HeartConnect: Integrating primary care and specialist cardiology for rapid access and better patient and healthcare practitioner experiences

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Background and objective
This study evaluates an innovative model of care, HeartConnect, which aims to improve timely access to specialist cardiology services and greater collaboration between general practitioners (GPs) and cardiologists.

Methods
HeartConnect was co-designed by GPs, cardiologists, researchers, patients and practice managers. A mixed-methods evaluation was performed. Details of referrals and HeartConnect appointments were collected. In total, 15 patients and six health providers were surveyed and/or interviewed.

Results
Ninety-five patients consented to the research (n=57 male; n=38 female; mean age 53.8 [standard deviation 19.5] years). Referrals were for review of symptoms (52%), clinical management (12%) and assessment of high-risk patients (10%). Patients were seen within two days if the appointment was made by the GP. In 91% of cases, follow-up letters were sent back to the GP on the same day. Analysis of survey and interview data showed that the model was considered acceptable.

Discussion
HeartConnect shows promise for reducing waiting times and enhancing collaboration between specialist cardiologists and GPs.

CARDIOVASCULAR DISEASE (CVD) remains the leading cause of morbidity and mortality worldwide,[1] and despite advances in the prevention and treatment of CVD, it continues to pose a major challenge to healthcare systems globally. The Australian Institute of Health and Welfare estimates that CVD costs to the Australian healthcare system are approximately $14.3 billion a year.[2] Despite the high health costs associated with the high prevalence of CVD globally, most patients who present to emergency departments (EDs) with chest pain are not diagnosed with an acute coronary syndrome or other cardiovascular condition.[3] With increasingly overburdened EDs,[4] it is critical that alternative and timely referral pathways leading to diagnosis and treatment are provided for patients with chest pain or other cardiovascular concerns.

Rapid access cardiology clinics (RACCs) have emerged as a promising model of care for patients with non-urgent cardiovascular presentations.[5] Reported benefits of RACCs include reduced waiting times, timely assessment by a specialist, access to early detection and treatment of CVD, improved patient outcomes and increased patient satisfaction.[6,7] In recent years, there has been an increase in the number of RACCs being established in Australia, with most located in or adjacent to major hospitals[5,8–10] and primarily accepting referrals from the hospital ED.[8,9] Although referring patients to these clinics can divert them away from the ED, they do not prevent ED presentations in the first place. Referral pathways in the community are needed to reduce waiting times to access specialist cardiologists, without the patient presenting to an ED or a hospital-based RACC first. Such pathways would be ideal for patients who are experiencing cardiac symptoms not urgent enough to warrant referral to the ED.

Furthermore, communication between specialists or hospital teams, including hospital-based RACCs and general practitioners (GPs), is limited to a discharge summary or letter that might arrive weeks or months after the patient is seen.[11–13] Timely communication and sharing of health information between GPs and specialists is essential for the delivery of high-quality and safe care; however, data on the timeliness of information sharing are limited.[12,13]

In this study, we describe HeartConnect, an independent RACC operating in an outpatient setting in Sydney, Australia. HeartConnect aims to provide a rapid access referral pathway for non-emergency patients, who need timely specialist review, referred by GPs to a specialist cardiologist.

Context and description of HeartConnect: An integrated rapid referral model of care

The HeartConnect clinic is located at MQ Health, which encompasses the Macquarie University Hospital (MUH) and a specialist medical centre offering a variety of services, including cardiology and primary care.[14] MUH does not provide emergency services. MQ Health integrates healthcare delivery, training and research and is co-located at the Macquarie University campus, and wholly owned and operated by Macquarie University under a unique private not-for-profit model.

The HeartConnect model was co-designed by cardiologists, GPs, researchers, practice managers and allied health professionals, with input from patient representatives and senior executive staff at MQ Health and the Sydney North Health Network (SNHN). The MQ Health cardiology team works in partnership with general practices in the SNHN area to provide a rapid access referral pathway that closely links GPs with the specialist HeartConnect service. The SNHN area is relatively socioeconomically advantaged; however, it has a higher proportion of people born overseas and households speaking a language other than English compared to New South Wales as a whole.[15] The rapid access service was offered as a private service, therefore incurring an out-of-pocket cost for patients; however, patients could be reviewed with a reduction in price or for free where personal circumstance dictated, at the discretion of the cardiologist or prompting by the referring GP.

There were no specific criteria for referral, and it was up to the GP's clinical judgement to decide whether to refer to the HeartConnect clinic, as is usual practice. However, the referral pathway was designed for patients with urgent cardiac symptoms that needed timely review, assessment and a treatment plan from a specialist rather than for emergency situations (eg if the patient presents with warning signs of impending heart attack) or for non-urgent symptoms associated with moderate CVD risk. The design features of HeartConnect included:

- a telephone advice line for GPs that links them with a specialist cardiologist
- a rapid referral pathway, with appointments with a specialist cardiologist organised within 72 hours for urgent problems as judged by the referring GP
- on-site access to investigations and imaging, ideally done on the same day
- interdisciplinary care provided by specialist cardiologists, cardiac technicians and nurses
- convenient on-site cross-referral to other specialties if needed
- rapid feedback and regular communication with GPs to exchange information about referred patients.

The implementation of HeartConnect was disrupted by the COVID-19 pandemic, with severe restrictions and lockdowns in Australia,[16] including limited in-person GP appointments in 2020 and 2021 and a significant focus in primary care to deliver COVID-19 vaccinations for the population.

Methods

A pilot mixed-methods implementation evaluation was undertaken during the first 18 months of operation of the HeartConnect model of care to understand the perceived appropriateness and feasibility of the service for GPs, cardiologists, clinic staff and patients.

Referral and appointment data

De-identified quantitative patient data were stored using REDCap software (Research Electronic Data Capture [REDCap]; Vanderbilt University, Nashville, TN, USA);[17] data were manually extracted from clinic software and records by a trained researcher with assistance from the HeartConnect clinic staff. Details extracted included:

- demographics: age, gender and postcode
- referral information: main reason for referral, risk factors noted and any relevant pre-existing health conditions and prescribed cardiovascular medications
- appointment process data: date of GP referral, date of appointment with the HeartConnect service, timing of tests and imaging, and timing of feedback sent to GPs after the HeartConnect appointment.

Surveys

Following their appointment with HeartConnect, patients were invited to complete a short evaluation survey about the service. The survey was developed in REDCap and sent to patients via email; a hard copy option of the survey was also offered. Patients were asked about the convenience of the clinic, perceptions of cost and how their experience compared with any cardiology or other specialist clinics that they might have visited (Appendix 1; available online only). Upon completion of the survey, respondents were given the opportunity to take part in a short phone interview to further discuss their experiences with HeartConnect.

Interviews

Semi-structured interviews were conducted with referring GPs, cardiologists and administrative staff at the HeartConnect clinic. Interviews covered the acceptability, appropriateness, experiences, perceived value and benefits of HeartConnect, as well as barriers and enablers of model implementation.

Patient care journey maps

Patient care journey maps were created based on the quantitative clinic data and qualitative data collected from patients. The process maps detailed the workflows and included details of the timeline for the patient's interaction with HeartConnect and the steps involved with their care.

Data analysis

Interview transcripts were imported into NVivo 20 (Lumivero, Denver, CO, USA) and analysed using a hybrid deductive/inductive coding approach by two researchers (GD, YZ), with regular meetings held with four researchers from the team (GD, YZ, FL, CN). De-identified survey data and quantitative clinic data were analysed using descriptive statistics in Microsoft Excel (Microsoft Corporation, Redmond, WA, USA) and IBM SPSS V27 (IBM Corporation, Armonk, NY, USA). As the COVID-19 pandemic coincided with the planned implementation of HeartConnect,[18] trends over dates corresponding to COVID-19 pandemic lockdowns were considered when interpreting data; however, HeartConnect was not designed as a response to the pandemic.

Ethics

Ethics approval was granted by the Macquarie University Human Research Ethics Committee (ref no: 52022938938023).

All participants provided full and informed written consent to take part in the research.

Results

Referral characteristics

Referrals to the HeartConnect program commenced in October 2020. In the first 18 months of the pilot implementation study, 155 patients were referred, with 95 (60% male; mean age 53.8 years) consenting to participate in the research study (Table 1). Patients were referred from 18 general practices, predominantly but not exclusively from the SNHN area. Three patients were referred from MUH for a routine preoperative cardiac check-up, and two were referred from specialist clinics within MUH for review, following other outpatient specialist appointments. Seven patients were referred from a nearby walk-in private emergency clinic.

The mean number of working days between referral by a GP and the specialist appointment at HeartConnect was eight days, with a median of four days and range of 1–104 days. Thirty-six patients (38%) were seen within three business days of referral. Nineteen patients had referral or appointment dates during COVID-19 pandemic lockdowns or restrictions in Sydney. Of these 19 patients, nine had more than five days between their GP referral and HeartConnect specialist appointment. Six of these nine patients were impacted by the COVID-19 pandemic Omicron outbreak coinciding with the holiday period in 2021–22, and the holiday period might have also contributed to delays. The average wait time for a cardiologist appointment when booked in by the GP was 2.2 days, compared to an average wait time of 10.3 days for appointments booked by the patient. All patients referred to the rapid access clinic who waited >14 days to see a cardiologist booked their own appointment. The average time between the specialist appointment and the follow-up letter from the cardiologist back to the GP was one day. For 87 (91%) patients, the follow-up letters were sent or emailed to the referring GP on the day of the cardiology appointment. Fifty-seven (60%) patients had multiple appointments with the HeartConnect service, most commonly, two appointments per patient.

Table 1. Patient and appointment characteristics

Category	n (%)
Patient characteristics	
Number of patients	95
Mean patient age (years, SD)	53.8 (19.5)
Gender	
Male	57 (60)
Female	38 (40)
Postcode within SNHN catchment	66 (69)
Postcode outside of SNHN catchment	26 (27)
Pre-existing conditions	
Dyslipidaemia	29 (31)
Hypertension	21 (22)
Arrhythmia	15 (16)
Hypotension	5 (5)
Multiple conditions listed	22 (23)
Other[A]	11 (12)
Reasons for referral	
Symptoms/cardiac event	55 (58)
Chest pain/discomfort/tightness	24 (25)
Patient at high risk of cardiovascular disease	20 (21)
Arrhythmia/palpitations	17 (18)
Opinion on management	11 (12)
Preoperative check/cardiac assessment	7 (7)
Other/not specified	15 (16)
Investigations undertaken	
Electrocardiogram	95 (100)
Transthoracic echocardiogram	66 (69)
Stress echocardiogram	20 (21)
HeartBug (HeartBug Pty Ltd)	8 (8)
Computed tomography coronary angiogram	8 (8)
Other[B]	6 (6)
Medication reconciliation	5 (5)

[A]Includes structural abnormality, disease of arteries or arterioles, heart valve disease, left bundle branch block, dextrocardia, heart failure, transient ischaemic attack.

[B]Includes sestamibi scan, Holter monitor, blood tests, blood pressure monitoring, carotid ultrasound.

SD, standard deviation; SNHN, Sydney North Health Network.

Table 2. Illustrative patient and healthcare professional quotes

Concept	Patient quotes	Health professionals' quotes
Acceptability and convenience of an integrated service	*Everything was in one place and I didn't have to travel to different locations for various tests. Also, when I needed to see/speak with the cardiologist urgently, an appointment time was quickly organised.* (Patient 1)	*It's been really good, so the patients have been seen within a couple of days, people have needed more things have been booked back in to have, you know Echos or maybe they've had an Echo and then they've been booked back in to see the cardiologist, but generally it's worked reasonably well and the letters back have been timely and the cardiologist has, at times, rang and had a chat, when that was relevant.* (GP 1)
Timely access to HeartConnect service	*When I found out I needed to see a cardiologist as soon as possible I was able to get an appointment within 1 week.* (Patient 18)	*Patient feedback has been really, really good in terms of how quickly you can get them in. There's a lot of relief, because they usually call a cardiologist and they say it'll be three months to get in, but they don't need emergency (care) and they get stuck in the middle.* (Practice Manager)
Cost and other barriers	*I am on a disability part pension and work part time.* (The cardiologist) *agreed to bulk bill my tests. I am so very grateful to him for that.* (Patient 11)	• *I have had some feedback from patients that it's expensive, but I don't know whether that's more expensive than other cardiologists.* (GP 3) • *There's a risk that some GPs will use the advice line … but then use another cardiology service.* (GP 1) • *I think one of the frustrations is that I've found a few people* (GPs), *they're happy to call you for advice, but then that doesn't result in them referring the patient but refer the patient somewhere closer to home.* (Cardiologist 1)

GP, general practitioner.

Patient characteristics

The most common reason for referral was the presence of cardiac symptoms or a cardiac event (n=22, 52%). Other reasons included review of high-risk patients, and opinion on the management of existing cardiac conditions. One-third of referred patients (n=31, 33%) were newly identified by the GP and had no pre-existing condition. The most common pre-existing conditions were dyslipidaemia (n=29, 31%) and hypertension (n=21, 22%); 22 (23%) patients had multiple conditions listed (Table 1).

Appointment characteristics

All face-to-face appointments comprised patient blood pressure and heart rate checks, together with an electrocardiogram (ECG). Other clinically indicated cardiac investigations included trans-telephonic monitoring via a HeartBug device (HeartBug Pty Ltd, Sydney, NSW, Australia), stress echocardiogram, sestamibi scan, computed tomography (CT) coronary angiogram, transthoracic echocardiogram and Holter monitoring (Table 1). Of the 95 patients enrolled, 51 (54%) had all specialist tests performed on the same day as their initial HeartConnect appointment. Delays mostly occurred due to clinical indications, such as the need for pharmacological heart rate suppression prior to cardiac CT to ensure high-quality imaging.

Patient experiences

Twenty-seven patients did not have an email address listed on their patient file or did not consent to being contacted by the research team for participation in the experience survey. Of the consenting patients with an email address (n=68), 20 (30%) opened the survey and 15 (22%) completed it. The average age of respondents was 56 years, 67% were male, 33% female and most resided in the area covered by the SNHN.

Patients rated their overall satisfaction of visiting the HeartConnect rapid access clinic an average of 9.1 on a scale of 1–10, with 10 denoting complete satisfaction. Most patients were referred from the local surrounding suburbs; however, some travelled from up to 200 km for their appointment, commenting that this was an acceptable distance to travel. Most patients (n=10, 67%) agreed that the costs of the service were reasonable and acceptable (Figure 1).

Three themes emerged from the qualitative data: (1) acceptability and convenience of accessing an integrated service; (2) timely access to a specialist cardiologist; and (3) cost and other barriers including some GPs not using HeartConnect as intended (Table 2). Patients appreciated the timeliness of appointments with the specialist cardiologist and commented on the convenience of travelling to one location for all necessary tests. Although cost was mentioned as a barrier, the willingness to waive fees based on personal circumstances was mentioned as a facilitator to access the services. Despite the largely positive response from patients, one GP commented that patients had brought up the cost of the HeartConnect appointments with them, but was unsure how that compared to other cardiologists, and a few patients who were seen at no cost appreciated the flexibility of taking their personal circumstances into account (Table 2).

Health professionals' experiences

Six staff members who were involved with the HeartConnect program were interviewed; three GPs, two cardiologists and the cardiology practice manager.

GPs highlighted the ease with which they were able to book appointments for

their patients, noting that there has been clear communication between various services (Table 2). GPs were asked about their awareness of various components of the HeartConnect service, including the on-call phone advice line, which could be used by GPs to seek advice about their patients. One of the GPs initially expressed concerns about the phone line being used just for advice and not for referral (Table 2). This concern was later confirmed by the cardiologists who expressed frustration with the way that the advice line was used by a few GPs. The cardiology clinic practice manager commented on the positive response from patients, particularly in terms of the reduced waiting time to access cardiologists (Table 2).

Patient journey mapping

The shortest patient journeys occurred when GPs booked the cardiology appointment on behalf of the patient, and when minimal testing was required (Figure 2A). Patients with more complex presentations who required follow-up testing and those who booked their own appointments had longer journeys (Figure 2B).

Discussion

The HeartConnect clinic and referral pathway facilitates greater care integration and collaboration between GPs and specialist cardiologists while improving timely access to specialist care for patients. Unlike rapid access cardiology clinics that are co-located with public hospitals,[9,19,20] the HeartConnect model of care utilises a cardiology service in a private not-for-profit medical centre at MQ Health. Despite disruptions during the COVID-19 pandemic, the clinic was successfully implemented and patient and provider experiences were positive. This aligns with acceptability of other rapid access cardiology clinics in Australia and New Zealand, with most patients and referrers reporting positive experiences in clinics that accept patients from EDs.[9,21,22] This study provides evidence that these positive experiences are also present for patients referred from primary care to a specialist clinic.

The timeliness of communication between GPs and specialist cardiologists improved with letters from the specialist back to the GP sent mostly on the day of appointment. One study conducted in the Netherlands found that approximately 40% of GPs did not receive correspondence from the cardiology department in the three months following a referral;[23] another study found that GPs mostly perceived that specialists' communication was not received in a timely manner.[12] The embedded, co-designed interdisciplinary nature of the HeartConnect clinic enabled effective, timely communication between GPs and cardiologists.

Providing access to an advice line staffed by a specialist cardiologist was a novel component of the model of care, providing direct ad hoc access to specialist advice. We were unable to collect reliable metrics to evaluate the use of the advice line; however, anecdotal information from the cardiologists suggests that it was seldom used by GPs. The limited use of an advice line by GPs was also found in another GP–specialist integrated care model;[24] however, the reasons for not using the advice line in the HeartConnect model remain unclear.

Strengths and limitations

The implementation of HeartConnect was delayed because of the COVID-19 pandemic, and engagement with GP practices in the evaluation component of the study was difficult due to ongoing competing priorities and staff shortages, and lack of compensation for participating in the study. This led to only a low number of providers participating in interviews, limiting the representativeness of these data. Similarly, only a small subgroup of the patient cohort completed the survey, which also limits representativeness of findings. Patient responses might have also been influenced by social desirability bias, considering the interaction between service providers and the research team. However, considering these limitations, the HeartConnect model of care was successfully implemented and continues to operate. HeartConnect was established in a unique context and was supported by a robust co-design process. Spreading and scaling this model of care might be possible in other contexts; however, careful formative evaluation, context mapping and further co-design in potential new settings would be advisable to inform any needed model adjustments.

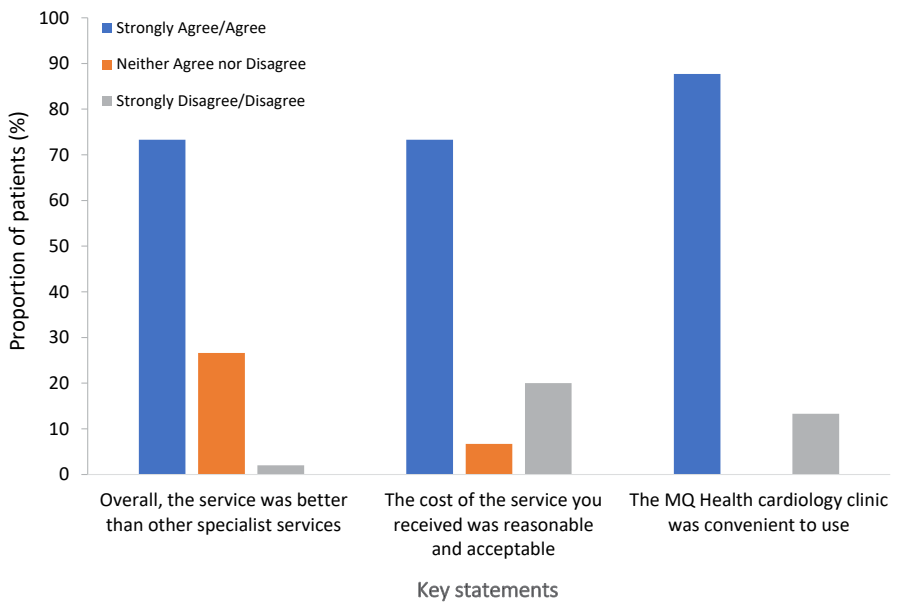
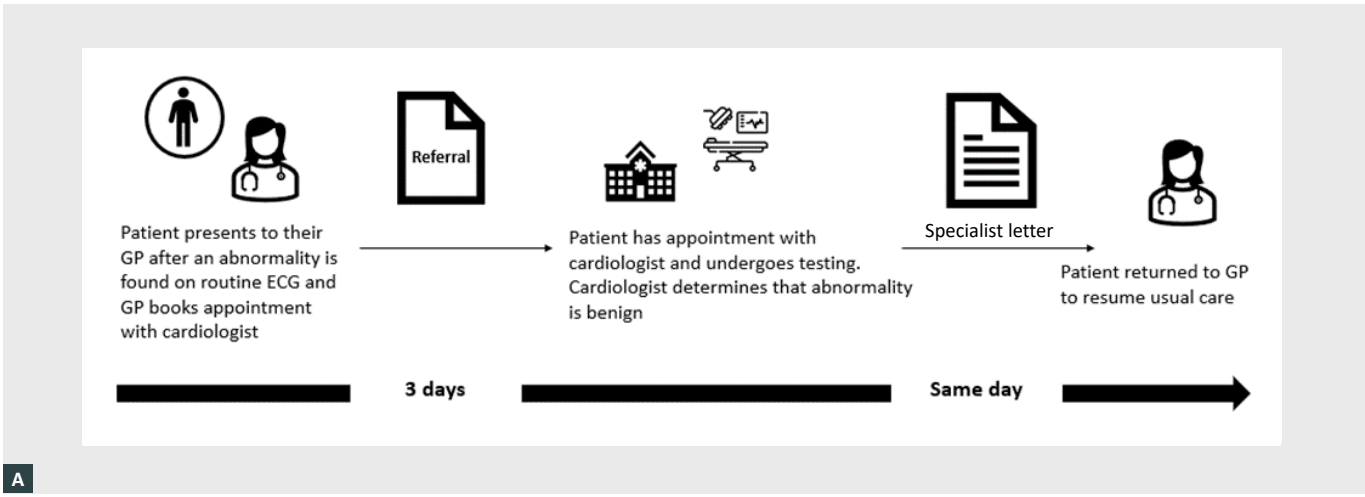


Figure 1. Patient agreement with key statements about the HeartConnect service (total responses=15).



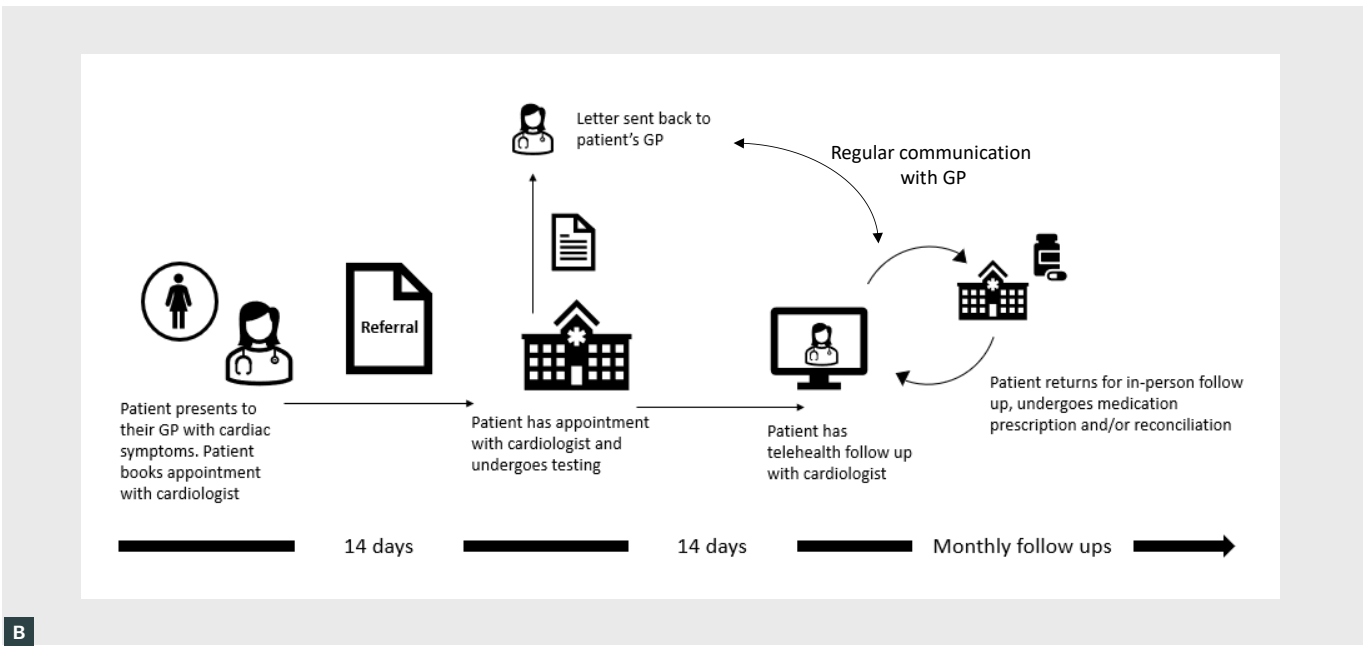


Figure 2. (**A**) Patient journey maps showing a simple referral assessment and review by cardiologist and return to the GP. (**B**) Patient journey map showing a more complex journey.

ECG, electrocardiogram; GP, general practitioner.

Conclusion

The HeartConnect clinic provides a unique rapid referral pathway from primary care to specialist cardiology. Distinct advantages were noted by patients and GPs, including the rapid access to appointments with a specialist cardiologist and streamlining of investigations, most of which were performed on the same day. This pathway provides a potential solution to reduce the long waiting times to see a specialist cardiologist for patients, who in the opinion of their GP, need to see a specialist but their condition is not urgent enough to be referred to the ED. Concerns from some patients about the cost of this service and the ongoing capacity of the clinic to continue providing bulk-billed appointments for patients experiencing difficult personal circumstances should be monitored. An evaluation of model sustainability and clinical outcomes is needed to assess the long-term viability of HeartConnect.

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