

Reverse triage in COVID surge planning: a case study of an allied health supported clinical care pathway in an acute hospital setting

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ABSTRACT

Objective. This case study describes the development and outcomes of a new integrated and multidisciplinary care pathway. Spearheaded by allied health, the ‘COVID community navigator team’, applied established principles of reverse triage to create additional surge capacity. **Methods.** A retrospective cohort study examined workflow patterns using electronic medical records of patients who received navigator input at the Royal Melbourne Hospital between 20 September 2021 and 20 December 2021. **Results.** There were 437 eligible patient encounters identified. On average patients stayed 4.15 h in the emergency departments (ED) (s.d. = 4.31) and 9.5 h (s.d. = 10.9) in the short stay unit. Most patients were discharged into a ‘low risk pathway’ with community general practitioner follow up. Of discharged patients, only 38 re-presented to the ED with symptoms related to their initial COVID-19 diagnosis (34.9% of total re-admissions). Of these re-admissions, more than half did not require admission to a ward. **Conclusion.** The findings presented here provide support for the clinical utility of a multidisciplinary reverse triage approach in surge planning for anticipated presentation peaks.

Keywords: allied health, case study, clinical pathways, clinical services, COVID-19, health services research, models of care, triage.

Since the World Health Organization declaration of the global pandemic in March 2020, coronavirus disease 2019 (COVID-19), caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), has remained one of the most profound public health challenges of our generation. Immense demand on finite healthcare resources has challenged both health care personnel and medical supply systems, with hospitals increasing surge capacity.¹

Globally, several initiatives have been trialled to manage patient influx into emergency departments (ED), with a primary focus on structural modifications to existing infrastructure. Levy and colleagues² reported on the success of an adapted triage process in a large Israeli hospital that allowed for the separation of COVID positive and negative patients presenting to the ED. Similarly, the utility of a ‘pre triage’ system at the entrance to the ED was evaluated in a large Italian hospital.³ Pre-triage was carried out in a purpose built structure by nurses and doctors, with a primary goal of filtering patients into one of four newly established pathways: ‘clean hospital areas’, ‘infected hospital areas’, home quarantine or triage out. The pre-triage model showed good sensitivity, specificity and accuracy in allocating patients to appropriate workflow patterns and played a key role in minimising spread of infection.

In an Australian context, the Royal Melbourne Hospital (RMH) has remained firmly at the epicentre of the pandemic. In response to rapidly rising presentations, the hospital

implemented an integrated multidisciplinary clinical program which supported COVID-19 positive patients to return safely home after presenting to the ED. Spearheaded by allied health clinicians, and supported by medical and nursing staff, the 'COVID community navigator team' (CCNt), applied established and validated principles of 'reverse triage' to create additional surge capacity, reduce overcrowding in the ED, minimise risk of in-hospital virus transmission and prevent unnecessary hospital admissions. With historical roots in military management of crisis, the reverse triage model of care seeks to promptly discharge patients who can be safely managed in the community.⁴

A limited body of literature has examined the effectiveness of the reverse triage model in managing demand in EDs. In the only Australian study to date, Satterthwaite and Atkinson⁵ implemented a reverse-triage model disaster management protocol in response to the 'Ashmore Reef disaster'. Multidisciplinary teams focused on rapid patient assessments, timely completion of clinical and administrative requirements, and efficient discharge. As a result of the reverse triage approach, patients were discharged promptly, allowing for the accommodation of incoming trauma patients. Reverse triage in the Satterthwaite and Atkinson study did not result in increased clinical risk with only one discharged patient returning for further treatment.

This case study describes the development and outcomes of a new care pathway (CCNt) implemented at the RMH.

Objectives

The objective of the CCNt clinical pathway was to support eligible COVID-19 positive patients to have a timely and safe discharge from the ED; improving patient flow, preventing unnecessary hospital admissions and reducing the likelihood of subsequent re-admissions.

Setting

The RMH is a large, tertiary hospital and one of two adult major trauma services in Melbourne, Australia, which was designated as a COVID-19 'streaming hospital' in the 'third wave' of the pandemic. The RMH faced rapidly rising admission rates in the third wave of COVID-19.

The RMH sits within the Western Public Health Unit (WPHU), which services a population of approximately 1.2 million people, across 10 local government areas and 53 postcodes. This catchment is one of the most culturally and linguistically diverse regions in Australia, adding additional clinical complexity.⁶

Intervention

The CCNt pilot intervention was introduced on 20 September 2021 and was initially a 24-h service, 7 days a

week. The team consisted of allied health clinicians (a term describing autonomous practitioners who work collaboratively with medical and nursing staff and include physiotherapy, occupational therapy, social work, speech therapy and speech pathology as well as many others); predominantly from occupational therapy and physiotherapy. There were two clinicians rostered onsite at the hospital during the hours of operation. The CCNt were also supported by an on-call social work service who were available to provide secondary consultation for patients with complex psychosocial needs. The dietetics service also created food packages which could be distributed by the CCNt to patients upon discharge.

Patients who were referred to the CCNt service had their eligibility screened against fixed criteria. Specifically, eligible patients had a confirmed or suspected diagnosis of COVID-19, were in ED and had been assessed by the medical team as medically stable and likely to discharge from hospital within the next 24 h. Patients who had abnormal observations, were requiring oxygen or were at risk of severe COVID-19 due to comorbidities were deemed inappropriate for referral. The CCNt worked alongside the medical and nursing team and the patient to determine the most appropriate medical follow up and isolation plan. Accordingly, once accepted for CCNt intervention, patients were managed in three distinct streams depending on risk (see Fig. 1). If patients' circumstances changed, they could be transferred to a lower or higher acuity service.

The CCNt interventions primarily focused on working with the patient to identify practical strategies and to implement individualised solutions to facilitate a safe discharge plan to isolate in the community. CCNt interventions regularly involved the provision of education and information to build patients' health literacy and understanding of public health directives. This information was delivered verbally (face to face or over the phone) or through print and online resources which were translated into several languages (see Fig. 2 for example patient resources). The CCNt also provided patients with independent self-management strategies, skills, and home monitoring devices such as a pulse oximeter and thermometer. Active intervention further entailed the coordination of appropriate transport to facilitate discharge and access to food and medications. Lastly, the CCNt could generate referrals to a Social Work Virtual Clinic and Dietetics Virtual Clinic to support ongoing patient care. Interventions were predominantly provided by the CCNt in a COVID-19 designated short stay unit.

Evaluation of the CCNt was informed by retrospective analysis of workflow patterns and medical records. Specifically, data were collated on patients referred while in the ED to the CCNt between 20 September 2021 and 20 December 2021. This COVID-19 wave was predominantly dominated by the Delta variant and occurred when only 49.8% of Victorian's were double vaccinated (as of 29 September 2021).⁷

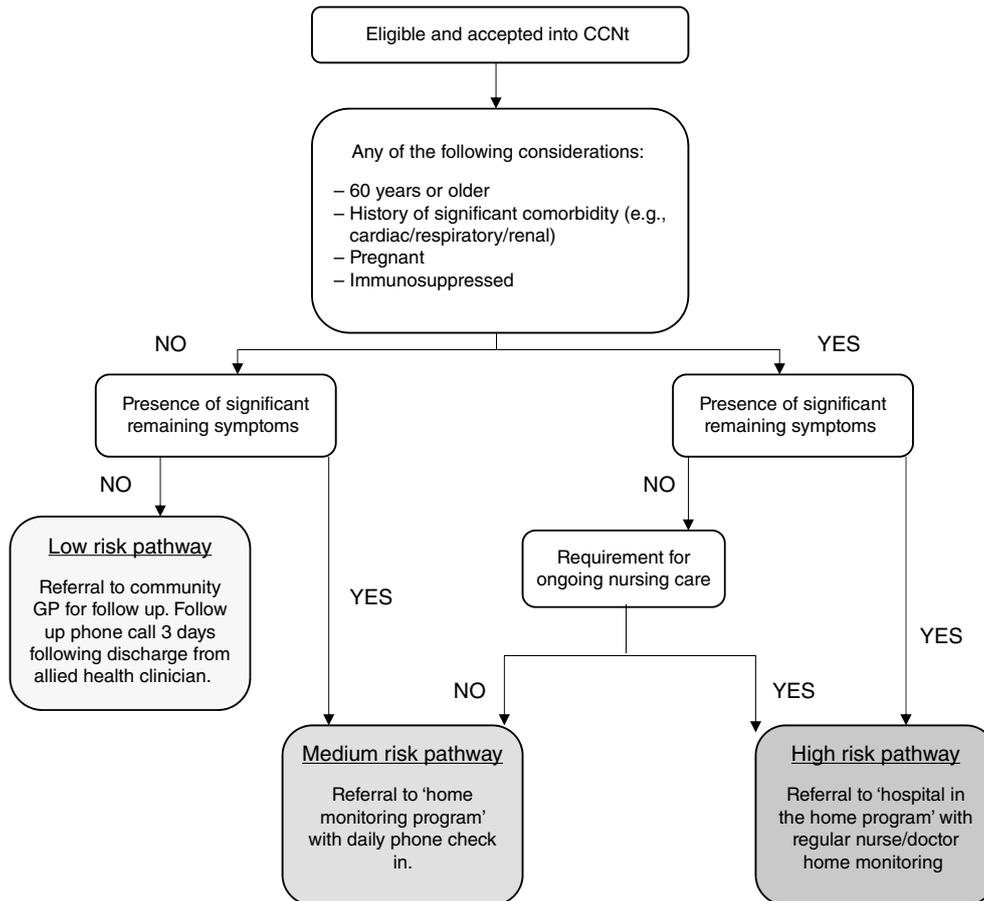


Fig. 1. Pathways of care following referral into the Clinical Care Navigator team (CCNt).

Scan the QR code for more information to help your recovery

You can also call:
Your general practitioner

The Victorian Coronavirus Hotline
Available 24/7 by calling 1800 975 398
Call 1800 975 398 and press 0 for information in your language.

cohealth community health service
Available 9 am to 5 pm by calling [redacted]

In an emergency call 000. Tell the operator you have COVID-19

After your hospital visit for COVID-19

Isolate Follow the Department of Health's rules for isolating. Everyone who lives with you must also get tested and isolate.	Call your doctor Let your doctor know that you have tested positive for COVID-19 and have been to the hospital emergency department.	Take pain relief Take over the counter pain relief, such as paracetamol or ibuprofen for aches, pains and fevers.	Stay hydrated Keep drinking water.	Order groceries Use home delivery services for your groceries.

If you feel breathless or faint, have chest pains, cannot eat or drink, or have significant vomiting or diarrhoea, your illness may be getting worse. Seek medical attention.

Fig. 2. Example patient resource provided by the COVID community navigator team. Note: hospital specific contact information has been removed for publication.

Outcomes

Patient flow

Five hundred and seventy-three patients were referred to the CCNt between 20 September 2021 and 20 December 2021. One

hundred and twelve patients were removed from this analysis as they were not seen by the CCNt in the ED due to clinical deterioration following initial referral. A further 24 encounters were excluded as they did not appear to have been seen by the CCNt despite initial referral. The remaining 437 episodes of

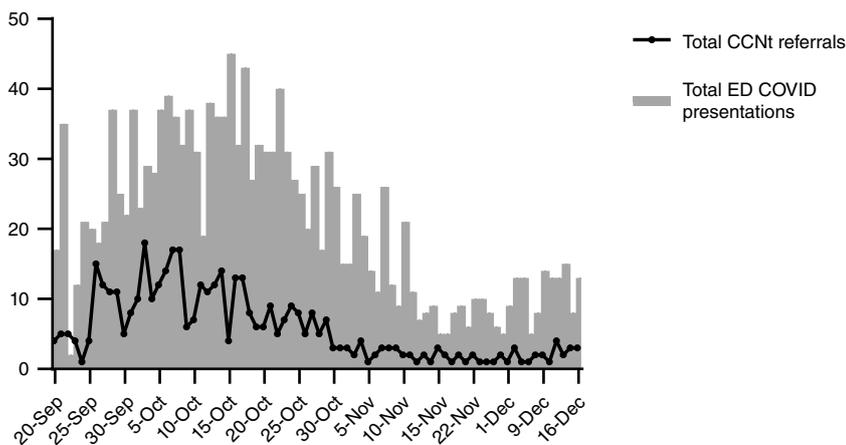


Fig. 3. Flow of referrals through CCNt over time relative to total ED presentations with COVID-19.

Table 1. Admission characteristics for patients referred to the navigator team.

Admission characteristic	Frequency (percentage)
Arrival method	
Road ambulance	306 (70.0)
Other means	131 (30.0)
Primary presenting issues	
Respiratory	181 (41.4)
Fever/infection	85 (19.5)
Cardiac	54 (12.4)
Other medical concerns	49 (11.2)
Gastrointestinal	16 (3.7)
Mental health	14 (3.2)
Collapse/falls	12 (2.7)
Neurological	12 (2.7)
Trauma	6 (1.4)
Musculo-skeletal	3 (0.7)
Genito-urinary	2 (0.5)
Eye	2 (0.5)
Endocrine	1 (0.3)
Triage Category	
Category 1	0 (0.0)
Category 2	36 (8.2)
Category 3	277 (63.4)
Category 4	121 (27.7)
Category 5	2 (0.5)

care were analysed. Flow of referrals is presented in Fig. 3, relative to total ED presentations with COVID-19.

On average, patients were aged 41.50 years (s.d. = 15.53), with 51.9% of female sex. Additional admission characteristics

are presented in Table 1. Patients stayed 4.15 h on average in the ED (s.d. = 4.31) before being transferred to the short stay unit in the hospital. Mean length of stay in this unit was 9.5 h (s.d. = 10.9).

Interventional outcomes

The CCNt provided transportation support for the majority of patients ($n = 398$; 68.2%). Further examples of interventional supports are illustrated in two case studies described in Box 1.

In terms of discharge destinations, most patients were discharged into the ‘low risk pathway’ with general practitioner monitoring ($n = 204$; 43.1%). A further 155 patients were discharged to the ‘medium risk pathway’ (32.8%), while 49 (10.4%) were discharged via the ‘high risk pathway’. Ten patients were discharged to hotel quarantine due to an inability to safely isolate in the community and the remaining 18 patients were discharged to other facilities (e.g. discharge against medical advice, discharge to another hospital/facility, discharge to police custody).

Re-admissions

On re-admissions, 108 patients (24.9%) represented to ED within a 6-month period of presentation. Most re-admissions ($n = 70$; 64.2%) were unrelated to COVID-19 and were primarily associated with acute medical issues (e.g. falls, trauma, fractures; $n = 51$), or pre-existing mental health/psychosocial issues ($n = 19$). Thirty-eight patients (34.9% of re-admissions) re-presented to the ED with symptoms related to their initial COVID-19 diagnosis. Of these, most ($n = 20$; 52.6%) did not require admission to a ward and appeared to relate largely to anxiety around symptoms associated with COVID-19 status. The remaining 18 patients who represented following discharge did require admission to the ward (16.5% of re-admissions and 3.8% of total referrals to CCNt). Eight of these patients had initially been discharged via the ‘high risk pathway’, while six had been discharged to the ‘medium risk pathway’. The remaining four patients were discharged to the ‘low risk pathway’ prior to re-presentation.

Box 1. Case examples

Mrs F

Mrs F was a 41-year-old female who presented with a 2-day history of vomiting, loss of appetite and severe lethargy. While Mrs F and her two young children had tested positive to COVID, her husband tested negative and remained symptom free despite not isolating from his family. Mrs F had limited conversational English and although she was aware of public health orders to stay home, she was not sure for how long or how to manage her symptoms. After being medically cleared for discharge, she was referred to the CCNt via the 'low risk' pathway. Upon assessment with a phone interpreter, Mrs F reported she did not have a regular general practitioner and reported feeling very anxious about her family's food security – their extended family all had COVID and were unable to deliver groceries or other necessities. The CCNt reassured Mrs F and provided her details of a GP in her local area who was accepting new patients. Mrs F was given a dry grocery pack, frozen meals and registered for a Department of Health Food Relief delivery. She was also provided information regarding home pharmacy delivery options. The CCNt educated Mrs F about isolation requirements and the importance of isolating away from her husband. Because the family all shared one bathroom, Mrs F was provided with N95 masks and alcohol wipes to ensure safe sharing of the bathroom and common spaces with her husband. An information pack with written education about COVID symptoms and recovery was also provided to Mrs F in her native language. Finally, because Mrs F arrived by ambulance and her husband was at home with their children, the CCNt requested COVID transport to take her home safely.

Ms X

Ms X was a 22-year-old female who presented with 3 days of a dry cough, shortness of breath, and fatigue, on a background of asthma. Ms X returned positive RAT and PCR tests taken in the emergency department. She was highly distressed about needing to continue isolation by herself with limited support, and expressed concern about the possibility of long COVID. A CCNt referral was placed to facilitate discharge home and provide education and reassurance about her COVID symptoms. The medical team requested that Ms X be discharged home via the 'moderate risk' pathway. The CCNt completed an assessment with Ms X to ensure she had a regular GP to organise a follow up appointment with; access to food and medications and discuss isolation requirements. The CCNt discussed with Ms X that although she lived alone in an apartment, her mother would be able to drop off groceries and medications (including a refill of her Ventolin); and provided her with a dry food package and frozen meals for the interim. The CCNt provided education about the COVID home monitoring pathway, as well as providing and demonstrating the use of a thermometer and pulse oximeter. Education and reassurance about symptoms and recovery was given to Ms X verbally and by providing her with a COVID educational postcard (Fig. 2). Finally, the CCNt offered Ms X a virtual social work clinic referral to provide some counselling and reassurance while she was in isolation at home, as well as to provide her with information around accessing Centrelink support while she was unable to work.

Discussion

This rapidly developed model of care utilised the clinical skills of allied health clinicians to create an effective and accessible means of improving flow through the ED and safely discharging COVID-19 patients into the community. As a result, hospital capacity was preserved for those patients requiring immediate admission, potential virus transmission in the hospital was minimised, and patients were provided with individualised support and education to facilitate care in the home environment. In support of this, only 3.8% of the patients reviewed in this file audit re-presented to hospital with COVID-19 symptoms requiring admission. Collectively, findings provide tentative support for the clinical utility of a multidisciplinary reverse triage approach in surge planning for anticipated presentation peaks.

Findings from our study further reinforce the utility of deploying allied health clinicians in critical care initiatives. In response to the COVID-19 pandemic, significant investment in healthcare has occurred globally with a primary focus on nursing and medicine. By comparison, there is a notable gap in recognition and utility of the broad skill set of allied health clinicians, despite published evidence finding that trans-disciplinary models of care in ED are feasible and effective at reducing re-admissions and supporting safe discharge.^{8,9} While representing 20% of the workforce, allied health clinicians continue to remain largely under-represented and under-utilised at an operational level; a well-recognised inequity,¹⁰ which has only been further magnified in the face of the pandemic.¹¹ The outcomes of this case study support the flexible and dynamic nature of allied health clinicians and offers innovative solutions for incorporating allied health clinicians to manage surging hospital demands. This has implications for Australian hospitals, where allied health professionals can – and should – be utilised to support clinical practice changes in response to the pandemic.

Reflections

The CCNt were required to adapt at short notice to changing workload demands and external service changes. These 'non-traditional' roles required clinicians to utilise transferrable clinical skills to build and maintain stakeholder relationships and support dynamic patient needs. On the former, sustainable implementation of the CCNt reinforced the importance of maintaining positive relationships and communication pathways with external service providers who could assist in facilitating discharges (i.e. hotel quarantine and Summer House). Similarly, clinicians operating in this unfamiliar area were required to draw upon skills and knowledge from outside of their usual clinical domain to provide effective and holistic patient care. This included the need for CCNt staff to regularly familiarise themselves with the rapidly changing public health directives and to understand the intricacies of how these apply to the patients linked in with the CCNt.

Similarly, allied health involvement from the outset allowed for research opportunities to be embedded into the CCNt from its inception, further diversifying the skills of, and opportunities for, allied health clinicians.¹²

Implementation of the CCNt required open communication and collaboration. It was undoubtedly challenging for CCNt clinicians to sit with the ambiguity of a new role in the setting of an already difficult time in the hospital. With recognition of these challenges, the CCNt team leader prioritised daily communication with clinicians. Weekly team meetings also offered the opportunity for clinicians to speak freely about the challenges of the role and to provide feedback to management.

Despite the success of the CCNt, the new clinical pathway was not without challenge. Notably, working over a 24/7 period was logistically difficult. For allied health clinicians, these work hours were new, and rostering was difficult due to limited staff numbers and the need to draw from a finite number of senior staff members when issues arose. Rosterings were also made more complex by the need to ensure experienced CCNt members could orientate new team. In addition, most CCNt members were accustomed to working in a multidisciplinary ward environment. The largely autonomous nature of the CCNt role reflected a departure from normal practice and was challenging for clinicians in both the CCNt and ED. Of note, the setting employs more than 500 allied health clinicians and feasibility of the CCNt program was reliant on availability of staff to be deployed. The CCNt program may not be feasible, or may require further adaptation for settings where there are fewer allied health staff and COVID-19 hospital presentations are much higher. Pathway delivery may be further enhanced through coordination with existing community social and health organisations, including establishing and solidifying collaborations with general practitioners.

Further research is required to determine cost effectiveness of the CCNt program and to evaluate if this initiative is more effective at reducing hospital admissions and improving ED flow in comparison to usual care. Similarly, future research should seek to characterise the nature and contributions to re-admissions for the cohort of patients triaged through this novel approach.

Conclusion

In this case study, a group of allied health professionals were deployed to spearhead a rapid discharge program for low

severity COVID-19 cases. Discharge planning and holistic support skills of these clinicians made them uniquely suited to the role. For sustainability once normal hospital activities increase again, devolution of this program to less trained staff could be considered.

Ethics

The Melbourne Health Human Research and Ethics Committee granted approval for this research to be undertaken.

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