecare doctor is happy to engage with [nursing] *staff and happy to listen and act upon our concerns."* #12

"The patients appeared to feel that somebody had more than a couple of minutes to spend with them. It helps that [Virtual Dr] *has got a really good bedside manner. He has patience and he listens, and he's interested. That was nice."* #07

1.4 Impact: care, people, and place

There were positive impacts on care, people and place. For example, care efficiencies were accentuated by access to electronic medical records and medication charts. As stated by an interviewee:

"An electronic medication charts, limits the risk of transcribing issues, et cetera and makes it really clear and accurate for staff to use." #10

Care effectiveness was highlighted by the impact for patients,

"Everyone likes to come back to their local health service, to their own hometown. We normally wouldn't have that capacity to take patients back over the weekend; with Telecare we now have that flexibility." #02

The impact on GPs considered the current and ongoing situation,

"Good for GPs to have a break, especially as we have less GPs doing on call. We don't want to lose anymore GP's" #12

2. The challenges that arose during the MoC pilot

The challenges identified by stakeholders were seen not as negatives or that it indicated the MoC was flawed but rather, there were things that arose which needed to be addressed. In addition, our analysis identified aspects which should be continuously monitored to facilitate sustainability of the model.

2.1 Nurse model of care and nursing staff workload

The consideration of the effects on nursing staff upon their model of care in the acute ward and for their workload is important,

"Initially it was quite onerous. We didn't always do doctors rounds, so by adding this in for us was an increased workload for the person in charge. They were spending on average about an hour doing a doctor's around that we had never done before. It was time consuming initially for us." #07

2.2 Managing perceptions

An area that was repeated in several of the interviews was the nature of the hybrid model and ensuring that it is not a replacement service, nor should it inadvertently be a means to ignore disadvantage or access and equity issues.

"Our discussions with our GPs and VMOs about Telecare and the service offered, being very mindful that we are not trying to take business away from them, we are just trying to add a complementary service in to work alongside our existing GPs." #10

"It's about supporting the GPs not substituting their care. And not substituting them on the rosters." #01

2.3 Feedback and continuous quality improvement

This category drew on interview content that alluded to not becoming complacent. It was seen as essential that regular and ongoing feedback about all aspects of the model is actively sought, consumers were a priority,

"It's important we are learning from all feedback; what are we learning from the model; what are we learning from the good experiences and the not so good experiences. Also, we are

undertaking any follow-up studies for example, monitoring of patient's care and their engagement with the health care system. #01

3. Sustaining the gains and the future

Stakeholders were cognisant that the pilot was successful, but it needs to be sustainable and there are the broader ongoing challenges facing rural and regional areas.

3.1 Sustainability and replicating the MoC

Stakeholders felt a responsibility to continue to embed and improve the MoC and to also ensure that the experiences of NCN Health are more widely available.

"Part of the role of the partnership is scale, sharing expertise, the project coordination. It's about where the scale, the processes and coordination and they shared expertise goes with this pilot." #11

3.2 The rural population and the rural workforce

There was an understanding that rural population health care needs are continuous and likely to increase, and a skilled and viable workforce is essential.

"That agility will become more important with not only the medical workforce but the clinical workforce as we become more and more challenged in rural areas. We need sustainability with care for an ageing population, more chronic disease and so forth. We need to look at different ways of doing things. #04

3.3 Need for a rural digital health strategy

The policy environment was also evident as an area in which to advocate for innovative hybrid models.

"The persistent shortage of staffing in the regional areas and working in this industry for the past years and dealing with different specialties, we believe that we wouldn't have a quick cure. So, we have to embrace a hybrid model as part of the public health strategy in the future. A digital health strategy and partnerships to better utilize specialists' capacity." #06

Appendix 5. Case studies

Case Study 1: MoC systems and processes in action

This case study highlights the domain of *Efficiency*.

> One example I've been involved with was late on a Friday afternoon trying to get a patient to the NCN Health Numurkah campus. I rang the NCN Director of Clinical Services because we were having issues with getting in touch with the local GP. This was 3:00 o'clock in the afternoon on a Friday. The director said, "*we have Telecare rostered on from 5:00 o'clock this afternoon.*"
>
> We were able to arrange transport of the patient from medical unit, FAX all our paperwork to NCN health and then they did the coordination with Telecare to accept the patient. #10

Case Study 2: MoC impact for care close to home

This case study highlights the domain of *Effectiveness.*

> There were positive cases where patients were able to come back here to us. We had one palliative patient that we got back from the Regional Health service [GV Health] here to NCN [Numurkah campus]. The virtual care Dr was able to initiate end of life care for them here at their local health service.
>
> The virtual Dr ordered syringe drivers etc for end-of-life care. The person passed away over the weekend we were able to admit her back to us, with local family present. The family were very positive about their loved one being able to come back to their hometown to receive end of life care. It achieved care close to home – one of our NCN strategic pillars. #02

Appendix 6. Copy of interview questions

1. What have been your overall experiences of the NCN Health virtual health care pilot project?
2. What have you found to be the most successful aspects of the virtual health care pilot project?
3. What have you found to be the most challenging aspects of the virtual health care pilot project?
4. Do you have any other feedback?

Questions added for external stakeholders:

- Were there any beneficial outcomes for your service in being involved with the project?
- Were there any detrimental outcomes for your service in being involved with the project?

Appendix 7. Dissemination of evaluation findings

A dissemination strategy from the findings of the evaluation has been developed by the following authorship group who are planning peer reviewed publications:

- Carol Reid, Rural Health Academic Network
- Catherine Church, NCN Health
- Viv Jeffery, Hume Health Service Partnership
- Dr Ka Chun Tse, Director of Medical Services, NCN Health
- Jacque Phillips, CEO, NCN Health
- Dr Raymond Wen, Telecare

The pilot project is currently being promoted by*Telecare* via the following:

- **2023 Royal Australasian College of Medical Administrators (RACMA) Conference**, "Virtual Admitting Officer Model of Care: a pilot project to address rural workforce limitations" Digital in Action, e-Poster, 11-13 October 2023, presented by Dr K Ka Chun Tse
- **2023 International Healthcare Improvement Forum**, "Virtual health care: addressing rural workforce limitations, one piece of the puzzle", e-poster, 30 October – 1 November 2023, presented by Dr K Ka Chun Tse
- **2023 World Organisation of National Colleges, Academies and Academic Associations of General Practitioners/Family Physicians (WONCA)** conference 26-29 October 2023**,** presented by Dr Raymond Wen