
A profile of older community-dwelling home care clients with heart failure in Ontario

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Abstract

Introduction: The aging of the Canadian population is associated with a rising burden of heart failure (HF), a condition associated with significant morbidity, mortality and health service use.

Methods: We used data from the Ontario Resident Assessment Instrument-Home Care database for all long-stay home care clients aged 65 years or older to (1) describe the demographic and clinical characteristics of home care clients with HF and (2) examine service use among home care clients with HF to promote management at home with appropriate services.

Results: Compared with other home care clients, HF clients exhibit more health instability, take more medications, experience more comorbid conditions and receive significantly more nursing, homemaking and meal services. They are hospitalized more frequently, have significantly more emergency department visits and use more emergent care.

Discussion: HF clients are a more complex group than home care clients in general. Patient self-care must be tailored to the clinical characteristics, patterns of service use and barriers to self-care of the client. This is particularly true for older, frail and medically complex HF patients, many of whom require home care services. This work provides a background upon which to base initiatives to help these higher-needs clients manage their HF at home with appropriate support and services.

Keywords: *heart failure, chronic disease, home care, interRAI, disease management, self-care, Ontario Resident Assessment Instrument-Home Care, older adults.*

Introduction

Heart failure (HF) is a “complex syndrome in which abnormal heart function results in, or increases the subsequent risk of, clinical symptoms and signs of low cardiac output and/or pulmonary or systemic congestion.”¹ An estimated 500 000 Canadians live with HF² and its prevalence increases with age.³ At age 80, both men and women have approximately a 20% lifetime risk of developing HF.³ Population aging and improved survival of patients with hypertension and myocardial infarction, two important risk factors for HF, contribute to the rising prevalence of HF.^{4,5}

Already a substantial burden on the Canadian health care system, projections of the future burden of HF are worrisome: HF incidence is projected to double in Canada by 2025 due to population aging, with the most rapid growth in prevalence expected in those over 85 years old.^{6,7}

Despite advances in the overall treatment and management of HF, survival and quality of life remain poor; in Canada, 4430 deaths were attributable to HF in 2004.⁸ HF is associated with annual

mortality rates as high as 50%, and 25% to 40% of patients will die within one year of diagnosis.^{1,9} HF patients today are primarily 65 years or older and suffer from multiple comorbidities including hypertension, diabetes, arthritis, cognitive impairment and depression.^{10,11}

The prevalence of HF translates into high costs for the Canadian health care system. The repeated hospitalizations, complex treatment regimen and cost of pharmacotherapy strain many components of health care including primary and specialty care, emergency departments (ED) and hospitals.¹² Among Canadians over 85 years of age, HF is responsible for more hospitalizations than ischemic heart disease or heart attack.⁸ Readmission rates for disease complications can reach 33% within three to six months;¹³ patients with HF are re-admitted because of poor clinical status, which may continue to worsen in hospital. Hospitalization itself, in fact, appears to lead to progressive functional decline and eventual placement into a long-term care (LTC) facility;¹⁴⁻¹⁶ over 10% of hospitalizations of older adults resulting in an Alternate Level of Care designation are for cardiovascular disease, particularly HF, as are up to 20% of transfers of LTC residents to hospital.^{17,18} LTC residents hospitalized with HF may experience long ED waits and spend on average six days in hospital.¹⁸ Further, 7.4% of LTC residents hospitalized for HF remain in hospital as Alternate Level of Care patients awaiting transfer back to their LTC home.¹⁸ Such admissions are often unsuitable and potentially preventable if HF were better managed in primary care.¹⁹⁻²³ Specifically, the health care system

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needs new approaches for the management of HF targeted towards reducing the risk and duration of hospitalizations.⁷

Effective management of HF is challenging as it involves complex pharmacotherapeutic regimens, periodic adjustment of medication doses, elaborate dietary and fluid intake regimens, exercise therapy, and ongoing patient education to ensure appropriate self-care. The Canadian Heart Health Strategy and Action Plan recommends the Chronic Disease Management (CDM) model as the preferred model for care delivery for cardiovascular disease.²⁴ A fundamental characteristic of CDM is patient-centered emphasis on disease self-care, which incorporates both self-maintenance and self-management. Self-maintenance requires adherence to prescribed treatments and health practices,²⁵ while self-management builds on self-maintenance and includes recognition of signs and symptoms of HF, evaluation of the importance of these signs and symptoms, implementation of a treatment option and evaluation of the treatment chosen.^{25,26} Self-management requires learning skills, insight, judgment, problem-solving and decision-making, and is more cognitively demanding than self-maintenance. CDM programs targeting HF strive to promote patient self-care; they have been shown to improve quality of life and functional status, reduce unplanned and repeated hospitalizations, and possibly reduce mortality.^{27,28} However, HF in older patients is often associated with multiple medical comorbidities and polypharmacy, as well as with depression and cognitive impairment, all of which can interfere with self-care and prevent patients from fully benefitting from CDM programs.^{29,30} Further, there is no clear understanding of the ideal duration of such programs or the most effective mode of follow-up.^{28,31}

Given the high prevalence of HF in populations over 65 years old, the acute health care system needs enhanced CDM for HF to ease the burden on itself. Working in partnership with primary care physicians and specialty HF clinics, home care is a potentially important component of CDM for HF

and may also provide a means of follow-up beyond the initial program.³² Developing methodologies to assess levels of risk, identify barriers to self-care, and deliver specific community-based interventions to home care clients with HF would make a significant contribution to an overall CDM strategy for HF.

HF is a common disease, but there is little research on the demographic and clinical characteristics, service use and needs of these clients in home care. This study seeks to (1) describe the demographic and clinical characteristics of long-stay home care clients with HF and (2) examine service use among long-stay home care clients with HF to promote management at home with appropriate services.

Methods

Data Source

We retrieved demographic, clinical and service use data from the Ontario Resident Assessment Instrument-Home Care (RAI-HC) database, a repository of all completed RAI-HC assessments in Ontario, a province of approximately 13.2 million people. The RAI-HC evaluates the care needs of all long-stay home care clients in the province, i.e. those expected to receive services for longer than 60 days. The assessment consists of over 300 questions designed to generate Client Assessment Protocols (CAPs) that help with further assessment and care planning, as well as to provide outcome measures for cognition, depression and physical function. Trained clinicians conduct the RAI-HC assessments and use clinical judgment to record diagnoses; they verify the accuracy of the recorded information through discussions with physicians, family and caregivers, and review medical records if necessary. The RAI-HC is considered both reliable and valid, and the items contained within have excellent inter-rater and test-retest reliability.³³⁻³⁶ The RAI-HC database contains detailed clinical and demographic information observed in the previous 7 days, including cognitive status, mood and behaviour patterns, informal support services, physical function, clinical diagnoses, prescription and

non-prescription medication use, and acute service utilization in the previous 90 days, including hospitalizations and ED visits. This breadth of information provides a comprehensive description of all long-stay home care clients within Ontario.

Sample

All home care clients aged 65 years or older who received their most recent RAI-HC assessment between January 2004 and December 2007 were eligible for this analysis, regardless of functional or cognitive status, or presence of comorbidity (N = 264 030). Using only the most recent assessment allowed for a prevalence sample, providing a comprehensive profile of HF clients in home care. Assessments took place either in a community or hospital setting; this study included only clients assessed in the community.

The Office of Research at the University of Waterloo provided ethics approval for our analyses of the anonymized data.

Measures

The RAI-HC includes valid and reliable items to assess HF (as well as other conditions);³⁷ clients were defined as having HF if this condition was recorded in the assessment. Trained assessors routinely verify this information through self-report, discussions with caregivers and health providers, review of medical records and more. Accuracy of the diagnostic and medication information collected using the interRAI instruments has also been established.³⁷ Among individuals with HF in nursing homes and LTC facilities, the positive predictive value and sensitivity for the interRAI diagnosis of HF was greater than 0.80 compared to that found in administrative databases.^{37,38} Clinical measures such as ejection fraction and New York Heart Association (NYHA) class were not available from this data source.

Based on previous literature and in consultation with a geriatrician,* we used key demographic and health-related variables to describe the HF sample,^{1,11,39,40} including age, gender, living arrangement, marital status, caregiver presence, caregiver stress,

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health region within Ontario (as defined by the geographic boundaries of each of the 14 Community Care Access Centres [CCACs], which are aligned with Local Health Integration Networks in Ontario), daily pain, edema, falls, number of medications, shortness of breath, incontinence and presence of comorbidity. We used the following comorbidities to describe this sample: coronary artery disease (CAD), arthritis, diabetes, reactive airway disease (including asthma, chronic obstructive pulmonary disease [COPD] and emphysema) and hypertension. The analysis also included five health index scales for functional ability, cognition, depression and health instability. These were: (1) the Activities of Daily Living (ADL) self-performance hierarchy scale (range 0–6); (2) the Instrumental Activities of Daily Living (IADL) scale (range 0–6); (3) the Cognitive Performance Scale (CPS) (range 0–6); (4) the Depression Rating Scale (DRS) (range 0–14); and (5) the Changes in Health, End-stage disease and Signs and Symptoms (CHESS) scale (range 0–5).^{35,41–44} Each scale has been developed and validated for use with the RAI-HC, and higher scores in each measure indicate more severe impairment.^{36,41–44} Using the RAI-HC, we captured and analyzed the use of nursing, homemaking, physiotherapy and meal services in the previous 7 days, and hospitalizations, ED visits and use of emergent care (defined as any unplanned visit to a non-ED health provider) in the previous 90 days.

Analysis

We collapsed scores from each of the five health index scales used (ADL, IADL, CPS, DRS and CHESS) into three levels to differentiate between levels of impairment, divided the variables for age, falls, hospitalizations, ED visits and use of emergent care into three levels, and analyzed use of nursing, homemaking, physiotherapy and meal services in the home by comparing receipt of any service versus no services. We excluded three classes of commonly used HF medications (angiotensin-converting enzyme inhibitors, angiotensin receptor blockers and beta-adrenergic receptor blockers) from the medication counts. Comorbidity and medication counts were collapsed into three and four levels,

respectively. We tested for differences in characteristics between groups using unpaired, two-tailed t-tests, for variance for continuous variables using Satterthwaite's unequal variance assumption and for categorical variables using chi-square tests (significance level $p < .05$). Stratification by age groups addressed potential confounding of observed group differences with clinical and service use variables.

All analyses were conducted using SAS software (version 9.0, SAS Institute Inc., Cary, NC).

Results

Heart failure client sample

Between January 2004 and December 2007, the RAI-HC assessed 264 030 unique clients and identified 39 247 home care clients with HF (14.9%) in total. The proportion of clients with HF in each CCAC varied significantly ($p < .0001$) (see Figure 1), and was highest in the Northeast CCAC (19.5%, 2899/14907) and lowest in the Central west CCAC (11.3%, 996/8824).

Demographic characteristics

Table 1 shows the demographic characteristics of clients according to the presence of HF. Given the size of the sample, most

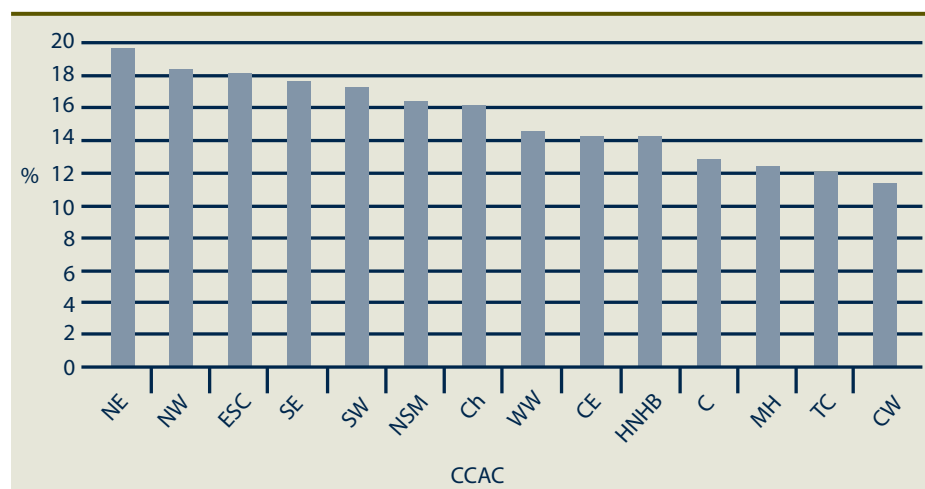
observed differences are statistically significant. Compared with clients without HF, those with HF are older (mean age 83.5 years vs. 81.8 years, standard deviation [SD] 7.5 and 7.6, respectively), less likely to be women and less likely to be living alone. More clients with HF have caregivers, but there is no significant difference in levels of caregiver stress.

Clinical characteristics

Table 2 shows the clinical characteristics of home care clients by HF status. Again, due to the large sample size most observed differences are statistically significant; only clinically significant findings are reported here. HF clients have more complex functional needs than those without HF and exhibit more health instability (as measured by the CHESS scale); as expected, they also experience significantly higher levels of edema and shortness of breath. They have less cognitive impairment, as measured by the CPS scale, although the overall proportion of HF patients with some degree of cognitive impairment is high. Prevalence of depression or a history of falls in the previous 90 days does not differ by HF status.

HF clients use more medications and have more comorbid conditions than those without HF. After exclusion of three classes

FIGURE 1
Variation in prevalence of heart failure by Community Care Access Centre among home care clients 65 years and over, Ontario, 2004–2007 (N = 264 030)



Abbreviations: C, Central; CCAC, Community Care Access Centre; CE, Central East; Ch, Champlain; CW, Central west; ESC, Erie St. Clair; HF, heart failure; HNH, Hamilton Niagara Haldimand Brant; MH, Mississauga Halton; N, sample size; NE, Northeast; NW, Northwest; NSM, North Simcoe Muskoka; SE, Southeast; SW, Southwest; TC, Toronto Central; WW, Waterloo Wellington.

TABLE 1
Demographic characteristics of home care clients, 65 years and older,
Ontario, 2004–2007 (N = 264 030)

| Characteristic | | HF sample (n = 39 247) % | Non-HF sample (n = 224 783) % | p-value |
|---------------------|--------|--------------------------------|-------------------------------------|---------|
| Age | 65–74 | 12.9 | 18.8 | < .0001 |
| | 75–84 | 39.0 | 43.0 | |
| | 85+ | 48.1 | 38.2 | |
| Gender | Female | 64.1 | 66.6 | < .0001 |
| Married | | 35.0 | 38.1 | < .0001 |
| Living alone | | 32.7 | 34.5 | < .0001 |
| Caregiver available | | 87.3 | 85.9 | < .0001 |
| Caregiver stress | | 16.7 | 17.0 | .08 |

Abbreviations: HF, heart failure; N, overall sample size; n, sample size; p, statistical significance.

of medications recommended for the treatment of HF (angiotensin-converting enzyme inhibitors, angiotensin receptor blockers and beta-adrenergic receptor blockers), the mean number of medications in the HF group is 9.3 (SD = 4.1) compared with 7.2 (SD = 2.9) for the group without. Further, 58.0% of the HF sample take 9 or more medications compared to only 35.0% of clients without HF. Almost half the clients with HF (45.1%) have five or more comorbid conditions, while only 26.5% of those without HF experience that level of comorbidity. Hypertension, arthritis, CAD, diabetes, osteoporosis and reactive airway disease (including COPD) are the most prevalent comorbidities in the entire sample studied. Except for osteoporosis, rates of comorbidity are higher among clients with HF. Stratification was done to explore potential confounding by age (not shown) and, apart from some variation in rates of depression and falls, there are no differences due to age for the clinical characteristics presented.

Home care and acute service use

Clients with HF receive significantly more nursing, homemaking and meal services compared with the group without HF (see Table 3), though receipt of physiotherapy services is low in both groups. Home care clients with HF received an average of 1.3 days of nursing services in the 7 days prior to RAI-HC assessment while clients without HF received an average of 1.0 days. HF clients are hospitalized more frequently,

with 37.4% hospitalized more than once in the previous 90 days compared to only 26.1% of clients without HF. They also report significantly more ED visits and use more emergent care. We explored potential confounding by age using stratification, and the results do not differ from those reported in Table 3.

Discussion

Our study provides a comprehensive description of older home care clients with HF in Ontario. The extensive RAI-HC data allowed us to examine many demographic and clinical characteristics as well as service use, both through home care and acute care services. These descriptors are useful in identifying care needs as well as patterns of service use among older, community-dwelling home care clients. These analyses are also useful in identifying areas for further study or intervention strategies.

The clustering of diseases that share risk factors with HF, such as diabetes, as well as the clustering of diseases that can precipitate HF, such as hypertension and CAD, is expected among clients with HF. These data show this clustering and provide an estimate of their co-occurrence in this older cohort. The observed clustering of HF with other diseases of aging, such as arthritis and reactive airways disease, indicates that this group is more complex medically. Further, these particular comorbidities may, in the setting of a history of HF, present

additional therapeutic challenges (e.g. NSAIDs for arthritis) and diagnostic challenges (e.g. dyspnea from HF or reactive airways).

The complex needs of the HF group are also reflected in the significantly higher levels of medication use in this group, even after adjusting to exclude three classes of medications recommended for HF. This means that these clients need to be more active in monitoring for adverse drug events as a component of their self-care.

HF clients are significantly older than their counterparts without HF. Older home care clients with HF exhibit more complex clinical characteristics than those without (Table 2); they have more health instability (as measured by the CHES scale), are less able to look after themselves (impaired in instrumental and basic ADLs), and experience more daily pain, edema, shortness of breath and incontinence. While shortness of breath is more prevalent among HF clients, this symptom is not universal in this group, likely because such individuals are frail, and present atypically, especially among older populations.^{1,45,46} However, it may also be possible that such hallmark symptoms are not present in the sample due to proper management of HF through pharmacotherapy and other treatment modalities. The significantly higher prevalence of daily pain and incontinence among the HF group may represent common yet underappreciated HF manifestations,^{1,45} as may the overall higher prevalence of other comorbid conditions in this group.

Clients with HF are less likely to be severely cognitively impaired than clients without HF, though rates of cognitive impairment are still high among both groups. Cognitive impairment in persons with HF is associated with a poorer outcome, including a greater risk of mortality and hospitalization, and consequently institutionalization. In a cross-sectional study such as this, people with HF and concomitant cognitive impairment may be so unable to look after themselves that they have been referred to more intensive care settings.³⁰ Alternately, cognitive impairment may be underestimated through CPS scores, as IADL impairment is also prevalent among clients with

TABLE 2
Clinical characteristics of home care clients based on RAI-HC assessment, 65 years and older, Ontario, 2004–2007 (N = 264 030)

| | | HF sample (n = 39 247) % | Non-HF sample (n = 224 783) % | p-value |
|-------------------------------------------------------------------|--------------------------------------|--------------------------------|-------------------------------------|---------|
| Activities of Daily Living (ADL) hierarchy scale ^a | 0 | 62.1 | 64.5 | < .0001 |
| | 1–2 | 24.1 | 22.6 | |
| | 3+ | 13.8 | 12.9 | |
| Instrumental Activities of Daily Living (IADL) scale ^a | 0 | 2.2 | 4.6 | < .0001 |
| | 1–2 | 17.1 | 21.4 | |
| | 3+ | 80.7 | 74.0 | |
| Cognitive Performance Scale ^a | 0 | 48.3 | 46.5 | < .0001 |
| | 1–2 | 41.5 | 39.5 | |
| | 3+ | 10.2 | 14.0 | |
| Depression Rating Scale ^b | 0 | 63.0 | 63.8 | .94 |
| | 1–2 | 23.3 | 22.5 | |
| | 3+ | 13.7 | 13.7 | |
| CHESS scale ^c | 0 | 20.5 | 33.0 | < .0001 |
| | 1–2 | 58.1 | 55.4 | |
| | 3+ | 21.4 | 11.6 | |
| Daily pain | | 48.9 | 45.3 | < .0001 |
| Edema | | 37.0 | 21.4 | < .0001 |
| Shortness of breath | | 46.5 | 21.2 | < .0001 |
| Incontinence | | 43.4 | 39.1 | < .0001 |
| Falls | 0 | 67.9 | 68.8 | .42 |
| | 1–2 | 24.8 | 24.0 | |
| | 3+ | 7.3 | 7.2 | |
| Medication count ^d | 0 | 1.1 | 2.6 | < .0001 |
| | 1–4 | 9.1 | 23.8 | |
| | 5–8 | 31.8 | 38.5 | |
| | 9+ | 58.0 | 35.0 | |
| Comorbid conditions | 0–1 | 5.9 | 11.8 | < .0001 |
| | 2–4 | 49.0 | 61.7 | |
| | 5+ | 45.1 | 26.5 | |
| Common comorbidities | Hypertension | 63.2 | 54.5 | < .0001 |
| | Arthritis | 58.8 | 52.5 | .0002 |
| | CAD | 46.2 | 23.6 | < .0001 |
| | Diabetes | 32.7 | 22.6 | < .0001 |
| | Reactive Airway Disease ^e | 28.7 | 15.0 | < .0001 |
| | Osteoporosis | 21.1 | 22.1 | < .0001 |

Abbreviations: CAD, Coronary Artery Disease; CHESS, Changes in Health, End-stage disease and Signs and Symptoms; HF, heart failure; N, overall sample size; n, sample size; p, statistical significance; RAI-HC, Resident Assessment Instrument-Home Care.

^a 0 = no impairment; 1–2 = mild impairment; 3+ = severe impairment.

^b 0 = no indicators; 1–2 = some indicators; 3+ = many indicators.

^c Changes in Health, End-stage disease and Signs and Symptoms; 0 = no instability; 1–2 = some instability; 3+ = severe instability.

^d Medication count excluded the following: Angiotensin-converting enzyme inhibitors (benazepril, captopril, cilazapril, enalapril, fosinopril, lisinopril, perindopril, quinapril, ramipril, trandolapril), beta-adrenergic receptor blockers (acebutolol, atenolol, bisoprolol, carvedilol, metoprolol, nadolol, propranolol) and angiotensin receptor blockers (candesartan, eprosartan, irbesartan, losartan, telmisartan, valsartan).

^e includes asthma, chronic obstructive pulmonary disease (COPD), and emphysema

HF, reflecting the presence of executive dysfunction common in this population.³⁰ Atypical symptoms of HF in older populations may include alterations in mood and behavioural symptoms, but the similar rates of depression among HF and non-HF clients do not support this interpretation.^{46,47} History of falls is also similar between the two groups (Table 2), and fall prevalence is lower than reported in similar populations.⁴⁸ These results indicate that the clinical complexity of HF clients receiving home care services is more apparent through functional characteristics such as ADL and IADL impairment than cognitive or depressive characteristics.

Given the clinical characteristics and medical complexity of home care clients with HF, it is likely that there are many barriers to self-care. An indirect indication of difficulty with self-care may be the high rates of access to an informal caregiver. It is possible that without caregivers, clients with

HF are at higher risk of death or placement in an LTC facility and are thus less likely to be seen in this home care sample.

Managing multiple medical conditions and medications, and dealing with depression, cognitive impairment and functional decline are likely all barriers to effective self-care. Cognitive impairment and depressive symptoms are present in 51.7% and 37.0% of clients with HF, respectively. Clinic-based CDM programs may not be designed to overcome such barriers to self-care, and the care setting may be inappropriate for such persons with HF. Functional impairment is high among home care clients with HF and may limit access to clinic-based programs. Further, having to schedule and attend numerous appointments for follow-up of multiple chronic conditions with many care providers may also be a barrier to attending clinic-based programs. Transitional care programs for seniors, in which specially

trained Advanced Practice Nurses help coordinate care and enhance the self-care skills of patients with HF and their caregivers reduce readmission rates after discharge from hospital.⁴⁹ However, the extension of such programs to frail home care clients with HF has not been evaluated. Home care may be a more suitable setting than LTC facilities in which to provide CDM for these medically complex clients.⁵⁰ InterRAI assessment instruments used in the home care setting can offer risk assessment for adverse outcomes, identify barriers to self-care and provide a potential platform for CDM delivery.

The geographic variation in HF prevalence is an interesting finding. Due to the standardized training given to RAI assessors throughout the province, it is unlikely that these are due to differences between raters in recording diagnoses. Given that HF risk increases with age, the age structures of the client bases of each CCAC may explain some of this variation. HF prevalence, however, is not highest in the CCACs with the oldest populations. Thus, such variations may indicate differences in access to home care services for older individuals with HF or, conversely, different management strategies of HF on the part of the CCAC. Some CCACs may be more likely to push for LTC admission for clients with HF, while others may promote more aggressive management within the home. There are other implications of such variations in HF prevalence, and such profiles could help CCACs prioritize service planning, initiate chronic disease management strategies and re-allocate staffing as necessary.

This descriptive work demonstrates that (1) HF is prevalent among older home care clients in Ontario and (2) clients with HF are more clinically complex, using home care and acute care more frequently than their counterparts without HF. There are some limitations to this work. First, the cross-sectional study design allows a snapshot of this sample during a given time period, but does not allow any assessment of the temporality of the associations observed. For example, we do not know whether use of services followed or preceded HF diagnosis. Further, we did not examine the reason for

TABLE 3
Home care and acute health care service use among home care clients,
65 years and older, Ontario, 2004–2007 (N = 264 030)

| | | HF sample (n = 39 247) | Non-HF sample (n = 224 783) | p-value |
|--------------------------------------------------|----|---------------------------|--------------------------------|---------|
| | | % | % | |
| Home care service use^{a,b} | | | | |
| Nursing | | 39.4 | 29.8 | < .0001 |
| Homemaking | | 46.3 | 40.3 | < .0001 |
| Meals | | 20.8 | 18.4 | < .0001 |
| Physiotherapy | | 7.8 | 9.0 | < .0001 |
| Acute health care service use^c | | | | |
| Hospitalizations | 0 | 62.6 | 74.0 | < .0001 |
| | 1 | 28.8 | 22.5 | |
| | 2+ | 8.6 | 3.6 | |
| Emergency Department | 0 | 78.1 | 81.7 | < .0001 |
| | 1 | 16.0 | 14.2 | |
| | 2+ | 5.9 | 4.1 | |
| Emergent Care | 0 | 91.2 | 92.9 | < .0001 |
| | 1 | 6.5 | 5.5 | |
| | 2+ | 2.3 | 1.6 | |

Abbreviations: HF, heart failure; N, overall sample size; n, sample size; p, statistical significance; RAI-HC, Resident Assessment Instrument-Home Care.

^a Service use measured as any vs. none.

^b In the seven days prior to RAI-HC assessment.

^c In the 90 days prior to RAI-HC assessment.

hospitalizations, ED use or emergent care use. These data indicate, however, that the more clinically complex clients with HF do indeed use more services both in the home and in the broader health care system. Additionally, these data do not include information regarding HF severity, which may influence service use, although the CHES scale in the assessment allows some assessment of health instability and can be predictive of mortality in LTC patients.⁵¹ Clients with HF scored significantly higher on this item, indicating more disease instability overall. Another limitation is that this sample is drawn from clients already receiving home care service in Ontario and is not representative of other populations, either in institutions or in the community, that do not seek out or receive referrals for home care services. Lastly, given the demographics of this sample, it is likely that HF with preserved ejection fraction (HFPEF) is prevalent. HFPEF is more common in women and is thought to account for more than half the HF cases in those older than 75 years.^{52,53} Given that almost 80% of the sample with HF was older than age 75, HFPEF likely affects a large proportion of these clients. This could not be verified from the data set used, but is worth noting as it has implications for CDM. There is much less evidence about the effectiveness of pharmacotherapy in the management of HFPEF compared to HF with reduced ejection fraction. Other aspects of HF management, however, are applicable to both populations. As better treatment modalities are identified for HFPEF, CDM programs will need to adapt accordingly.

This research has unique strengths. It provides a clear picture of the burden of HF in home care clients in Ontario and allows regional differences to be identified. It makes use of the extensive information available in the RAI-HC assessment to richly describe the clinical characteristics, presence of other diseases and service use in this population. Lastly, it assesses all long-stay home care clients in Ontario; since the number of HF clients identified in this sample is quite large, we can fully describe the clinical and functional characteristics of HF clients.

Our results depict home care clients with HF as a more complex, high-needs group with more medication use, more frequent use of health care services and many potential barriers to self-care, as shown by the high levels of functional impairment, cognitive impairment, depression, comorbidity and medication use. Any new CDM strategy for home care clients with HF should take these factors into consideration. Capable caregivers may have an important role to play, although programs would need to be designed to avoid undue caregiver stress. Targeting intervention strategies to improve self-care skills may significantly reduce the burden on other parts of the health care system. Improving communication between primary care providers, geriatric or cardiology consultants, and home care could allow such vulnerable populations to remain at home and independent. Such interventions would align well with the Aging at Home Strategy in Ontario, as well as with the Comprehensive Canadian Heart Health Strategy and Action Plan. An initial step to such strategies may be to identify and target the highest-needs individuals for such interventions. This work has provided a potentially important first step in achieving that goal.

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