A NOVEL METHOD USING PRESCRIPTION TREATMENT PATTERNS TO ESTIMATE HEART FAILURE PREVALENCE IN CANADA

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BACKGROUND
Heart failure (HF) is a condition in which the heart cannot pump enough blood to fully meet the oxygen demand of the body. This is due to one of two reasons: the heart cannot fill with enough blood, or the heart cannot pump blood to the rest of the body with enough force. HF has been shown to negatively impact a patient’s quality of life by affecting their physical, psychological, social, and economic status. Despite currently available therapies for HF, both morbidity and hospitalization remain high. Approximately 22,000 deaths per year occur due to HF, comparable to the annual number of deaths from breast, colorectal, prostate and pancreatic cancer combined. HF presents a challenge to the healthcare system as it is the most common cause of an inpatient hospitalization in patients aged 65 or older, and prior cost studies demonstrated a substantial cost per HF hospitalization. Approximately 805,000 Canadians are diagnosed with HF. However, existing Canadian HF prevalence estimates use hospital and, where available, primary care diagnosis from databases which are limited in coverage and availability. As HF has a large impact on the Canadian healthcare system, it is important to have up-to-date prevalence estimates.

OBJECTIVES
The objective of this study is to identify treated Canadian HF patients through the development of a model using retail prescription patterns from a national database to validate and build upon Canadian literature prevalence estimates.

DATA SOURCE
IMS Brogan’s (IMS) E360 Canadian Electronic Medical Record (EMR) database:
• A primary care medical record database housing approximately 1,000,000 patient medical records from Ontario – Canada’s largest province – including diagnosis, laboratory values, and prescriptions.
• IMS Brogan’s Longitudinal (LRx) database:
• A national retail pharmacy based dispensed prescription database projected to 100% coverage.

RESULTS
Patients and Variables
• 675 HF patients and 840 randomly sampled non-HF patients were included to develop the CART model (Figure 1).

Table 1: Total and age group stratified HF prevalence from two literature sources and the HF predictive model

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Literature Estimate</th>
<th>Model Estimate</th>
</tr>
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<tbody>
<tr>
<td>60-64</td>
<td>2.3% 3.5% 3.6%</td>
<td>2.3%</td>
</tr>
<tr>
<td>65-74</td>
<td>3.3% 3.5% 3.6%</td>
<td>3.3%</td>
</tr>
<tr>
<td>75-84</td>
<td>4.0% 3.6% 3.8%</td>
<td>4.0%</td>
</tr>
<tr>
<td>85+</td>
<td>5.4% 4.7% 5.8%</td>
<td>5.4%</td>
</tr>
</tbody>
</table>

Model Accuracy
• The model had 80% accuracy, 81% PPV, and 75% NPV when applied against the test dataset.

PREVALENCE
• The study estimated a 2014 national aged ≥18 HF prevalence of 2.3%, or 657,952 treated patients.

METHODS
Phase 1: Develop and test predictive model
• A Classification and Regression Tree (CART) model predicting HF prescription patterns was constructed using the IMS E360 EMR database.

Phase 2: Application of predictive model to national LRx dataset
• To identify-national HF patients, the CART model was applied to the national LRx dataset.

Inclusion criteria – Phase 1
• Aged ≥18.

Inclusion criteria – Phase 2
• Aged ≥18.
• ≥6 months follow-up.

CONCLUSION
The model’s Canadian HF prevalence estimates closely match values found in literature both in overall and age stratified prevalence. As of 2014, approximately 2.3% of Canadians aged ≥18 are treated for HF. Overall, this study provides a means to refine and construct national HF prevalence estimates in Canada when applied to retail prescription data.