

Article details: 2020-0230	
Title	Health expenditures after first hospitalization for heart failure in Nova Scotia, Canada: prevalence- and incidence-based costs of illness
Authors	Adrian R. Levy PhD, Karissa M. Johnston PhD, Alexia Daoust MSc, Andrew Ignaszewski MD, Jonathan Fortier MSc, Basia Rogula MSc, Paul Oh MD
Reviewer 1	Eric Kai Chung Wong
Institution	Division of Geriatric Medicine, Department of Medicine, University of Toronto, Toronto, Ont.
General comments (author response in bold)	<p>The average hospital length of stay is shortest in those age >80 in both sexes. Generally, hospitalization length of stay tends to increase with increasing age. Is there a strong palliative care program for HF in Nova Scotia? What else can explain the shorter LOS in older adults?</p> <p>The reviewer does not provide a source of the information provided so it is not possible to compare to a specific study. The reviewer's comment seems to reflect a patient's perspective, not the Canadian public payer adopted in this manuscript, which may explain partially or fully the discrepancy. This is explained in the Interpretation.</p> <p>There is palliative care program in Nova Scotia is small, with the first hospice opening in (INTERPRETATION, third full paragraph: "The target population for this study could reasonably be construed to include all Canadian public payers (i.e., hospitals and ministries of health).The mean length of stay reported in Nova Scotia (4.6 days; SD 13.6) was lower than that reported from other Canadian provinces³⁵ and in the United States Medicare Hospitalization files (4.9; 3.5).³⁶ Some of this difference may be due to differences in study designs. Those authors calculated the mean individual hospitalization episodes while in the prevalence-based estimates from Nova Scotia, we tabulated the total number of hospital days between 2013 and 2015 and divided by three. As such, the methods employed here reflect the perspective of Canadian public payers, not patients. Beyond the target population, the results may be generalizable to publicly-funded health care systems that are not centrally organized. ")</p> <p>- Are echos, bloodwork, cardiac rehab, resynchronization therapy, ICD etc considered in the cost analysis? What about the cost of home oxygen, palliative care, physio/home care? This may not be feasible with the available data, but I think these are all paid by the public payer. At least mention this as a limitation if you can't generate an estimate. This would affect the emphasis of the main cost being hospitalization.</p> <p>Those services are paid for by hospital budgets for patients admitted to hospital (including those with a day admission). Services are home are not captured, nor are those offered in outpatient clinics. (This following phrase is included in the INTERPRETATION, Limitations, ninth sentence:" "Third, no information on emergency department, outpatient clinic costs, or home services such as oxygen, cardiac rehabilitation, or palliative care, was included because..")</p> <p>- I didn't see explicit statement about the perspective of analysis. There was something about public payer in the text, but I think this should be stated explicitly. OK to not include discounting because you're just reporting annual cost and not lifetime cost.</p>

(This is explained on the METHODS, Resource Use and Costs, second full paragraph, first sentence: "Costing was done from the perspective of a third-party public payer (i.e., the Nova Scotia Department of Health and Wellness) using a...")

- Abstract objectives statement is odd: "Objective: The objective here was"? Usually start with "To determine.."

(The objective in the Abstract and main body of the text now reads: "The objective was, among subjects aged 50 years and older in Nova Scotia discharged alive after a first hospitalization for heart failure, to estimate mean prevalence- and incidence-based direct medical costs.")

- Also, if the objective is to determine mean age and sex specific prevalence and incidence based direct medical costs, how come only a sex specific annual prevalence cost is reported in the abstract results? Is that the primary objective? Maybe change the objective to make it relate to the primary outcome?

("age- and sex-specific" has been removed from the objective in the Abstract and main body of the text.)

- Abstract conclusion: I think this line doesn't quite fit in an abstract conclusion. "These cost estimates for heart failure may be used to highlight areas of inefficiency, identify temporal changes, underscore areas of inequitable allocation of resources, and serve as inputs for economic analyses" - Consider including in discussion main text only.

(The Abstract conclusion now corresponds to the results presented: "Direct medical costs of treating heart failure patients in Nova Scotia displayed a reverse J-shape, with costs highest after diagnosis, declining, and then increasing during the last year of life. Strategies designed to improve quality of care immediately after diagnosis and during more advanced stages of disease may reduce and costs. ")

- Discussion first paragraph at the end: suggest including conversion to 2020 inflated CAD so that comparison can be made easily: " Given those caveats, investigators have shown that the annual cost-of-illness ranges from \$868 in 2014 South Korea (2014 US dollars)¹² through \$20,2456 (2012 US dollars) and \$20,61833 (2008 US dollars) in the United States, to \$25,532 in 2002 Germany (2014 US dollars).¹³"

This calculation would involve a number of assumptions and given the caveats presented and the message of the sentence – that there is wide international variation – we have not made that change. (No change to manuscript.)

- Funding: Is there a declaration of COI for the industry co-authors? The conclusions seem to emphasize the cost of hospitalization while minimizing the cost of medications. What role did industry co-authors play in the data analysis and manuscript authorship?

The funding declaration and the roles of all co-authors are clearly indicated. We allowed the data to speak for themselves and did not empathize or de-emphasize any component of costs. The relative contributions of each category of cost are consistent with the literature. (No change to manuscript.)

Reviewer 2	Helen Johansen
Institution	Health Statistics Division, Statistics Canada — Main Building, Ottawa, Ont.
General comments (author response in bold)	<p>Page 5 lines 44-46 "...between 2009 and 2012, after removing those with a hospital discharge abstract including any heart failure coded in 2007 or 2008". Was the incidence calculated for each year in Table 1 washed out for 2 years? If one means to look at a trend in incidence and say that the incidence rate has actually been decreasing, each year from 2009 to 2012 should be treated exactly the same way and washed out only say by its preceding two years. If instead one means to get the best estimate of incidence for each year individually then one can washout each year by different (and increasing) number of years, as might have been done here,. But one must be clear on what was done and what you wanted...</p> <p>While we show the rates of hospital discharge, we do not state that the incidence is declining. We state (page 12, last full paragraph, third sentence) "The declining rates of hospital discharge for heart failure between 2009 and 2012 is consistent with declining incidence observed in Ontario⁴⁴, the United Kingdom⁴³ and the United States⁴⁵." (No change to this manuscript.)</p> <p>The actual incidence could be declining due to improved treatment of heart disease, hypertension and diabetes, But if each year is washed out by an increasing number of years, a decline in incidence could be due only to differences in how the rates were washed out as more years of washout exclude more people.</p> <p>As per previous comment, we do not make statements about incidence.</p> <p>For incidence costs, what was the reason that only those who left the hospital alive after the index hospitalization were used? Those that died during the index hospitalization had costs as well. What percentage died during the index hospitalization and what was their cost.</p> <p>Costs of persons dying during the index hospitalization were actually included. This is now made clear in the Methods. (Costs of illness, third sentence: "Incidence-based costs began with the initial hospitalization for heart failure and were tabulated for up to seven years (2009 to 2015) after diagnosis." Costs of illness, fifth sentence: "Prevalence-based costs began to be tabulated with the initial hospitalization for heart failure (including those who died) and the annual mean was calculated for the three most recent years available (2013 to 15).")</p> <p>You say in Lines 11-13 on page 7 :</p> <p>"For the prevalence-based approach, annual mean costs were based on the three most recent years available (2013 to 15)". Indicate these results are in (Table 2) In Line 14-16 on page 7 "We tabulated the costs in the two years prior to death, accounting for left-censoring for those who survived less than two years." It would be clearer to say : "We tabulated the costs in the first and second years prior to death, accounting for left-censoring for those who survived less than two years. (Table 4)"</p> <p>The first change is not made because it would mean referring to Table 2 before Table 1 or making a confusing reversal of the first two tables.</p> <p>The second change has been made: Cost of illness, first paragraph, fifth sentence</p> <p>Page 7 lines 40-42 "Mortality after heart failure diagnosis was high, with 20% of individuals dead within two months and a median survival of less than three years</p>

(Figure 1) .” Did this include those that died during the incident hospitalization? **No. This now made explicit in the text. (Results, second paragraph, first sentence: “Mortality after heart failure diagnosis was high, with 20% of individuals dead within two months and a median survival of 2.5 years for men and 2.2 years for women after the first hospital discharge for heart failure (Figure 1).”)**

Why didn't the Figure and Tables have titles and numbers? This lack makes it hard to read the article. A Figure or Table should be able to stand on its own.

Also column heading should clearly indicate whether a number, percentage or rate is shown. For example, what are 83 (84) in the second column of Table 1? I assume they are Age-specific rate and number.

The table and figure titles are correctly labeled and the type of values clearly indicated.

Similar comments also go for Table 3 for costs. What are the numbers in parentheses? Columns in Tables 2 and 4 appear to be labeled correctly.

The type of values are clearly indicated.

Picky point: On page 6 lines 7-9 the article states “All-cause mortality was illustrated using Kaplan-Meier curves.” So page 7 line40 “Mortality after heart failure diagnosis was high” should indicate “All-cause mortality”

Change made.

Page 8 line 23 “Table 3” should be “Table 4”

The table numbering is correct.

Discussions of the findings relevance and their place in the context of the literature are good.