

Article

Stakeholder Perspectives of the Delivery of Tele-Emergency Care: Insights from the Southeast Melbourne Virtual Emergency Department

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Abstract

Background: Emergency department (ED) demand is increasing due to rising patient complexity and an aging population complicated by limited access to general practitioners. Virtual emergency departments (VEDs) have been proposed as an alternative to deliver high-quality care for some ED presentations. This qualitative study explores stakeholder experiences with the Southeast Melbourne Virtual Emergency Department to inform future development of telehealth services. **Methods:** A qualitative study was conducted utilising semi-structured interviews with 24 stakeholders, including emergency physicians, geriatricians, general practitioners, and residential aged care staff. Content analysis was performed to identify key enablers, challenges, and opportunities for improvement. **Results:** Stakeholders reported that the VED facilitated high-quality care in the community and worked well by coordinating with follow-up services. Themes identified were that the services were particularly beneficial for older adults and palliative care patients. Challenges included technological limitations and some clinician scepticism about delivering care via telehealth. Further integration with community services and standardised telehealth training were identified as opportunities for enhancement. **Conclusions:** The VED was perceived as an effective model for community-based emergency care. Future implementations should prioritise clinician training, technological infrastructure, and service integration to optimise patient outcomes.

Keywords: digital health; telehealth; models of care

1. Introduction

In Australia, increasing emergency department (ED) demand has been outpacing population growth [1]. This has occurred partly due to a lack of timely access to general practitioners (GPs) and partly due to an increased prevalence of chronic disease [2,3]. As a consequence, the health system is under pressure, which in turn has flow-on effects. In the

ED, this manifests most obviously with overcrowding that may lead at best to poor patient experiences of care, and at worst compromised patient care due to increased demand on clinical resources. Interactions with potentially dissatisfied patients and, in extreme cases, occupational violence and aggression can lead to decreased staff satisfaction [4,5]. Ongoing dissatisfaction from working within a stressed healthcare system may affect workforce retention [6] further exacerbating the issue.

Greater integration of digital technologies into the health system has been proposed to address the increasing demand for emergency care [7]. Telehealth is increasingly being used to assess and manage patients requiring unscheduled care, with services implemented in Victoria and Queensland [8–10]. These services were initially developed to assist paramedics by having an emergency physician provide an opinion at the scene of patient pick-up, potentially facilitating the provision of care remotely and avoiding hospital transfer. Subsequently, some telehealth models have expanded to allow requests for consultations directly from patients and provide support to staff at residential aged care facilities and rural health centres [9,11].

Many of these services currently focus on providing only an initial consultation, but maturing telehealth systems may be able to incorporate other elements [12], including remote ambulatory monitoring [13]. This would allow patients to be monitored in their own homes. With enhanced infrastructure allowing real-time transmission of large amounts of biometric data, machine learning could be utilised for early identification of patient deterioration, flagging them for review. While telehealth services are gradually expanding their reach and scope, and some published data on outcomes exists [9,10], there has been limited research into the stakeholder experiences of such services.

The Southeast Melbourne Virtual Emergency Department (SEMVED) was a tele-emergency care service that operated from February 2022 until July 2023. The aim of this study is to describe the experiences and perspectives of the SEMVED service of those involved in delivering or referring patients to the service (ED doctors, residential aged care nurses and managers, in-reach geriatricians and community doctors, and GPs) to inform decisions regarding other large-scale telehealth services currently in operation or development.

2. Materials and Methods

This evaluation consisted of semi-structured online interviews conducted with key stakeholder groups—ED doctors, residential aged care nurses and managers, general practitioners, and hospital in-reach program staff for residential aged care. The study was approved by the Alfred Health Research Ethics Committee (Project ID 280/22) on 25 May 2022.

2.1. Setting

SEMVED was established across three health services (Alfred, Monash, and Peninsula Health) and was run concurrently across their respective catchment zones in collaboration with Ambulance Victoria (AV). EDs in these health services collectively receive approximately 400,000 patients annually, with an average of 342 ambulance arrivals daily. Initially, SEMVED operated from midday to 21:00, seven days a week, accepting referrals from paramedics who, at the scene of patient pick-up, identified patients potentially suitable for remote management. A secure audio-visual platform facilitated real-time interaction and consultation between the virtual emergency department (VED) clinicians, patients, paramedics, and/or aged care facility staff. If deemed safe and suitable by the VED clinician and agreeable to the patient, this model allowed treatment and management at the scene of patient pick-up, thus preventing an in-person ED presentation. The model included

ongoing care by sending scripts to the pharmacy and follow-up phone calls to ensure patient stability.

The VEDs could also link patients to other follow-up services, including other hospital-run services (such as residential in-reach) and other community resources (such as urgent care centres/priority primary care clinics and respiratory clinics). The Alfred and Monash VEDs were supported by a care coordinator, who was able to facilitate referrals to outreach services. Another notable point of difference was that The Alfred and Monash VEDs were staffed by clinicians who had no other duties other than to consult in the VED, whereas the Peninsula VED was incorporated into the normal function of the community care team and would balance VED consultations along with the other functions of that department. Other than this, the VEDs operated similarly.

Building on early successes [14], the VED expanded in September 2022 to operate all hours, seven days a week. This expansion included accepting referrals directly from residential aged care facilities and GP clinics and greater collaboration between the services, with Alfred Health covering the entire catchment of SEMVED overnight. Further, “load-sharing” was also introduced during the day, where VEDs could review patients in other catchments to even out workload [6]. In September 2023, government funding for SEMVED ceased, and the state-wide Victorian Virtual Emergency Department (VVED) took over. More details regarding the service have been published elsewhere [8].

2.2. Participant Recruitment

Potential participants were identified by the Alfred GP liaison unit or the Alfred ED management team, who also had contacts at Monash Health and Peninsula Health due to the collaborative nature of the service. Those invited to participate had worked within one of the constituent health services or were potential consumers of the SEMVED. Most of the participants were invited based on their frequent involvement in the service, with the intention of capturing the experiences of clinicians most familiar with its delivery. To complement this perspective, we also invited additional stakeholders to participate in structured interviews to ensure that the analysis incorporated a broader system-level view. This included some who had not utilised or worked within the service as a means of determining what the potential reservations about utilising the service might be. Permission was sought from potential participants before their contact information was passed on to the Monash University researchers. The researchers attempted contact using the details a maximum of three times. Upon agreeing to the interview, participants were provided with the explanatory statement. Participants who completed an interview were given a voucher for AUD 50 to acknowledge their time. Verbal consent was obtained at the start of the recording before the interview commenced.

2.3. Data Collection

Interviews were conducted online using a virtual video-assisted meeting platform and a researcher-developed interview guide (Appendix A) was utilised, with questions that addressed three overarching topics: (1) What worked well? (2) What did not work well? (3) What are the opportunities for the service to evolve?

Interviewers were trained and skilled qualitative researchers (CP, DA, and AB). The interviews were audio-recorded and transcribed using built-in software functions, which were then reviewed for accuracy by the research team. Data were collected over two distinct periods, the first in May to July 2022 (when SEMVED was in service) and the second in October to December 2023 (after the SEMVED operation had ceased).

2.4. Data Processing and Analysis

A conventional content analysis methodology set out by Hseih and Shannon [15] was employed in this study to enable direct information and perspectives to be obtained from participants without applying existing ideas or theories. A stepwise approach was undertaken; researchers familiarised themselves with the data during the transcript-checking process, and the transcribed interviews were imported into NVivo. Coding was conducted using a combination of deductive and inductive approaches: initial codes were informed by the research questions and interview guide (deductive), while additional codes emerged from the data during analysis (inductive). Three coders (CP, DA, and AB) independently reviewed and coded the transcripts. Discrepancies in coding were discussed in meetings and resolved through consensus to ensure consistency and reliability. This process led to the development of conceptual themes through content analysis.

3. Results

In total, 24 stakeholders participated in the service (see Table 1) over two distinct data collection periods. In 2022, thirteen participants were interviewed; in 2023, eleven were interviewed. Staff were interviewed from the EDs of the hospital organisations, participating residential aged care facilities, general practice, and residential in-reach services. Of the 24 participants, 17 had used or worked in the VED service.

Table 1. Participant characteristics.

Role by Organisation (<i>n</i> = 24)	<i>n</i> (%)	
Alfred Health ED Consultant	6	(25)
Monash Health ED Consultant	3	(12.5)
ED Registrar	1	(4.2)
Peninsula Health ED Consultant	2	(8.3)
Community Care Doctor	1	(4.2)
Residential Aged Care Facility 1 Manager *	1	(4.2)
Registered Nurse *	1	(4.2)
Residential Aged Care Facility 2 Manager *	1	(4.2)
Registered Nurse *	2	(8.3)
Residential Aged Care Facility 3 Manager *	1	(4.2)
Registered Nurse *	1	(4.2)
Residential in-reach service 1 Geriatrician	1	(4.2)
Residential in-reach service 2 Geriatrician	1	(4.2)
General Practice 1 General Practitioner	1	(4.2)
General Practice 2 General Practitioner *	1	(4.2)

* Participant had not used the VED service.

3.1. What Worked Well?

3.1.1. High-Quality Patient Care in the Community with Efficient Follow-Up Services

Participants perceived the patient care provided by the VED to be of a high quality that facilitated efficient follow-up in the community (Table 2). This included a description of good patient outcomes, patient satisfaction with the service, and shorter wait times. Eleven participants expressed satisfaction with the provision of high-quality care, noting that the VED provided care to patients in their own homes that was comparable to what they would have received in a physical emergency department. One ED clinician highlighted that a key strength of the service was the ability to focus on one patient at a time and offer longer consultations. This contrasted with the physical ED, where there might be multiple competing demands, and doctor–patient interactions are not likely to be as long in duration.

Table 2. Participant comments on what worked well.

Theme	Participant Comments
High-quality patient care in the community with efficient follow-up services	<i>"I think we gave high-quality care, I think it was a really good way of preventing them spending a very long stay in ED for something that they potentially didn't need to. I think we organised really good follow-up care and care in place for the patient at that time to prevent the long stay in ED".</i> (Monash Health, ED Consultant) <i>"The role of the Ambulance Victoria paramedics can't be understated that that was really sort of powerful to have their, you know, quite significant skills on the other end sort of their assessment was really important".</i> (Peninsula Health, Community Care Doctor) <i>"I think it was a great service in terms of initiating the, you know, assessment and management, planning appropriate, kind of, investigation".</i> (In-Reach Geriatrician) <i>"Some patients felt that I gave them more time to if they went to a GP or like ED, I wouldn't spend half an hour with a patient in ED. . . I would have to be constantly interrupted, whereas in Virtual ED, if I didn't have another patient waiting, I could spend 45 min with you, call the pharmacy, I could do things for you".</i> (Monash Health, ED Registrar)
Appropriate avoidance of unnecessary in-person ED presentation	<i>"Not only could we avoid them having to come and sit in an ED. . . [we could] still provide a really good service for them and give them what they needed without wasting valuable time and money in the emergency department".</i> (Monash Health, ED Consultant) <i>"You have a good feel for what an ED visit would mean for the patient, because you're generally, in the middle of chaos and patients [will get] uncomfortably cold in corridors and asking to use the toilet [and there are] no nurses available to come in, and help them. [We have a] tangible impression of the downsides of a patient being in the ED. . . that can put you in a good position to advocate for the best interest of the patient and prevent an unnecessary transfer or presentation."</i> (Alfred Health, ED Consultant)
Benefits for an older patient cohort	<i>"It was, I think, incredibly valuable for patients in particular for patients who were in nursing homes and would have difficulty, you know, getting to hospital and would require ambulance transfer and didn't actually need to be in emergency department, which is incredibly traumatic for especially elderly patients at times. So, I think for those patients, especially, sometimes they would have for example, an Advanced Care directive".</i> (Alfred Health, ED Consultant). <i>"we did a lot of work palliating people. So, I think it's a very safe thing. I think we did quite well. I think we had a lot of success with it".</i> (Peninsula Health, ED Consultant) <i>"they (residents) come back so distress[ed] (from ED) . . . the residents are not familiar with their staff and the staff don't know them. . . The [ED] environment is not good for the residents."</i> (RACF Nurse)
Access to patient notes and local knowledge	<i>"The way the virtual ED used to work is that we had access to their medical notes, that doesn't still continue to be the case, because that was absolute sort of cornerstones of what allowed us to keep patients at home. . . I would say that's probably like a good half of the cases, having the medical file specifically made a massive impact into what we ultimately ended up doing with the patient, that's huge, a massive loss".</i> (Peninsula Health, ED Consultant). <i>"I do think there's issues with [just one state-wide system]. With that the clinician not necessarily knowing the local referral pathways which make just makes it less useful for the patient potentially. So, having I think a local service does help in some ways"</i> (Alfred Health, ED Consultant)

It was also perceived that the service enabled greater utility of the skills and abilities of other pre-existing services. For example, two participants discussed that paramedics

could use their skills in assessing patients and administering treatments. The VEDs could link patients to other follow-up services, including other hospital-run services (such as residential in-reach) and other community resources (such as urgent care centres/priority primary care clinics and respiratory clinics). The care coordinator role used within Alfred and Monash Health was described as a helpful resource by the VED clinicians due to their advanced knowledge of the available community pathway referrals.

3.1.2. Appropriate Avoidance of In-Person ED Presentation

All participants agreed that unnecessary in-person ED presentations were avoided through the appropriate diversion of patients suited to receive care in place. This saved many patients from being sent to the ED, which, in the case of older adults, may have been “incredibly traumatic” and, in some cases, resulted in physical harm (e.g., risk of falls). Additionally, the service was considered effective at identifying patients who did require hospital transfer and facilitating the ability to pre-prepare for their arrival, with the VED clinician being able to advise the ED team of the transfer, request investigations, and suggest an initial plan for assessment and management.

3.1.3. Benefits for an Older Patient Cohort

Interviewees recognised that the VED was beneficial for a range of patient cohorts, including those with complex needs and those with COVID-19. In particular, emergency physicians, geriatricians, and residential aged care facility (RACF) staff felt that it was valuable to avoid transfers of RACF residents, specifically those with dementia. One RACF staff member relayed that without the service, residents would return from the ED distressed following a disorientating visit. Another specific scenario where the VED was perceived to be of benefit was for patients requiring palliation, with one VED clinician acknowledging that the service enabled this to be provided in a comfortable and familiar environment rather than in the ED or on a hospital ward.

3.1.4. Access to Patient Notes and Local Knowledge

In addition to highlighting the importance of a senior clinician (GP or emergency physician)-driven model with strong collaboration between services, a major facilitator of the VED model was the duality of access to patient notes and a high degree of knowledge of available local health resources and services. Access to patient records, which provided comprehensive accounts of recent care, was considered extremely valuable in making decisions during virtual consultations. Supplementing this, local knowledge of the referral pathways and community support available was also noted as beneficial. These advantages were raised in the context of the pending shift to a single state-wide service, and there was concern that this considerable benefit would be lost.

3.2. What Did Not Work Well?

3.2.1. Technology Systems Varied in Usability and Adoption

During the interviews, seven clinicians discussed technology as a significant barrier to the provision of the VED (Table 3). This included the quality of internet coverage and phone reception, which was particularly bothersome to Monash Health and Peninsula Health participants. However, Alfred Health participants did not report this issue to the same extent, highlighting potential equity issues.

Table 3. Participant comments on what did not work well.

Theme	Participant Comments
Technology systems varied in usability and adoption	<i>"Phone reception was often dire, if I'm honest. And that was another, like, definite frustration that the video wouldn't work or the platform that we used very frequently wouldn't work and so we're just using voice. Yeah, it wasn't perfect for sure". (Peninsula Health, ED Consultant)</i>
Workforce rostering and service provision processes hindered delivery	<i>"Overnight, when we were expected to be working on the floor in ED. So also, you know, managing the ED and seeing sick patients in person, then also expected to be answering the virtual ED calls as soon as possible. So that overnight, when you had to work in ED and do virtual ED at the same time, that didn't work as well in my opinion because you were, your priorities were split. But when they had a dedicated ED consultant just doing virtual ED, I thought that was really good". (Alfred Health, ED Consultant)</i> <i>"The challenge is from 8 at night to 8 the next morning, they don't actually have a doctor at in-reach to speak to. . . Some like, you know the patient is quite unwell, so, I don't think that's something to do with how the virtual ED is run, I think that's more about the resources available rather than how it's run and it's more then I guess a referral system". (In-Reach Geriatrician)</i>
Individual working preferences and stakeholder perceptions varied	<i>if 'there is a group of clinicians who are interested in doing it (virtual ED), then they should be the ones doing it'. (Alfred Health, ED Consultant)</i> <i>"I went to med school to be a clinician, to be a doctor and to be in the room, with people and to be able to touch them on the shoulder and really connect and to work out what's best for the patient in front of me . . . I still believe that that's where we add our most value. It takes specialists to train for 10 years or more, and the idea that we're just kind of you know, getting equal pay for sitting on the end of the phone kind of trying to prevent a few elderly people coming to hospital. . . kind of a nurse on call on steroids". (Alfred Health, ED Consultant)</i> <i>"I kind of worry that what we are doing is trying to create a solution at the wrong end, where the issue really is downstream beds. . . I do feel like it's kind of a Band-aid, and the underlying issue is actually the mainstream bed access. . . and it hasn't really been addressed". (Alfred Health, ED Consultant)</i>

3.2.2. Workforce Rostering and Service Provision Processes Hindered Delivery

Barriers concerning workforce rostering and service provision processes were discussed. An Alfred Health ED consultant highlighted issues with staff rostering, noting that overnight, the VED consultant was responsible for working in the physical ED while also attending to their virtual commitments. During the day, clinicians would be dedicated solely to the VED, which was deemed more effective due to the lack of competing demands.

Despite comments about the benefit of the VED regarding its linkages to follow-up services, the in-reach clinicians felt that the limited capacity of these follow-up services restricted the VED service's functionality. It was noted that fewer staff within those follow-up services were being rostered on weekends and that no staff were available to review patients overnight.

3.2.3. Individual Working Preferences and Stakeholder Perceptions Varied

From three participants in the first data collection period (who had not yet worked in the VED), there was concern that telehealth was not the same as practising medicine in the ED, and they would prefer not to be part of the telehealth service. There was also criticism that the service did not address the most significant issues contributing to ED overcrowding. They explained that this was considered a limitation of inpatient beds and that diverting a few patients from attending the ED was not likely to have a significant impact. Others noted that some of the referrals to the VED might have otherwise not been transported to the ED typically. Thus, it was perceived that the VED was not necessarily meeting an unmet need.

3.3. What Are the Opportunities for the Service to Evolve?

3.3.1. Greater Integration with Community Services

Following the loss of funding to the SEMVED, four participants highlighted that there might have been a missed opportunity to improve the integration of the VED into local community services (Table 4). The three health services operated with some differences,

and Peninsula Health staff pointed out that their community care team model enabled an efficient and connected system by managing in-person follow-ups themselves, as the community care team oversaw both the VED and the community follow-up programs. This was seen as beneficial in optimising the function of the VED.

Table 4. Opportunities for the service to evolve.

Theme	Participant Comments
Greater integration with community services	<i>“One of the things that set us apart from the Alfred and Monash, and how we did. It was, as I said before, that we didn’t just do virtual ED in isolation. So, we, part of community care which covers a whole umbrella of things, including hospital in the home, what’s called residential in-reach . . . So, one of the advantages of that is, we had a better ability to keep these people where they were and be like, that’s fine, we can send a nurse out to you this afternoon, we can do bloods, we can do this test, we can get a Physio, we can get an OT. The nurses will deliver your medication, because we were all one service. And even like we could directly admit to hospital in the home because we were that person”.</i> (Peninsula Health, ED Consultant)
Greater definition of roles and duties for VED clinicians	<i>“I guess if you linked it in with other work, like for example my suggestion would be like we have an emergency consultant who checks all the results in the department and, because it is something that needs to be done each day, but it also is not necessarily has to be done immediately. So if you were doing that job and were interrupted by a phone call, that would be absolutely fine. Whereas if you’re an emergency consultant on the floor treating patients and you’re interrupted sometimes that is a big issue”.</i> (Monash Health, ED Consultant)
Formalised training for VED providers	<i>“Virtual ED is not the same as in-person ED and there does need to be a training process and a credentialing process and in order to maintain that skill you need to be doing that (type of work) regularly.”</i> (Alfred Health, ED Consultant)

3.3.2. Greater Definition of Roles and Duties for VED Clinicians

Whilst the VED was establishing its function, there were a relatively small number of calls. This resulted in time between calls where it was felt other work could be carried out. Both Peninsula Health and Monash Health staff suggested that other non-urgent tasks performed by emergency physicians as part of their non-clinical duties could be completed during this time, such as reviewing pathology results. For instance, Alfred VED clinicians took calls that would otherwise go to the in-charge consultant in the physical ED, which prevented the emergency physician from being interrupted from urgent tasks.

3.3.3. Formalised Training for VED Providers

Whilst one consultant did not see the need for training, most felt more training would be beneficial. Participants discussed the need for a formalised training and credentialing process as the VED moves forward.

Themes from stakeholders are summarised below (Table 5).

Table 5. Summary of themes.

Service Benefits and Facilitators: What Worked Well	
High-quality patient care	<i>“To be able to provide such a high standard of care to our patients. . . I think it was looked at as an attractive proposition about ED diversion, and that success was about ED diversion, but it became quite apparent to all of us in the cluster in a short period of time it was actually about providing the high standards of care in the right setting”</i> (Peninsula Health, Community Care Doctor) <i>“From the interactions that I had it seems like the patients were very happy with the level of care that was delivered. . . to be able to stay in their home or and. . . be given analgesia, be given medications, be given scripts for things, be given referrals and follow up plans all from home, most patients were very grateful for that”</i> (Alfred Health, ED Consultant)

Table 5. Cont.

Service Benefits and Facilitators: What Worked Well	
Appropriate avoidance of in-person ED presentation	<i>“There’s no question that it was helping in terms of reducing the need for hospital or ED transfer from what I can see. . .by engaging appropriate people for follow up and avoiding hospital transfer” (In-Reach Geriatrician)</i> <i>“I had a patient who was unwell with an infection and that was unable to mobilise at all and we were able to just without them coming into emergency, organise for hospital in the home to, you know, visit them at home and deliver those the antibiotics that they needed without them coming into the emergency department at all. So, yeah. I think though for the, for those patients, it was incredibly valuable” (Alfred Health, ED Consultant)</i>
Older patient cohort	<i>“Patients in nursing homes. . .really benefited from having a consultant help make a decision about whether or not a patient should be transferred to the hospital. . .Of course, you can transport anyone to hospital, but whether you should, whether it’s actually going to make a difference substantially to the patient is a completely different story” (Peninsula Health, ED Consultant)</i> <i>“Particularly the patients and the families in the nursing homes, because often their stay is pretty rough in ED and pretty prolonged and protracted and they don’t sleep particularly well, they don’t get fed particularly well, they often have a lot of iatrogenic harm, such as falls. So, I think trying to provide a lot of good quality care in the nursing home was really beneficial for them” (Monash Health, ED Consultant)</i>
Access to information and knowledge	<i>“I think one of the good things was that. . .we knew our area really well. . .so, I’m seeing the ambulance crews that work in the area quite frequently. I would see a certain patients name come up, and I’d know, okay, I know this patient, they have a care plan with Monash Health, I know what their needs are, and I know what the pitfalls are with them” (Monash Health, ED Consultant)</i> <i>“Having that extra information was so helpful, especially with nursing home residents the amount of times that you’d find out they’ve got an advanced care directive or actually, this person was in hospital yesterday, and they wouldn’t even know that. So, it was super helpful” (Alfred Health, ED Consultant)</i>
Service Barriers: What Did Not Work Well	
Technology systems	<i>“Technology is a really challenging aspect of it. So, in the nursing home, especially those really big ones, where they have hundreds of patients, the depth of the nursing home didn’t have very good coverage. And so, you often couldn’t get video or couldn’t get video and audio, and you’d really have to resort to using your phone” (Monash Health, ED Consultant)</i> <i>“Certainly, just the ability for video consult, sometimes deep in a residential aged care facility. . .lots of sort of dropouts, paramedics having to kind of walk out in a room down the corridor to be able to try and establish connection could be sort of difficult at times. . .but look yeah, to our, you know, sort of credit we wouldn’t say well we’ll just ditch that call, we would go to the telephone model, and we would just work it through” (Peninsula Health, ED Consultant)</i>
Workforce rostering	<i>“Initially, [what] didn’t work because. . .we tended to be the busier team because we’ve got the greater catchment and so at times, we would have three or four ambulances waiting, [the other teams would] have nobody. But in the end, we actually ended up coming up with a good sort of negotiation of how to fix it and I think that worked in the end” (Monash Health, ED Consultant)</i> <i>“I don’t think the workload is different on Sunday compared to Monday or Tuesday or weekdays to be honest. The difference is even over the weekends we have less GP or locum coverage compared to a normal day. So, I don’t see any reason workloads. . .would be easier or less on a Sunday compared to weekdays. [With] Geriatrician] in reach rostering. . .why we should have only one registrar on Sunday compared to the rest of the week? But this has been discussed many times” (In reach Geriatrician)</i>
Individual and stakeholder preferences and perceptions	<i>“I think it worked really well when the clinicians engaged with it, which I would find myself getting really grumpy when I was on shift at any day, and just seeing all of these patients that I’m like, did you think, to [refer to] virtual ED. When the clinicians engage it was fantastic, and you would find, you know, like the shifts were 5 or 6 h and you’d find that often you would speak to the same crew 2 or 3 times on that shift because they’d be, you know, they were the ones that were willing to use it” (Monash Health, ED Consultant)</i> <i>“I kind of worry that what we are doing is trying to create a solution at the wrong end, where the issue really is downstream beds. . .I do feel like it’s kind of a Band-aid, and the underlying issue is actually the mainstream bed access. . .and it hasn’t really been addressed” (Alfred Health, ED Consultant)</i>

Table 5. Cont.

Future Directions: Opportunities to Evolve	
Integration with community services	<i>"Follow up options are a bit more limited with those who were in. . . supported residential accommodation. So, they'll often be patients who have severe mental health problems or. . . medical disabilities and because in reach, don't see those patients. . . the follow up options for those patients were their regular GP. However, there were often like difficulties with those patients accessing their regular GP quickly, there might be transport limitations and. . . that sort of thing"</i> (Monash Health, ED Consultant) <i>"I think if we were bringing in the sort of problems that are more subacute or more, primary care related, I think it would benefit to have a range of specialists, including GP and nurse practitioners, which I've heard works really well here in the [Victorian] VED system that they have. . . I do wonder whether that would make and make things easier for patients to be managed in the community as well"</i> (Alfred Health, ED Consultant)
Definition of roles and duties for VED clinicians	<i>"Often Monash doesn't have enough staffing, like across all the sites and people on the ambulance, are on the ambulance trolley for a very long time. [Another staff member] has actually asked me to see a couple of patients from the ambulance trolley, that [they] thought [were] VED suitable. . . I just started my consult, because otherwise [the] patient would just be parked there for a very long time. . . It's an extra person on shift that can cover any of these for you. . . Obviously, I will prioritise my virtual ED patients on the road, so that ambulance can leave. But you are an extra person, on clinical support, I'll be happy to support [the] staff"</i> (Monash Health, ED Consultant) <i>"I guess because there's a different variability in the skill of a junior registrar and I have had referrals from ED registrars who do virtual ED, my experience with. . . in terms of clinical assessment [is that] I might be more comfortable if it's coming from a consultant and not to say that a registrar is. . . not as good as a consultant, but sometimes the assessment may not be as complete or it's lacking in a few conversations having a, having a more refined seniority in [the role], that might be good as well"</i> (In reach Geriatrician)
Formalised training for VED providers	<i>"I feel like you either need to be committed to virtual ED and it be a significant part of your job and you undergo training and credentialing and keep up at that skill set or you don't do it all. It's not something we should be embarking on, on the side or as a bit of a hobby"</i> (Alfred Health, ED Consultant) <i>"Telehealth has gone from being talked about a lot and because of COVID, has now exploded. It is here to stay. But we do need to pause. . . get the governance put in. We need to make sure there is proper training, proper credentialing. That the systems in place are appropriate for what we're wanting to do"</i> (Alfred Health ED Consultant)

4. Discussion

Our work examines the diverse experiences of individuals working with a VED service (SEMVED). It is the first study looking into the perspectives of staff working with or within an Australian VED and in so doing addresses the "staff experience" dimension of the quadruple aim that is currently lacking in the existing literature. Although SEMVED is no longer operational, large-scale state-wide services operating under similar frameworks have been established in Western Australia, South Australia, Victoria, and Queensland, attracting hundreds of millions in funding. This study provides insights that are directly relevant to policymakers, service designers, and clinicians in Australia and internationally.

Clinicians found that this model facilitated the provision of quality care, which benefited patients. The service could be improved further through standardised training for the delivery of emergency telehealth and increased collaboration with community programs. Emergency telehealth services should also be mindful that appropriate technological and clinical support is required to ensure success. In particular, care should be taken to ensure a reliable broadband connection and suitable pathways for arranging patient follow-ups. The ability to access local medical records and the opportunity to develop relationships with local facilities and community in-reach services were additional benefits of the VED service.

Prior research supports the potential of telehealth to enhance community-based care. MacNeil et al. conducted a qualitative study in the UK examining the experiences of primary care staff with telehealth for patients with chronic conditions [16]. Consistent with our findings, their study reported that telehealth was well-received as a supplementary approach to care delivery and was perceived to benefit patients. Similarly, Shah et al. found that delivering care via telehealth was particularly beneficial for older adults [17]. They

explored the use of telemedicine within senior living communities, finding it an effective way to reduce unnecessary ED visits and provide accessible patient care within the comfort of a familiar environment.

The barriers to delivering care via telehealth are similar to those identified previously. Technological barriers, including connectivity issues, have previously been cited as an issue [18], and it has been suggested that 24 h technological support is a necessity for services delivering telehealth [19]. Our finding that clinicians found the work satisfying was partly due to the opportunity to focus on one patient at a time and deliver quality care. Concerns raised by clinicians in this study about having to simultaneously care for patients in the physical emergency department and via telehealth are echoed in a study by De Guzman et al., which found that general practitioners often felt the quality of care they provided through telehealth was hindered by time pressures [20].

In our study, some stakeholders, particularly those who had not worked within the service, were sceptical about its benefits. Previous research highlights that a key element in the success of a telehealth program is confirming that medical practitioners are both willing and prepared to use telehealth and digital care solutions [18]. It has been suggested that allaying these concerns may involve demonstration of patient benefits [21], and it seems likely that ongoing robust evaluation of patient outcomes and experiences will be beneficial in this regard.

The existing qualitative literature evaluating services utilising models similar to SEMVED is limited. Thus, there are no published prior insights on how a service such as ours might be improved. However, the need to focus on training clinicians on the delivery of telehealth is considered by many to be an important priority as telehealth gradually expands its footprint in the health system.

4.1. Future Directions

There is potential for mature telehealth services to offer additional benefits, such as removing the barrier of distance and thereby allowing the exportation of medical expertise to any hospital or clinic, as well as providing remote follow-up utilising technologies such as remote ambulatory monitoring. Further ongoing robust evaluation is required as the scope of telemedicine expands to ensure that services are delivered optimally, efficiently, and safely while still providing patient benefits and acceptable care experiences.

4.2. Limitations

This study was conducted over two distinct periods, and, as such, some of the findings may have been more applicable to one time period over another. In addition, due to the range of participant roles, some of the findings were borne from the experience of one or two participants from a single role. Those who agreed to be interviewed may have been more enthusiastic about the service, leading to some selection bias. Further, a more complete evaluation would have included insights from additional stakeholders involved in care delivery, including Ambulance Victoria staff and the care coordinators who supported virtual clinicians. Gaining the patients' perspectives would also provide valuable insights for improving the design of virtual health services.

5. Conclusions

Healthcare providers perceived that the SEMVED was able to deliver high-quality care. The service could be improved further through standardised training for the delivery of emergency telehealth and increased collaboration with community programs while also ensuring that any service is supported by the appropriate technological infrastructure.

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Appendix A. Interview Guide

Questions for RACF or GP Participants
1. What sort of patients does your service see, that may be suitable for the VED? 2. What sort of patients does your service see, that may not be suitable for the VED? 3. Are there aspects particular to your organisation and patient group (or residents) that you can foresee would facilitate referral to the VED over transport to ED in person? 4. Are there aspects particular to your organisation and patient group (or residents) that you can foresee would present a barrier to the VED over transport to ED in person? 5. What do you think your patients/residents and their families might think about a VED referral (over transport to ED in person)? Probe for barriers/enablers here. 6. How would a model of VED referral operate in your organisation? Prompt: How will policies/processes need to change?
Questions for Alfred Health, Monash Health, Peninsula Health, Residential In-Reach Staff Participants
1. Tell me about your role in the VED or what you know about the VED. Prompt: What is your view of the care received by the patient? Prompt: How do the patients feel about the VED? Probe for whether patients prefer to go to hospital. Prompt: What is your overall impression of care delivery and patient outcomes? 2. From your perspective what works well in the current model of the VED? Prompt: How do the operational processes/procedures support the current model of care delivery through the VED? Prompt: Patient types? Inclusions/exclusion criteria? Workload etc. 3. From your perspective what isn't working well in delivering care in the current model? Prompt: How do the operational processes affect care delivery in a negative way in the VED? Probe for organisational culture. Prompt: Patient types? Inclusions/exclusion criteria? Workload etc. 4. What suggestions do you have to improve the VED service in the future? 5. How do you see the VED service evolving? Prompt: What opportunities are there for the VED?

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