

# Prevalence and Incidence of Ischemic Heart Disease and Heart Failure in Saskatchewan

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## Purpose:

The purpose of this report is to present prevalence (percentage of existing cases) and incidence (new cases per year) information for ischemic heart disease (IHD) and heart failure (HF) in Saskatchewan.

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## Executive Summary

### Background

This snapshot report highlights the age and sex profile and regional variations of ischemic heart disease (IHD) and heart failure (HF) in Saskatchewan.

Each disease is characterized at the provincial level by sex and age-specific prevalence for the 2010/11 fiscal

### Key Findings

In the 2010/11 fiscal year:

- most IHD and heart failure cases also had hypertension or other chronic diseases;
- more than 68,000 (8%) residents 20 years of age and older had IHD;
- more than 26,000 (5%) residents 40 years of age and older had heart failure; and
- IHD and heart failure prevalence and incidence rates were significantly higher for men than for women.

### Chronic Disease Co-morbidity

Individuals may have multiple chronic diseases at the same time. Table 1 shows co-prevalence of IHD and HF with combinations of hypertension (HT), diabetes (DM), chronic obstructive pulmonary disease (COPD), and the other heart disease (IHD/HF). (Table 2 in the Technical Notes describes the case definitions for the other three chronic diseases.)

- Almost all residents with IHD (87%) or HF (97%) had at least one of the other conditions (100% minus Column A).

year, and by sex specific incidence rates for 2001/02-2005/06 and 2006/07-2010/11. The report also provides age-standardized prevalence and incidence rate estimates for comparison of disease burden in each regional health authority.

- From the five-year time period 2001/02-2005/06 to 2006/07-2010/11, incidence rates of IHD and heart failure decreased.
- IHD prevalence and incidence rates were significantly lower in the Sun Country and Regina Qu'Appelle health regions and significantly higher in the combined three Northern, Kelsey Trail and Prince Albert Parkland health regions than in the province.
- Heart failure prevalence and incidence rates were significantly lower in Saskatoon, and significantly higher in the Sunrise, combined three Northern, and Five Hills health regions than in the province.

- Hypertension was the most common co-morbidity for both IHD (80%) and HF (89%) (Columns B+D), and fewer than 10% of IHD or HF cases had co-morbidity without HT (Column C).
- About half (49%) of the IHD cases and more than three-quarters (77%) of HF cases had HT and at least one additional chronic disease (Column D).
- About two-thirds of HF cases also had IHD and one-quarter of IHD cases had HF (not shown in table).

**Table 1: Co-prevalence of select combinations of chronic conditions among IHD and HF cases, Saskatchewan 2010/11**

|                | A<br>Without HT or COPD<br>or DM or IHD/HF | B<br>With HT only | C<br>With COPD or<br>DM or IHD/HF | D<br>With HT and (COPD or<br>DM or IHD/HF) |
|----------------|--|-------------------|-----------------------------------|--|
| IHD (N=68,442) | 13%  | 31%               | 7%                                | 49%  |
| HF (N=26,120)  | 3%   | 12%               | 8%                                | 77%  |

Ischemic heart disease (IHD) is a condition characterized by reduced blood supply (ischemia) to the heart muscle, usually due to thickening of the inner lining of the blood vessels to the heart (coronary vessels) with fat deposits and other materials (atherosclerosis). It can cause a heart attack, angina (chest pain), and sudden death. Its risk increases with age, smoking, high cholesterol levels, diabetes, and hypertension, and is more common in men and those who have close relatives with ischemic heart disease.

## Ischemic Heart Disease (IHD) Prevalence

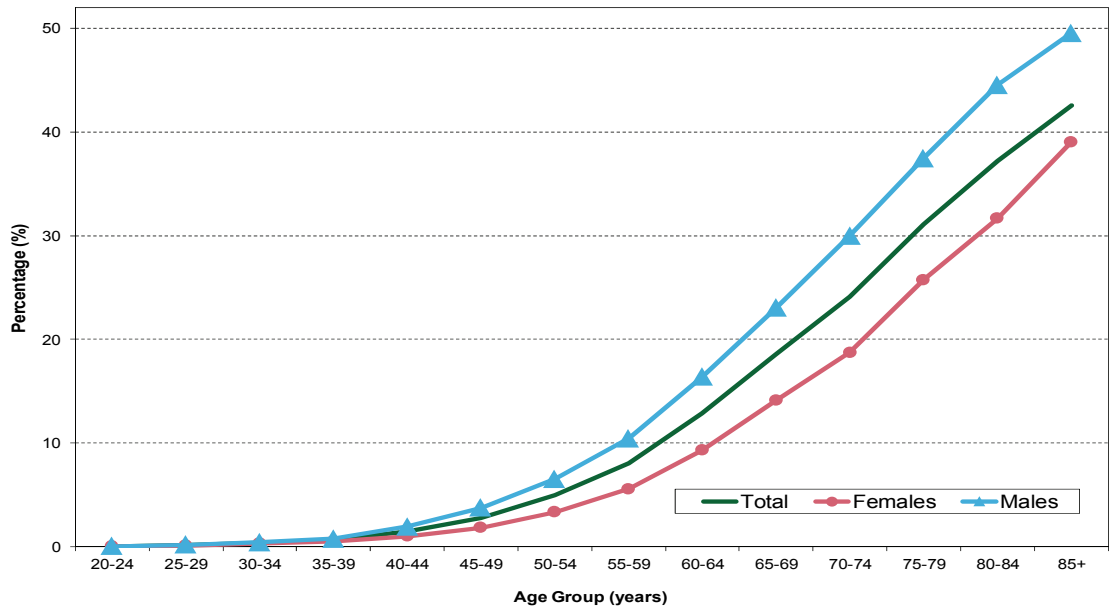
In 2010/11 in residents 20 years of age and older:

- more than 68,000 (8%) had IHD;
- IHD prevalence (percentage of existing cases) increased with age to more than 40% in the older than 85 years age group; and
- the percentage of men with IHD was higher than the percentage of women in all age groups.

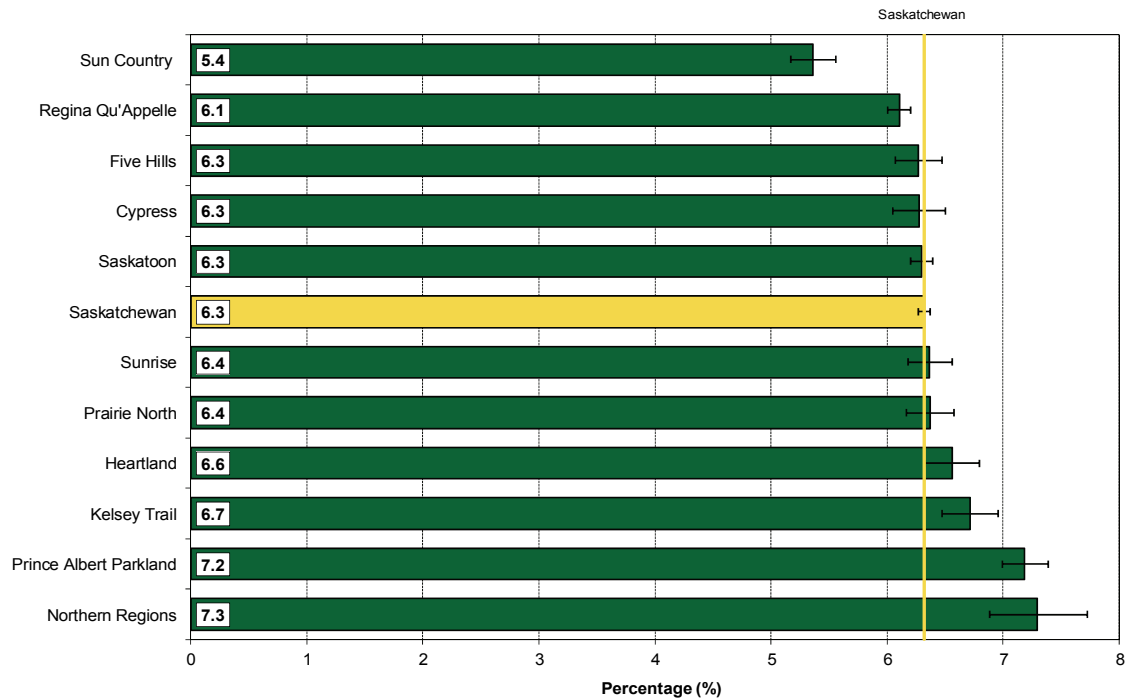
In 2010/11 compared to the province, IHD prevalence was:

- significantly lower in the Sun Country and Regina Qu'Appelle health regions; and
- significantly higher in the combined three Northern, Kelsey Trail and Prince Albert Parkland health regions.

**Figure 1: Ischemic Heart Disease (ages 20 years and older) — age-specific prevalence by sex, Saskatchewan, 2010/11**



**Figure 2: Ischemic Heart Disease (ages 20 years and older) — age-standardized prevalence by health region, Saskatchewan, 2010/11**



# Ischemic Heart Disease (IHD) Incidence

From 2001/02-2005/06 to 2006/07-2010/11 for residents aged 20 years and older, the IHD incidence rate (new cases per year):

- decreased from about 6,400 (8 per 1,000) per year to about 5,400 (7 per 1,000) per year;
- decreased by about 21% for women and about 16% for men; and
- was significantly higher for men than for women in

both 5-year periods.

In 2006/07-2010/11 compared to the provincial rate, the IHD incidence rate was:

- significantly lower in the Sun Country, Regina Qu'Appelle, and Cypress health regions; and
- significantly higher in the combined three Northern, Saskatoon, Kelsey Trail and Prince Albert Parkland health regions.

For surveillance purposes, the IHD case definition requires that an individual must have EITHER:

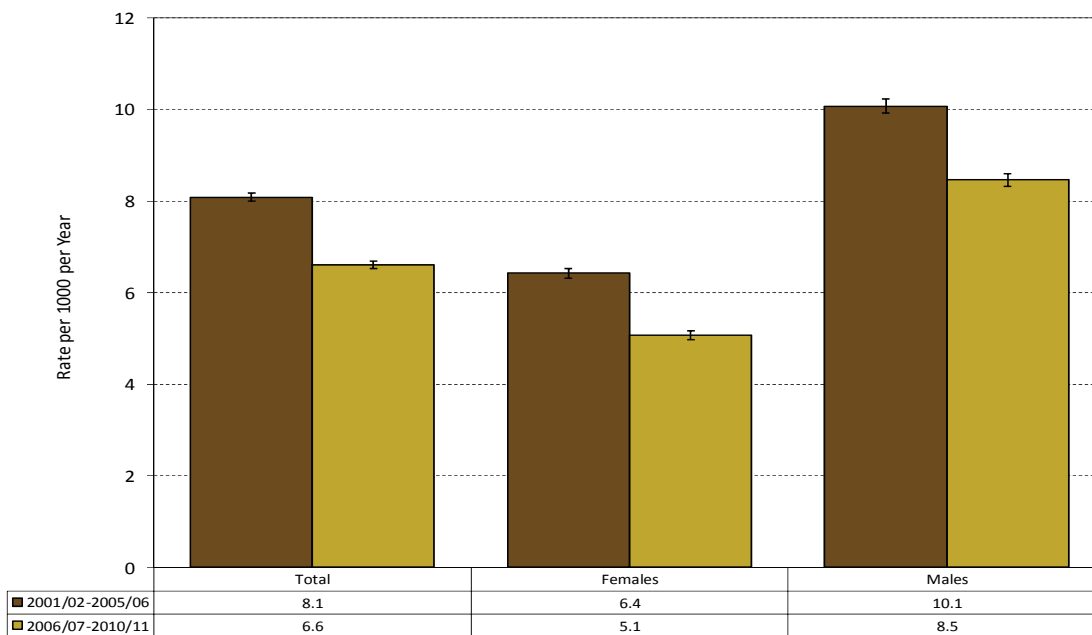
- One or more inpatient hospital separations with a diagnosis of ICD-9 codes 410-414 or ICD-10-CA codes I20-I25 OR a percutaneous coronary intervention (PCI)/coronary artery bypass grafting (CABG) procedure with Canadian Classification of Diagnostic, Therapeutic and Surgical Procedures (CCP) codes 48.02, 48.03, 48.11- 48.19 or Canadian Classification of Health Intervention (CCI) codes 1.IJ.50, 1.IJ.54, 1.IJ.57.GQ, 1.IJ.76 in any field of the hospital service records;

OR

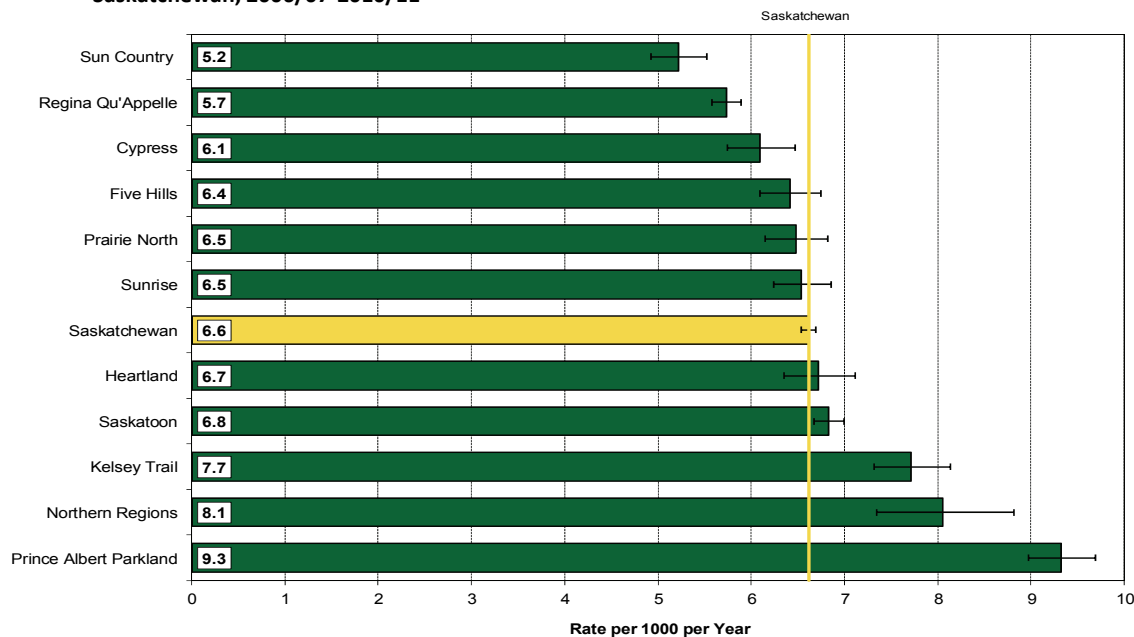
- Two or more medical claims with a diagnosis of ICD-9 codes 410-414 within one year.

The IHD case definition applies to ages 20 years and older.

**Figure 3: Ischemic Heart Disease (ages 20 years and older) — age-standardized incidence rates by sex, Saskatchewan, 2001/02-2005/06 and 2006/07-2010/11**



**Figure 4: Ischemic Heart Disease (ages 20 years and older) — age-standardized incidence rates by health region, Saskatchewan, 2006/07-2010/11**



## Heart Failure (HF) Prevalence

Heart failure (HF) is generally defined as the inability of the heart to supply sufficient blood flow to meet the needs of the body. HF can cause a number of symptoms including shortness of breath, leg swelling, and exercise intolerance resulting from a buildup of fluid in the body, particularly the lungs or legs. Individuals with congestive heart failure are at risk of dying suddenly from a disturbance in heart rhythm.

Common causes of HF include heart attack and other forms of IHD, long-term hypertension, valvular heart disease, cardiomyopathy (disease of the heart muscle), and the effects of lung disease such as chronic obstructive pulmonary disease (COPD).

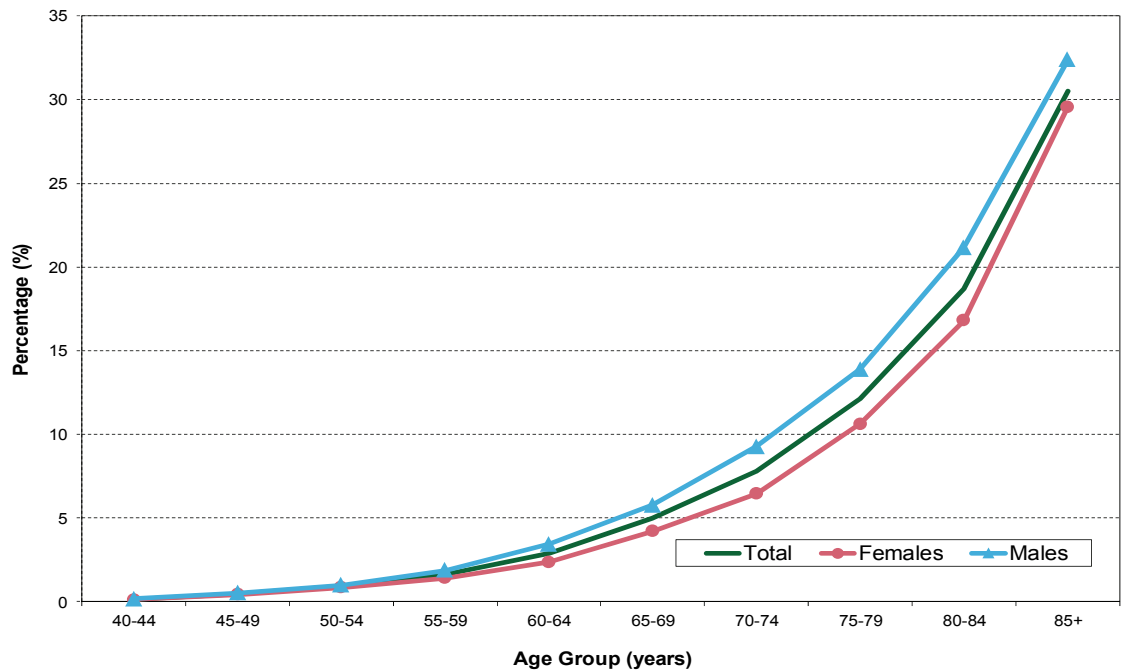
In 2010/11 in residents 40 years of age and older:

- more than 26,000 (5%) had heart failure;
- Heart failure prevalence (percentage of existing cases) increased with age to about 30% in the older than 85 years age group; and
- the percentage of men with heart failure was higher than the percentage of women in all age groups.

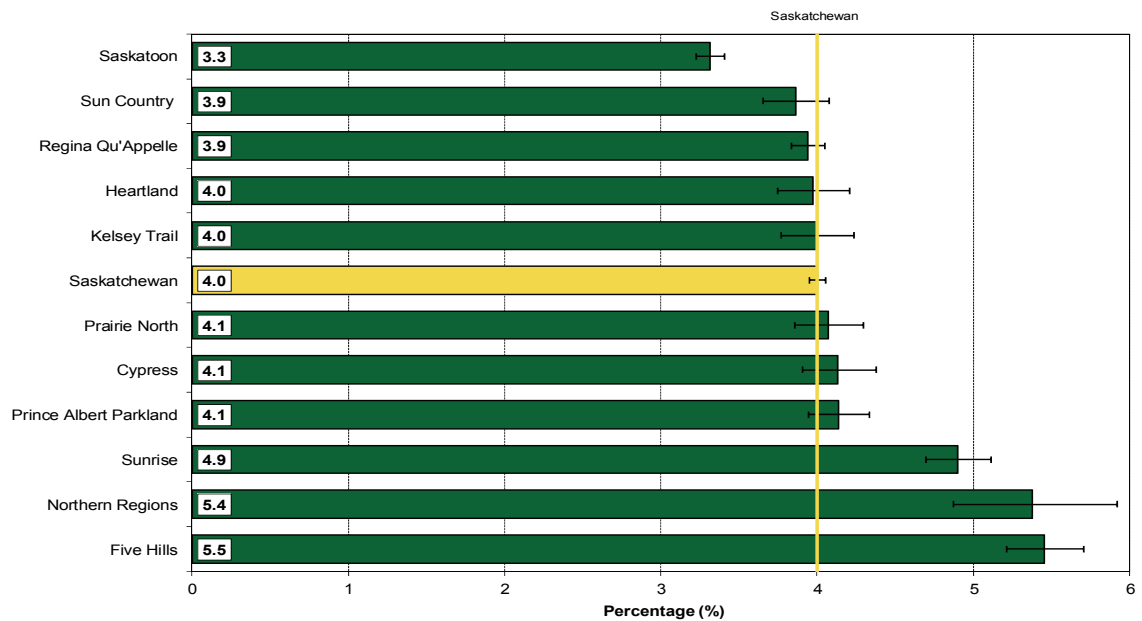
In 2010/11 compared to the province, prevalence of heart failure was:

- significantly lower in the Saskatoon health region; and
- significantly higher in the combined three Northern, Sunrise and Five Hills health regions.

**Figure 5: Heart Failure (ages 40 years and older) — age-specific prevalence by sex, Saskatchewan, 2010/11**



**Figure 6: Heart Failure (ages 40 years and older) — age-standardized prevalence by health region, Saskatchewan, 2010/11**



# Heart Failure (HF) Incidence

From 2001/02-2005/06 to 2006/07-2010/11 for residents aged 40 years and older, the heart failure incidence rate (new cases per year):

- decreased from about 4,200 (8 per 1,000) per year to about 3,600 (7 per 1,000) per year;
- decreased by about 20% for women and about 17% for men, and
- was significantly higher for men than for women in both

5-year periods.

In 2006/07-2010/11 compared to the provincial rate, the heart failure incidence rate was:

- significantly lower in the Saskatoon health region; and
- significantly higher in the combined three Northern, Sunrise, and Five Hills health regions.

For surveillance purposes, the heart failure case definition requires that an individual must have EITHER:

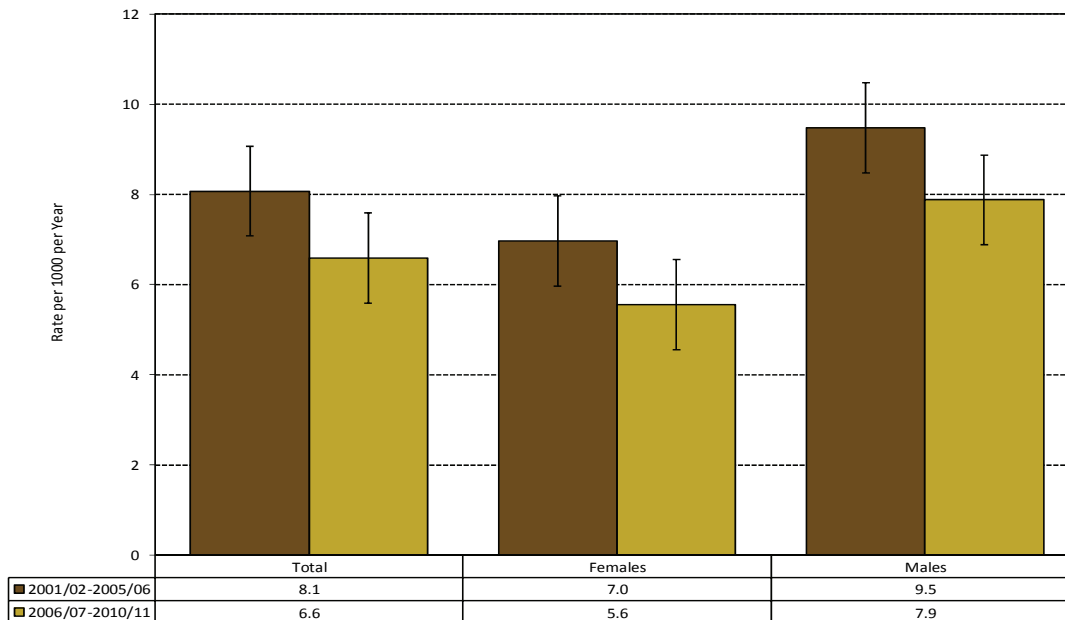
- One or more inpatient hospital separations with a diagnosis of ICD-9 code 428 or ICD-10-CA code I50 in any field of the hospital service records;

OR

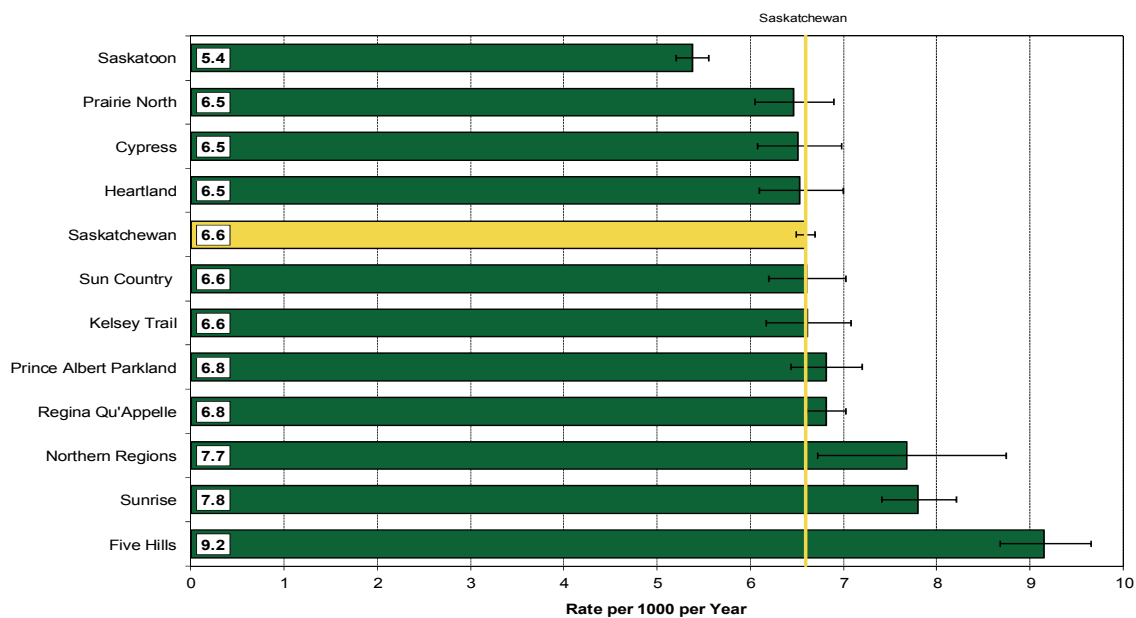
- Two or more medical claims with a diagnosis of ICD-9 code 428 within one year.

The heart failure case definition applies to ages 40 years and older.

**Figure 7: Heart Failure (ages 40 years and older) — age-standardized incidence rates by sex, Saskatchewan, 2001/02-2005/06 and 2006/07-2010/11**



**Figure 8: Heart Failure (ages 40 years and older) — age-standardized incidence rates by health region, Saskatchewan, 2006/07-2010/11**



## Technical Notes

### Method:

Chronic disease estimates are based on the infrastructure and case definitions recommended<sup>1,2</sup> for the Canadian Chronic Disease Surveillance System (CCDSS), with support of the Public Health Agency of Canada. This method is based on linkage of administrative data sources including:

- Person Health Registry System (PHRS) — includes all residents eligible for Saskatchewan Health benefits;
- Hospital Services — includes data on inpatient separations for patients treated in hospitals; and
- Health Services — includes claims for services provided by Physicians and Nurse Practitioners.

Diagnoses are coded in hospital according to the ICD-10-CA or ICD-9 system depending on the year. Diagnoses in medical services are coded according to ICD-9 system in all years.

### Calculations:

Age standardization allows comparisons to be made among regions that have populations with different age distributions, or comparisons over time. To adjust for differences in population age distributions and the resulting effect on rates, the rates were age-adjusted using the 1991 Canadian population as a reference. Adjustment was done via the direct method, using five-year age groups to age 85 years and older.

To facilitate comparisons, 95% confidence intervals (CIs) of all age-standardized rates were calculated for rates greater than zero. The CI includes the true value for the estimated rate 19 times out of 20. A rate difference was considered statistically significant if there was no overlap of confidence intervals.

Incidence rates were calculated as five-year averages to reduce year-to-year fluctuations.

### Limitations:

The administrative data used in this report captures only those diagnosed with the respective chronic diseases and excludes those who do not access the healthcare system.

The case definitions do not identify individuals diagnosed with chronic disease in hospital, but who are not captured within the hospital discharge abstract databases, such as emergency rooms or outpatient clinics.

Health services data includes information for fee-for-service and from shadow billing when available.

Changing diagnostic criteria and billing practices may cause significant short-term fluctuations in incidence estimates.

Any system which tracks lifelong diseases over many years on an individual basis will tend to accumulate false positives. This is because a case, once identified, is carried forward from year to year. Even if false positives are extremely rare, they will still inevitably comprise an increasing proportion of reported cases over time.

During the time of this report, provincial administrative data excluded full-time members of the Canadian Forces, individuals in the Royal Canadian Mounted Police, and individuals residing in federal correctional facilities whose health benefits are covered by federal jurisdiction.

**Table 2: Case definitions of select chronic diseases.**

|                        | <b>COPD (ages 35 years and older)</b>   | <b>Diabetes (ages 1 year and older)</b> | <b>Hypertension (ages 20 years and older)</b> |
|------------------------|---|---|---|
| <b>Case Rule</b>       | One or more inpatient hospitalizations with code in any field of the hospital service records OR Two or more medical service claims within two years. |   |   |
| <b>ICD-9 codes</b>     | 491, 492, 496   | 250                                     | 401 to 405                                    |
| <b>ICD-10-CA codes</b> | J41 to J44  | E10 to E14                              | I10, I11, I12, I13, I15                       |

1. Robitaille C, Bancej C, Dai S, Tu K, Rasali D, Blais C, Plante C, Smith M, Svenson LW, Reimer K, Casey J, Puchtinger R, Johansen H, Gurevich Y, Waters C, Lix LM, Quan H. *Surveillance of ischemic heart disease should include physician billing claims: population-based evidence from administrative health data across seven Canadian provinces.* BMC Cardiovasc Dis. 2013; 13(1):88.
2. Blais C, Dai S, Waters C, Robitaille C, Smith M, Svenson LW, Reimer K, Casey J, Puchtinger R, Johansen H, Gurevich Y, Lix LM, Quan H Tu, K. *Assessing the burden of hospitalized and community-care heart failure in Canada.* Can J Cardiol 2014;30(3):352-358