Healthcare services use by patients with heart failure in Australia

Findings from the SHAPE study

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Background and objective

General practitioners (GPs) play a central role in healthcare, serving as the first point of contact, making appropriate referrals and coordinating care for chronic conditions such as heart failure (HF). We sought to determine healthcare use by people with HF in primary care.

Methods

In this Study of Heart failure in the Australian Primary carE setting (SHAPE), we analysed records of 1.93 million adult patients who attended a total of 43 practices between 1 July 2013 and 30 June 2018. We identified and examined the data of 20,219 patients with HF to describe the frequency of visits and use of Medicare Benefits Schedule items.

Results

Patients with HF saw GPs 14.4 times per annum on average; 59.5% had a General Practice Management Plan (GPMP), 2.9% of GPMPs were reviewed annually or more frequently, and 46.8% of patients had been referred to a cardiologist. A total of 3761 had coexisting anxiety or depression, and of these 37.1% had a mental health plan.

Discussion

Patients with HF visit their GP frequently, with many not reaching guideline therapy nor referred to cardiologists. Low use of care planning and reviews presents an opportunity for GPs to improve care.

HEART FAILURE (HF) affects more than 38 million people worldwide and its prevalence is growing.[1] Chronic HF is associated with an increased risk of hospital admission and a five-year mortality rate of 37–48%, which reflects a prognosis similar to non-haematological malignancies.[1] Despite the significance of this disease, little is known about how people with HF in Australian general practice are being managed.

In Australia's universal healthcare system, general practitioners (GPs) play a central role in the delivery of healthcare. They serve as the first point of contact for health issues, ensure appropriate referrals to specialists and coordinate the provision of integrated patient care for chronic diseases, including HF. To support this, GPs can access items funded under the Medicare Benefits Schedule (MBS), including Chronic Disease Management (CDM) items, Domiciliary Medication Management Reviews (more commonly known as Home Medication Reviews [HMRs]) and GP Mental Health Treatment Plans (GP-MHTPs). CDM has two components: the General Practice Management Plan (GPMP) and the Team Care Arrangement (TCA). Patients with a GPMP also have access to MBS-funded practice nurse services.

In Australia, CDM items are available under the MBS to patients with chronic medical conditions. It enables GPs to plan and coordinate the healthcare of patients with chronic or terminal medical conditions, including those who require multidisciplinary team-based care.[2] The Australian Department of Health defines a 'chronic medical condition' as one that has been (or is likely to be) present for six months or longer, and provides cardiovascular disease, diabetes, asthma, musculoskeletal conditions and stroke as examples.[2] The funding allows one care plan per 12-month period (unless a significant change has occurred) and up to three reviews.[3] Once a CDM has been developed, access is provided to five subsidised allied health services. Uptake of planned care in patients[4,5] and reviews of care plans[6] have both demonstrated positive outcomes in people with chronic disease.

There is a paucity of research and studies on HF in primary care in Australia. However, research that has been done emphasises the

importance of primary care and care planning in producing up to a 20% reduction in hospital presentations.[7] Integrated care programs have been associated with a 19% reduction in hospital admissions compared with usual care.[8] This is especially relevant for HF, for which the risk of hospitalisation is high and each hospitalisation costly.[9]

We conducted a retrospective cohort study of people with HF in the Australian primary care setting to describe the epidemiology of HF and associated healthcare use. Our overall aim was to highlight areas that can be improved to optimise patient outcomes.

Methods

This Study of Heart failure in the Australian Primary carE setting (SHAPE) examined the records of patients aged ≥18 years who were cared for at a total of 43 participating GP practices from a large practice network (Healius) in the five-year period between 1 July 2013 and 30 June 2018. Only 'active patients' in a practice were recruited, based on the Royal Australian College of General Practitioners (RACGP) definition: patients visiting their GP more than three times in a two-year period.[10] Participating practices were those that used Medical Director software – this group comprised 43 centres from a network of 71. The remaining 28 practices were using software other than Medical Director and so data were not available for extraction and analysis. The medical centres were widely distributed across Australia, with the exception of Tasmania and the Northern Territory.[10]

Data for relevant patients were extracted from the GP practice software and de-identified by Healius. Relevant patients were defined as those with a diagnosis of HF, those with a diagnosis of an aetiological condition for HF, those who received ongoing treatment with a medication for HF or reported test results (pathology, echocardiography, cardiac blood pool scans) indicative of HF. From these data, patients with HF were identified by 1) a specified diagnosis of HF; or 2) ongoing treatment with a HF-specific medication; or 3) clinical

features of HF; or 4) pathology test results indicative of HF. The population was stratified based on a hierarchy of selection criteria into 'definite HF', 'probable HF' and 'possible HF'. Details of the selection criteria and other methods are provided in Parsons 2020.[10]

The endpoints of interest were the prevalence and incidence of HF, the characteristics of the HF population and other factors pertinent to the management of patients with HF, including their use of healthcare – that is, frequency of GP visits; frequency of use of CDM items, HMRs and GP-MHTPs; and frequency of referral for specialist care. The management of the patients with HF was assessed against the Cardiac Society of Australia and New Zealand HF guidelines.[1] The analysis of healthcare use was conducted only for patients classified as having definite or probable HF. The study was principally an analysis of the clinical notes, both coded and uncoded, and was later linked to billing to determine the frequency of MBS items claimed. It was not a study of billing practices. However, there are billing practices that are associated with better outcomes for people with chronic disease – care plans and reviews.[6,11]

We calculated the frequency of GP visits by dividing the total number of patient visits by the total time that the person was a patient at the practice in the five-year study period (x visits/([last visit – first visit date]/365.25). We also assessed the frequency of GP visits against the number of comorbidities recorded for each patient. Components of the CDM items included GPMP preparation (MBS item 721) and review (item 732), Team Care Arrangements preparation (item 723) and review (item 732), as well as contributing to or reviewing of a Multidisciplinary Care Plan being prepared by another health or care provider (item 729) or for a resident of an aged care facility (item 731). The HMR was covered under a single item number (item 900), while the preparation, review and consultation for GP-MHTP are covered under items 2700, 2701, 2712, 2713, 2715 and 2717. Depression is common in patients with HF and is a prognostic indicator, with cognitive behavioural therapy

showing positive outcomes.[1] These item numbers were recorded in the patient's medical records as atomic data and therefore readily available for analysis in our study. We identified the type of specialist (cardiologist, endocrinologist or renal physician) that patients had been referred to by cross-referencing the name of the specialist against a licensed copy of the Australian Medical Publishing Company (AMPCo) database of healthcare professionals.

Data analyses were conducted using SAS for Windows (version 9.4). The study was approved by the Bellberry Human Research Ethics Committee (Application No: 2018-09-746). The Healius Clinical Council provided governance approval for the study.

Results

A total of 1.93 million patients over the age of 18 years were treated within the network of 43 GP practices over the five-year study period, of which 1.12 million adults visited the practice three or more times in a 24-month period ('active' patients). Of these 'active' patients, 20,219 were classified as having 'definite or probable HF'. From this, the age-standardised prevalence and annual incidence of HF in the 'active' population were calculated to be 2.20% (95% confidence interval [CI]: 2.17, 2.23) and 0.348% (95% CI: 0.342, 0.354).[12] We are confident that the results are representative of the epidemiology in the Australian community setting. The key word search was conducted on the medical records of 1.93 million adult Australians – over 10% of the adult population.[13]

For the active patients with definite or probable HF the median age was 72.0 years, 51% were male, median age at diagnosis of HF was 68.0 years, median body mass index was 30.1 kg/m^2, 48.7% were obese or overweight, 21.5% were smokers, 27% were ex-smokers and 1.6% were classified as Aboriginal or Torres Strait Islander.[1] The most commonly recorded comorbidities were hypertension (41.1%), chronic obstructive pulmonary disease (COPD)/asthma (25.1%), depression/anxiety (18.4%), ischaemic heart disease (12.9%), diabetes (11.9%),

osteoporosis (9.5%), renal impairment (4.0%) and atrial fibrillation (3.6%).[14]

Patients with 'definite' or 'probable' HF attended their GP practice an average of 14.4 times per year (median 11.9), ranging from a mean of 11.7 (median 9.0) visits per annum for those with no recorded comorbidities to a mean of 27.2 (median 22.9) visits per annum for those with five or more comorbidities (Table 1).

Of patients with definite or probable HF, 12,028 (59.5%) had received a GPMP, 11,096 (54.9%) a TCA and 7135 (35.3%) a GPMP/TCA review over the five-year period (Table 2).

The use of GPMPs increased with the presence of comorbidities – over 75% (1591) of patients with three or more comorbidities had received a GPMP, and 83% (1499) of those with diabetes as a comorbidity had received a GPMP. Of those with three or more comorbidities, 75% (1596) had a TCA and 57% (1207) had a GPMP/TCA review. Where diabetes was identified as a comorbidity, 80% (1448) had a TCA and 58% (1057) had a GPMP/TCA review (Table 2).

Many patients received just one GPMP (5171, 25.6%). Only 579 patients (2.9%) had received GPMPs annually or more frequently, 4457 (22.1%) biennially or more frequently and 1821 (9.0%) had received GPMPs less frequently than every two years (Table 3). The median time in years between repeated GPMPs for those patients who had more than one item over the five-year period was 1.7 years (Table 4). Use of care planning did not have an impact on use of HF medication but was associated with an increased likelihood of consulting a cardiologist.

The provision of practice nurse support for active patients with definite and probable HF was modest, with 4115 (20.4%) having received a relevant MBS item. The use of HMRs was even more uncommon, received by only 1099 (5.4%) of patients. Of those with an HMR, there was no improved uptake of HF-specific medication (Table 5).

Of the patients with definite and probable active HF, 2461 (12.2%) had a mental health plan preparation charged to Medicare, 855 (4%) had a GP-MHTP review and 2851 (14.1%) had a GP-MHTP

consultation. These percentages increased in those who also had a recorded diagnosis of anxiety or depression: 1393 (37.1%) had a mental health plan preparation charged to Medicare, 580 (15.5%) had a GP-MHTP review and 1558 (41.5%) had a GP-MHTP plan consultation (Table 2). The median time in years between repeated mental health plan preparations for those patients who had more than one item over the five-year period ranged from 1.6 to 1.9 years (Table 4).

Cardiology referrals (within one month following the diagnosis date, presuming that the referral to the specialist may be the

time when the GP was suspecting HF and wanted specialist involvement) had been undertaken for 9468 patients (46.8%), while 2312 (11.4%) were referred to an endocrinologist and 1058 (5.2%) to a renal physician (Table 1). We also assessed referrals starting from seven months prior to diagnosis, which allowed for patients to have been seen by a specialist, provided with six months of prescriptions and so only needing a GP consultation after this period. For this group, 10,258 active patients (50.7%) were referred to a cardiologist, 2573 (12.7%) to an endocrinologist and 1172 (5.8%) to a renal physician (Table 1).

Table 1. Number of GP visits and referrals to non-GP specialist by patients with definite and probable heart failure, active population

GP visits per year	Median (IQR); mean (SD)
No comorbidities*	9.0 (5.1–15.1); 11.7 (9.5)
1–2 comorbidities	12.5 (7.9–19.4); 15.0 (10.5)
3–4 comorbidities	18.4 (12.6–26.0); 20.7 (12.3)
≥5 comorbidities	22.9 (16.1–36.2); 27.2 (14.9)
Overall number of visits per annum	11.9 (7.0–19.0); 14.4 (10.8)

	n (% of group that has had a referral)	
Referred from GP to non-GP specialist,[†] all with active HF	**Within one month prior to diagnosis of HF onwards**	**Within seven months prior to diagnosis of HF onwards**
Cardiologist	9,468 (46.8%)	10,258 (50.7%)
Endocrinologist	2,312 (11.4%)	2,573 (12.7%)
Renal physician	1,058 (5.2%)	1,172 (5.8%)
Referred from GP to non-GP specialist, patients with definite active HF		
Cardiologist	7,459 (48.2%)	8,005 (51.8%)
Endocrinologist	1,731 (11.2%)	1,902 (12.3%)
Renal physician	792 (5.1%)	875 (5.7%)
Referred from GP to non-GP specialist, patients with probable active HF		
Cardiologist	2,009 (42.3%)	2,253 (47.4%)
Endocrinologist	581 (12.2%)	671 (14.1%)
Renal physician	266 (5.6%)	297 (6.3%)

*Comorbidity is defined as the presence of a formal diagnosis of one or more of the diagnoses that are aetiological factors for heart failure.
[†]Specialist referrals were accumulated from the time of diagnosis of HF.
GP, general practitioner; HF, heart failure; IQR, interquartile range; SD, standard deviation

Table 2. Frequency of use of CDM items, HMRs and GP-MHTPs by patients with definite and probable heart failure, active population

GP CDM items	n (% of group that has had a CDM item)
No GPMP item recorded	8,101 (40.2)
GPMP (MBS item number 721)	12,028 (59.5)
TCA (723)	11,096 (54.9)
Multidisciplinary Care Plan (729, 731)	240 (1.2)
GPMP or TCA reviews (732)	7,135 (35.3)
HMR/DMMR (900)	1,099 (5.4)
Practice nurse item (10997)	4,115 (20.4)
GPMP by number of comorbidities*	
No comorbidities	3,028 (40.9)
1–2 comorbidities	6,477 (60.5)
≥3 comorbidities	1,591 (75.4)
GPMP by type of comorbidity	
Diabetes	1,499 (82.7)
Osteoporosis	957 (78.1)
COPD/asthma	2,794 (70.8)
Depression/anxiety	2,613 (69.6)
TCA by number of comorbidities	
No comorbidities	3,081 (35.4)
1–2 comorbidities	6,517 (59.4)
≥3 comorbidities	1,596 (75.3)
GPMP/TCA review by number of comorbidities	
No comorbidities	1,729 (23.4)
1–2 comorbidities	4,199 (39.2)
≥3 comorbidities	1,207 (57.2)
CDM items with diabetes comorbidity	
GPMPs	1,499 (82.7)
TCAs	1,448 (79.9)
GPMP/TCA reviews	1,057 (58.3)

GP CDM items	n (% of group that has had a CDM item)
GP-MHTP items (patients with and without a mental health diagnosis)	
GP-MHTP preparation (2700, 2701, 2715, 2717)	2,461 (12.2)
GP-MHTP review (2712)	855 (4.2)
GP-MHTP consultation (2713)	2,851 (14.1)
GP-MHTP items (patients with diagnosis of anxiety or depression)	
GP-MHTP preparation (2700, 2701, 2715, 2717)	1,393 (37.1)
GP-MHTP review (2712)	580 (15.5)
GP-MHTP consultation (2713)	1,558 (41.5)

GP CDM items	HF-specific drug[†]	Referral to cardiologist[‡]
GPMP (MBS item number 721)		
No	3,220 (39.3)	3,395 (41.5)
Yes	3,861 (32.1)	6,863 (57.1)
TCA (723)		
No	3,628 (39.8)	3,967 (43.5)
Yes	3,453 (31.1)	6,291 (56.7)
GPMP or TCA reviews (732)		
No	4,862 (37.2)	6,016 (46.0)
Yes	2,219 (31.1)	4,242 (59.5)
HMR (900)		
No	6,702 (35.1)	9,567 (50.0)
Yes	379 (34.5)	691 (62.9)

*Comorbidity is defined as the presence of a formal diagnosis of one or more of the diagnoses that are aetiological factors for HF.
†HF-specific drugs at any time (not earlier than diagnosis since these drugs may be a criterion for diagnosis)
‡Referrals from seven months prior to diagnosis of HF onwards
CDM, Chronic Disease Management; COPD, chronic obstructive pulmonary disease; DMMR, Domiciliary Medication Management Review; GPMP, General Practice Management Plan; GP, general practitioner; GP-MHTP; GP Mental Health Treatment Plan; HF, heart failure; HMR, Home Medication Review; MBS, Medicare Benefits Schedule; TCA, Team Care Arrangement

Discussion

HF is associated with high rates of mortality and hospital admission, which impose a significant burden on the healthcare system. Planned care is important for chronic conditions such as HF since it can lead to lower rates of morbidity and mortality. Our study shows that patients with HF are attending general practices frequently, on average 14 times per year. However, there was little use of MBS-funded care plans. Despite the complexity of managing HF, nearly half of patients with HF did not have a CDM plan, only 35.3% had had their CDM plan reviewed, and fewer than 3% had their CDM item reviewed annually as is funded by Medicare.

Our findings corroborate others that have shown that, despite their proven benefit, care plans are underused, especially reviews of care plans where most of the positive outcomes are realised.[15,6]

Our data also suggest that, where a CDM plan existed, it was probably implemented not for HF but for another chronic condition, with much higher use and review of CDM plans in patients with concomitant diabetes, osteoporosis and COPD/asthma. This finding is troubling because chronic HF is associated with a worse prognosis than these other conditions. There may be many reasons for this finding, which may include lack of formal diagnosis in the history fields, lack of clarity of role in HF management and the rapidly changing management guidelines.[4] The highest uptake for allied health claims in 2019 is podiatry.[16] It may

Table 3. Use of CDM items, HMR and GP-MHTP by time period for patients with definite and probable heart failure, active population

Service (item number)	None n (%)	One only	More frequent than six-monthly	Six months +/-1 n (%)	7–11 months n (%)	12 months +/-1 n (%)	13–21 months n (%)	24 months +/-3 n (%)	Less frequent than biennial n (%)
GPMP preparation (item 721)	8,191 (40.5)	5,171 (25.6)	6 (0.0)	2 (0.0)	16 (0.1)	555 (2.7)	2,952 (14.6)	1,505 (7.4)	1,821 (9.0)
TCA coordination (item 723)	9,123 (45.1)	5,220 (25.8)	4 (0.0)	2 (0.0)	14 (0.1)	464 (2.3)	2,547 (12.6)	1,204 (6.0)	1,641 (8.1)
Plan for RACF patient (item 729)	20,173 (99.8)	42 (0.2)	1 (0.0)	1 (0.0)	0 (0.0)	0 (0.0)	1 (0.0)	0 (0.0)	1 (0.0)
Plan for non-RACF patient (item 731)	20,025 (99.0)	105 (0.5)	47 (0.2)	11 (0.1)	11 (0.1)	7 (0.0)	8 (0.0)	0 (0.0)	5 (0.0)
Review of GPMP or TCA (item 732)	13,084 (64.7)	2,779 (13.7)	1637 (8.1)	896 (4.4)	987 (4.9)	249 (1.2)	376 (1.9)	100 (0.5)	111 (0.6)
Practice nurse (item 10997)	16,104 (79.7)	1,969 (9.7)	608 (3.0)	378 (1.9)	572 (2.8)	214 (1.1)	218 (1.1)	62 (0.3)	94 (0.5)
DMMR (item 900)	19,120 (94.6)	932 (4.6)	1 (0.0)	0 (0.0)	1 (0.0)	11 (0.1)	54 (0.3)	32 (0.2)	68 (0.3)
GP-MHTP (item 2700)	19,647 (97.2)	509 (2.5)	0 (0.0)	0 (0.0)	0 (0.0)	3 (0.0)	26 (0.1)	11 (0.1)	23 (0.1)
GP-MHTP (item 2701)	20,038 (99.1)	163 (0.8)	0 (0.0)	0 (0.0)	0 (0.0)	1 (0.0)	10 (0.1)	3 (0.0)	4 (0.0)
GP-MHTP (item 2715)	18,971 (93.8)	1,002 (5.0)	1 (0.0)	0 (0.0)	3 (0.0)	21 (0.1)	97 (0.5)	49 (0.2)	75 (0.4)
GP-MHTP (item 2717)	19,418 (96.0)	676 (3.3)	0 (0.0)	0 (0.0)	0 (0.0)	14 (0.1)	63 (0.3)	18 (0.1)	30 (0.2)
GP-MHTP review (item 2712)	19,364 (95.8)	552 (2.7)	47 (0.2)	37 (0.2)	70 (0.4)	23 (0.1)	68 (0.3)	16 (0.1)	42 (0.2)
GP-MHTP consult (item 2713)	17,368 (85.9)	1,439 (7.1)	637 (3.2)	155 (0.8)	217 (1.1)	60 (0.3)	164 (0.8)	65 (0.3)	114 (0.6)

CDM, Chronic Disease Management; DMMR, Domiciliary Medication Management Review; GP, general practitioner; GPMP, General Practice Management Plan; GP-MHTP, GP Mental Health Treatment Plan; HMR, Home Medication Review; RACF, residential aged care facility; TCA, Team Care Arrangement

well be that the primary driver for many of these CDM plans is to access subsidised podiatry rather than using it as a way of engaging people in chronic disease management such as HF. This is further supported by reviews of the care plans occurring in only one-third of patients. If done optimally, there should at least be twice if not three times as many reviews as there are care plans, as this is where the evidence of improved outcomes occurs.

In our cohort, fewer than one in 10 patients with HF had an HMR performed. HMR by a community pharmacist is another MBS item that may be initiated by a patient's GP to maximise an individual patient's benefit from their medical regimen while preventing medication-related problems.[17] Analyses of the Department of Veteran Affairs data have reported a 45% reduction in hospitalisation for HF following HMR among veterans with HF in Australia.[18] Unfortunately, HMR growth has been negative over the past five years and reflects increasing limitations on claiming by pharmacist as well as decreasing overall access to HMRs and reduced sustainability of the program.[19] Having

an HMR did not increase the likelihood of being on HF-specific medication. Part of the explanation here is that if HF is not mentioned in the referral or documented in the past history, the pharmacist conducting the HMR will not be aware of the need for HF-specific medications.

Depression is a common and significant but often neglected issue in people with HF, which can be complicated by overlap of symptoms with HF. Regular screening for depression is advised in people with HF.[1] Improving and managing depression is a key strategy for improving general wellbeing and self management. However, we found that only 37.1% of patients with HF and comorbid anxiety or depression had a GP-MHTP. The GP-MHTP is part of another government-funded initiative (Better Access initiative) aimed at improving outcomes for people who have a clinically diagnosed mental disorder.[20] This treatment plan provides Medicare rebates for up to 10 individual or 10 group appointments with allied mental health services per year. However, patients are required to consult their GP again after the first six appointments for a mental health plan review and another referral before the

remaining appointments will be rebated. In our cohort, only 15.5% of patients with HF with comorbid anxiety or depression had a GP-MHTP review.

Our study has shown that less than half of patients with HF are being referred to a cardiologist by their GP. This may be explained once again by poor recognition of the patients' HF diagnosis. This finding is concerning because there is evidence that early collaborative care between a GP and a cardiologist are associated with improved outcomes in HF. Lee and colleagues studied the relationships between different types of outpatient physician care after an emergency department visit for HF, and found that those who received collaborative care from a GP and a cardiologist were more likely to undergo important assessments, receive guideline recommended therapies for HF and achieve better outcomes, including lower rates of mortality compared to those who were managed by a GP alone.[21,22] The importance of this GP–cardiologist collaboration strengthens the case for wrap-around care and for patients with HF to be treated using CDM plans.

Strengths and limitations
The major strength of the SHAPE setting lies in its size and involvement of a large number of general practices from across Australia. It is also the first study of HF involving data directly drawn from the general Australian community. Although this study is limited to patients in a single primary care network (albeit a large one), we are confident that the results are representative of the epidemiology in the Australian community setting. The key word search was conducted on the medical records of 1.93 million adult Australians – over 10% of the adult population.

Observational studies are susceptible to confounding, information bias and selection bias.[23] Population-level databases often do not include details regarding comorbidities, disease severity status and specific treatment plans.[24] Also, provider compliance with populating the electronic records in accordance with a system's intended structure is variable and often incomplete. Furthermore, some data in the records are not available

Table 4. Time between Chronic Disease Management services for those patients who had more than one item over the five-year period, active population

Variable	Median in years (IQR)
GPMP (MBS item number 721)	1.72 (1.31–2.30)
TCA (723)	1.72 (1.31–2.36)
GPMP or TCA reviews (732)	0.51 (0.33–0.79)
HMR/DMMR (900)	2.01 (1.48–2.93)
Practice nurse item (10997)	0.61 (0.38–0.96)
GP-MHTP preparation (2700)	1.89 (1.36–2.79)
GP-MHTP preparation (2701)	1.69 (1.28–1.89)
GP-MHTP preparation (2715)	1.76 (1.30–2.50)
GP-MHTP preparation (2717)	1.59 (1.23–2.20)
GP-MHTP review (2712)	0.90 (0.55–1.58)
GP-MHTP consultation (2713)	0.48 (0.19–1.04)

DMMR, Domiciliary Medication Management Review; GPMP, General Practice Management Plan; GP-MHTP, GP Mental Health Treatment Plan; HF, heart failure; HMR, Home Medication Review; IQR, interquartile range; TCA, Team Care Arrangement

for electronic assessment as they are contained in scanned attachments in the systems (eg discharge summaries, echocardiogram reports), which reduced our ability to identify severity of HF and outcome (eg rehospitalisation, death). As the point of diagnosis, treatment initiation and performance of key investigations may occur in the hospital setting, some patients may have been reclassified if the full hospital data had been available.

While some of the data were extracted as coded entries to specific files (formal diagnoses, drugs prescribed, brain natriuretic peptide, management items), symptoms and signs of HF and ejection fraction data were searched for within the free text of the clinical notes. The use of programming methods to search free text for specific keywords is an inexact science. However, the search criteria were refined by reviewing records manually and to confirm that commonly appearing misspellings of words were identified and corrected for. Although it was not feasible to review all patient notes (there were over eight million records in total), we believe that misclassification errors would have occurred infrequently so that the final results should be a good representation of the epidemiology in the Australian community setting.

Conclusion

HF is a serious disease with high mortality and morbidity. Holistic care planning and team reviews are frequently not being implemented, with large gaps in both the uptake and renewal of care plans. This presents an opportunity for general practice in coordinating care and improving adherence to guideline-based therapy for people with HF.

Role clarity of GPs in managing HF, raising awareness of best practice guidelines and integrated approaches will lead to better outcomes for people with HF.

Improved GP recognition of HF accompanied by a coordinated, funded approach to HF from both federal and state governments are essential to improve outcomes for patients with HF.

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Table 5. HF-specific drugs and referrals to a cardiologist, according to visit frequency for selected CDM items, active population

Service (item number)	None n (%)	One only	More frequent than six-monthly	Six months +/−1 n (%)	7–11 months n (%)	12 months +/−1 n (%)	13–21 months n (%)	24 months +/−3 n (%)	Less frequent than biennial n (%)
GPMP preparation (item 721)	8,191 (40.5)	5,171 (25.6)	6 (0.0)	2 (0.0)	16 (0.1)	555 (2.7)	2,952 (14.6)	1,505 (7.4)	1,821 (9.0)
HF drugs	3,220 (39.3)	1,770 (34.2)	2 (33.3)	0 (0.0)	6 (37.5)	189 (34.1)	894 (30.3)	481 (32.0)	519 (28.5)
Cardiologist referral	3,395 (41.5)	2,682 (51.9)	4 (66.7)	1 (50.0)	8 (50.0)	328 (59.1)	1816 (61.5)	924 (61.4)	1,100 (60.4)
TCA coordination (item 723)	9,123 (45.1)	5,220 (25.8)	4 (0.0)	2 (0.0)	14 (0.1)	464 (2.3)	2,547 (12.6)	1,204 (6.0)	1,641 (8.1)
HF drugs	3,628 (39.8)	1,730 (33.1)	1 (25.0)	1 (50.0)	4 (28.6)	154 (33.2)	746 (29.3)	361 (30.0)	456 (27.8)
Cardiologist referral	3,967 (43.5)	2,754 (52.8)	4 (100.0)	1 (50.0)	8 (57.1)	259 (55.8)	1,546 (60.7)	721 (59.9)	998 (60.8)
Review of GPMP or TCA (item 732)	13,084 (64.7)	2,779 (13.7)	1,637 (8.1)	896 (4.4)	987 (4.9)	249 (1.2)	376 (1.9)	100 (0.5)	111 (0.6)
HF drugs	4,862 (37.2)	875 (31.5)	498 (30.4)	277 (30.9)	302 (30.6)	84 (33.7)	111 (29.5)	35 (35.0)	37 (33.3)
Cardiologist referral	6,016 (46.0)	1,553 (55.9)	936 (57.2)	563 (62.8)	635 (64.3)	166 (66.7)	245 (65.2)	69 (69.0)	75 (67.6)
HMR* (item 900)	19,120 (94.6)	932 (4.6)	1 (0.0)	0 (0.0)	1 (0.0)	11 (0.1)	54 (0.3)	32 (0.2)	68 (0.3)
HF drugs	6,702 (35.1)	313 (33.6)	0 (0.0)	0 (0.0)	1 (100.0)	3 (27.3)	23 (42.6)	14 (43.8)	25 (36.8)
Cardiologist referral	9,567 (50.0)	574 (61.6)	1 (100.0)	0 (0.0)	1 (100.0)	5 (45.5)	40 (74.1)	22 (68.8)	48 (70.6)

*Home Medication Reviews are only funded by Medicare annually (or less frequently).
GPMP, General Practice Management Plan; HF, heart failure; HMR, Home Medication Review; TCA, Team Care Arrangement.

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