

THE COST OF ACUTE CARE HOSPITALIZATIONS ASSOCIATED WITH CHRONIC HEART FAILURE IN CANADA

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BACKGROUND

Heart failure (HF) is a condition where the heart has difficulty circulating blood throughout the body¹. The condition manifests in two forms: the heart cannot fill with enough blood, and the heart cannot pump blood to the rest of the body with enough force. Some patients face both problems. Chronic heart failure (CHF) is when a patient presents persistent signs and symptoms of HF, which can worsen over time¹.

CHF is estimated to affect more than 600,000 Canadians, resulting in thousands of hospitalizations and deaths each year². Moreover, a US study has found that the cost of a HF hospitalization is estimated to exceed over \$17,000³. We currently do not know the total CHF hospitalization cost to the Canadian healthcare system, and to the best of our knowledge, there are no current estimates of CHF hospitalization costs in Canada.

OBJECTIVES

The objective of this study is to compare the mean cost (\$CAD) of a CHF, cardiovascular, and non-cardiovascular diagnosed hospitalization amongst acute care treated CHF diagnosed patients in Canada.

METHODS

Study design

- A retrospective cross-sectional study design was used to calculate the average hospital costs and length of stay (LOS).
- Hospital discharge abstracts recorded between 2009 and 2013 were extracted from the Canadian Institute for Health Information's (CIHI) Discharge Abstract Database (DAD) and National Ambulatory Care Reporting System (NACRS) database.
- Costs were assigned to each hospital stay based on CIHI's Case Mix Group (CMG+) methodology⁴, jurisdiction, and age group.
- Abstracts were categorized by most responsible diagnosis (MRDx); abstracts with a CHF MRDx were categorized in the CHF group. The remaining abstracts were categorized into either the cardiovascular group (circulatory system disease MRDx (ICD-10 I00 – I99), excluding CHF) or non-cardiovascular group (non-circulatory system disease MRDx).
- When a patient died prior to discharge, their abstract was categorized as such, whereas if they survived to discharge their abstract was categorized as hospitalization survival.

Inclusion criteria

- All acute care hospitalization discharge abstracts.
- Either congestive heart failure (ICD-10 code I50.0) recorded as the MRDx or contributing diagnosis (non-MRDx) were included in this study.

Exclusion criteria

- Patient was less than 18 years of age.
- Discharge abstracts with missing patient demographics.
- Evidence that the patient left against medical advice or prior to being seen/ treated.
- The abstract did not have a valid health card number.
- Not enough information was recorded to calculate a cost estimate.
- Treated in non-inpatient care department care setting.

RESULTS

Patient counts

- 156,847; 66,056; and 127,847 CHF, cardiovascular, and non-cardiovascular group discharge abstracts were included (Figure 1), respectively, of which 10%, 13% and 21% of the respective group abstracts resulted in death (Table 1).

Figure 1.

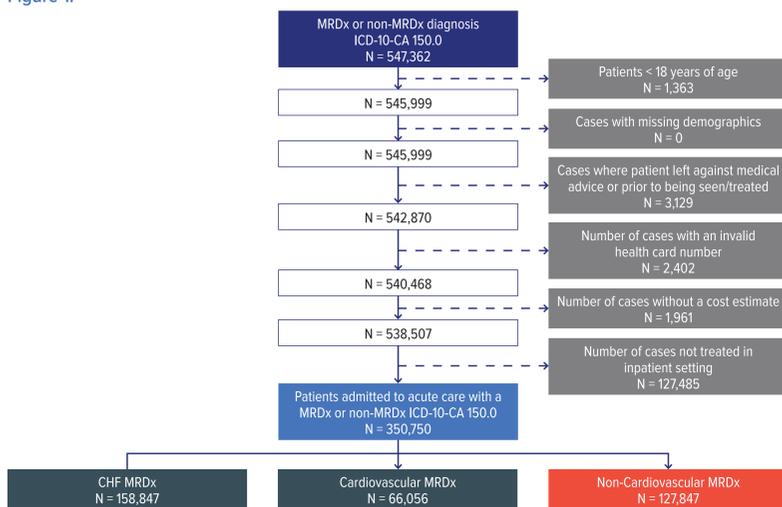


Table 1. Patient demographic and hospitalization outcome counts of analyzed hospitalizations

Count	CHF Group	Cardiovascular Group	Non-Cardiovascular Group	Total
Total	156,847	66,056	127,847	350,750
Age Group				
18 to 34	668	398	534	1,600
35 to 64	21,149	12,883	15,666	49,698
65 and over	135,030	52,775	111,647	299,452
Gender				
Female	77,570	30,517	66,789	174,876
Male	79,277	35,539	61,058	175,874
Geography				
BC & Prairies	61,903	24,286	51,898	138,087
Ontario	79,253	34,661	64,016	177,930
Atlantic	15,588	7,085	11,874	34,547
Territories	103	24	59	186
Hospitalization Outcome				
Hospitalization Survival	140,900	57,601	101,372	299,873
Death Prior to Discharge	15,947	8,455	26,475	50,877

Hospitalization costs

- The national mean hospitalization visit cost was \$10,123; \$20,890; and \$21,283 for the CHF, cardiovascular, and non-cardiovascular MDRx groups respectively (Table 2).
- For each CHF, cardiovascular, and non-cardiovascular group, a survival outcome incurred a lower national mean hospitalization visit cost at \$9,222; \$19,899; and \$19,036 whereas a death outcome incurred a high national mean hospitalization visit cost at \$18,087; \$27,642; and \$29,887, respectively.

Table 2. Mean and standard deviation hospitalization costs by patient demographic and hospitalization outcomes

Mean (Std Dev)	MOST RESPONSIBLE DIAGNOSIS (MRDx)		
	CHF Group	Cardiovascular Group	Non-Cardiovascular Group
Total	\$10,123 (\$14,814)	\$20,890 (\$33,971)	\$21,283 (\$37,240)
Age Group			
18 to 34	\$13,225 (\$31,022)	\$36,274 (\$52,306)	\$36,741 (\$90,776)
35 to 64	\$10,572 (\$19,624)	\$25,306 (\$47,553)	\$28,191 (\$52,215)
65 and over	\$10,038 (\$13,775)	\$19,696 (\$29,392)	\$20,240 (\$34,018)
Gender			
Female	\$10,245 (\$14,605)	\$19,109 (\$32,937)	\$20,517 (\$34,399)
Male	\$10,005 (\$15,015)	\$22,420 (\$34,761)	\$22,121 (\$40,101)
Hospitalization Outcome			
Hospitalization Survival	\$9,222 (\$11,688)	\$19,899 (\$31,085)	\$19,036 (\$31,326)
Death Prior to Discharge	\$18,087 (\$29,680)	\$27,642 (\$48,793)	\$29,887 (\$53,349)

Length of stay

- The national mean LOS in days was highest for the non-cardiovascular and cardiovascular groups compared to the CHF group, 20.3 days, 14.2 days, and 10.8 days respectively (Table 3).
- Men and women had similar LOS regardless of diagnosis group.
- LOS did not seem to have a clear trend with age.
- LOS did increase when the patient died prior to discharge compared to having survived the hospitalization.

Table 3. Mean and standard deviation hospitalization length of stay in days by patient demographic and hospitalization outcomes

Mean (Std Dev)	MOST RESPONSIBLE DIAGNOSIS (MRDx)		
	CHF Group	Cardiovascular Group	Non-Cardiovascular Group
Total	10.8 (16.7)	14.2 (20.6)	20.3 (33.1)
Age Group			
18 to 34	11.1 (17.5)	17.2 (21.6)	22.3 (60.9)
35 to 64	9.0 (13.4)	12.9 (16.8)	20.3 (42.0)
65 and over	11.1 (17.2)	14.5 (21.4)	20.3 (31.5)
Gender			
Female	11.5 (18.2)	14.5 (20.1)	20.6 (32.1)
Male	10.1 (15.2)	13.9 (21.0)	20.1 (34.2)
Hospitalization Outcome			
Hospitalization Survival	10.1 (15.0)	13.8 (19.2)	19.7 (30.6)
Death Prior to Discharge	17.2 (26.8)	16.7 (28.2)	22.7 (41.4)

REFERENCES

- McKelvie, R. S., Moe, G. W., Ezekowitz, J. A., Heckman, G. A., Costigan, J., Ducharme, A., ... & Sussex, B. The 2012 Canadian Cardiovascular Society heart failure management guidelines update: focus on acute and chronic heart failure. *Canadian Journal of Cardiology*, 2013; 29(2), 168-81.
- Blais, C., Dai, S., Waters, C., Robitaille, C., Smith, M., Svenson, L. W., ... & Tu, K. Assessing the burden of hospitalized and community-care heart failure in Canada. *Canadian Journal of Cardiology*, 2014; 30(3), 352-8.
- Wang G, Zhang Z, Ayala C, Wall HK, Fang J. Costs of heart failure-related hospitalizations in patients aged 18 to 64 years. *Am J Manag Care*, 2010; 16(10), 769-76.
- Canadian Institute for Health Information (CIHI). Case Mix Groups. Available from: <https://www.cihi.ca/en/data-and-standards/standards/case-mix/cmg>. [Accessed October 16, 2015].

NOTE: Parts of the material are based on data and information provided by the Canadian Institute of Health Information. However, the analysis, conclusions, opinions and statements expressed herein are those of the author and not necessarily those of the Canadian Institute for Health Information.

CONCLUSION

Cardiovascular and non-cardiovascular hospitalizations result in higher mean hospitalization costs than those with a CHF MRDx. An opportunity exists for interventions reducing the number of any CHF related hospitalization to ease the burden on the Canadian healthcare system.