

# Prevalence of Asthma, COPD, Diabetes, Ischemic Heart Disease and Heart Failure in Saskatchewan 2012/13

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## **Purpose:**

The purpose of this report is to present prevalence (percentage of existing cases) information for asthma, chronic obstructive pulmonary disease (COPD), diabetes, ischemic heart disease (IHD) and heart failure in Saskatchewan.

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## **Background**

This snapshot report highlights the percentages of existing cases and regional variations of five chronic diseases in Saskatchewan in the 2012/13 fiscal year: asthma, chronic obstructive pulmonary disease (COPD), diabetes, ischemic heart disease (IHD) and heart failure.

Chronic diseases are not mutually exclusive and individuals can have more than one chronic disease.

Therefore, in this report each disease is characterized at the provincial level by its simultaneous occurrence with the other four diseases (co-morbidity). The report also provides age-standardized prevalence for comparison of disease burden in each regional health authority.

## **Key Findings**

### **Overall:**

- about 257,000 (23%) Saskatchewan residents had at least one of five chronic diseases: asthma, chronic obstructive pulmonary disease (COPD), diabetes, ischemic heart disease (IHD) or heart failure;
- of these, about one quarter (25%) had more than one of the five chronic diseases; and
- about 950 residents had all five of the chronic diseases at the same time.

### **Asthma:**

- affected about 117,000 (10%) Saskatchewan residents aged one year and older;
- occurred without any of the other four chronic diseases (COPD, diabetes, IHD, heart failure) in the majority (80%) of cases; and
- was about five times higher among those with COPD than those without COPD.

### **COPD:**

- affected about 57,000 (10%) Saskatchewan residents aged 35 years and older;
- occurred with at least one of the other four chronic diseases (asthma, diabetes, IHD, heart failure) in about two-thirds (62%) of cases; and
- was about four times higher among those with asthma and three times higher among those with heart failure than those without those conditions.

### **Diabetes:**

- affected about 81,000 (7%) Saskatchewan residents aged one year and older;
- occurred without any of the other four chronic diseases (asthma, COPD, IHD, heart failure) in more than half (56%) of cases; and
- was about three times higher among those with IHD or heart failure than those without IHD or heart failure.

### **Ischemic Heart Disease (IHD):**

- affected about 69,000 (8%) Saskatchewan residents aged 20 years and older;
- occurred with at least one of the other four chronic diseases (asthma, COPD, diabetes, heart failure) in more than half (59%) of cases; and
- was about five times higher among those with heart failure than those without heart failure.

### **Heart failure:**

- affected about 26,000 (5%) Saskatchewan residents aged 40 years and older;
- occurred with one of the other four chronic diseases (asthma, COPD, diabetes, IHD) for about one-third (34%) and two additional diseases in another third (32%) of cases; and
- was almost seven times higher among those with IHD, and about three times higher among those with diabetes or COPD than those without those conditions.

# Asthma

Asthma is a chronic inflammatory disease of the airways that is characterized by wheezing, coughing, chest tightness, and shortness of breath. It is thought to be caused by a combination of genetic and environmental factors such as exposure to allergens, tobacco smoke, and viral respiratory infections.

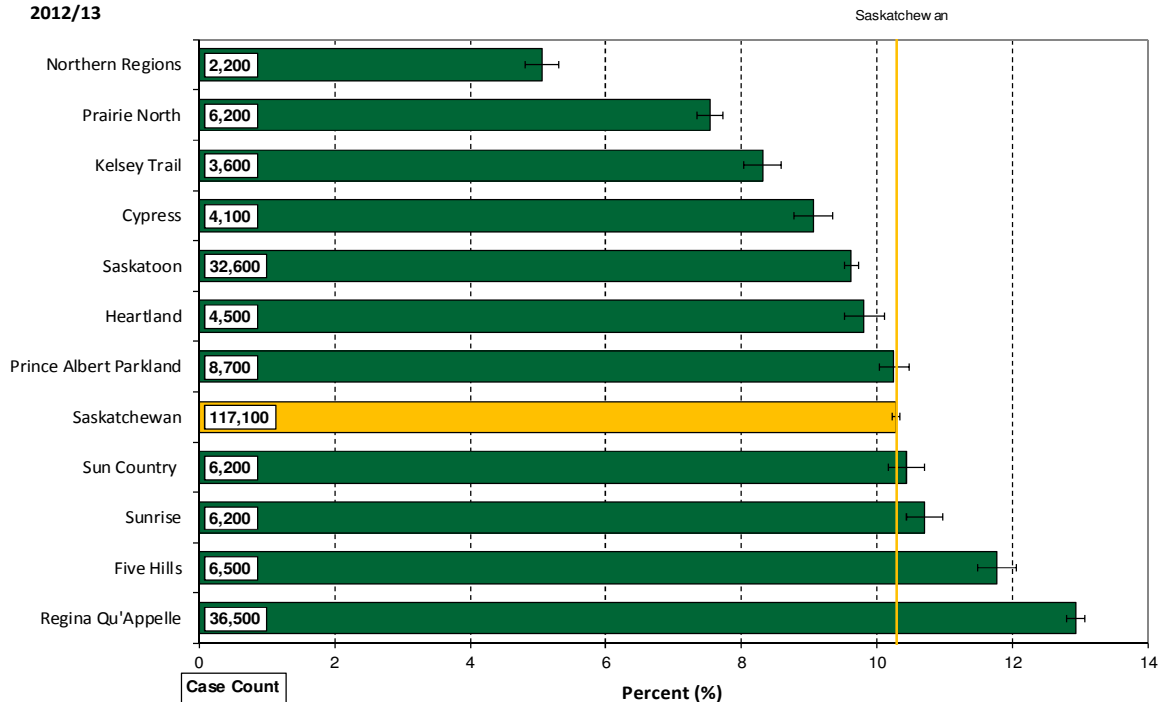
Management of asthma includes identification and avoidance of triggers that cause asthma attacks, as well as use of quick-relief medications to treat acute symptoms and long-term control medications to prevent further exacerbation.

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

- One or more inpatient hospital separations with a diagnosis of ICD-9 code 493 or ICD-10-CA codes J45, J46 in any field of the hospital service record; OR
- two or more medical claims with a diagnosis of ICD-9 493 within two years.

The asthma case definition applies to individuals one year of age and older.

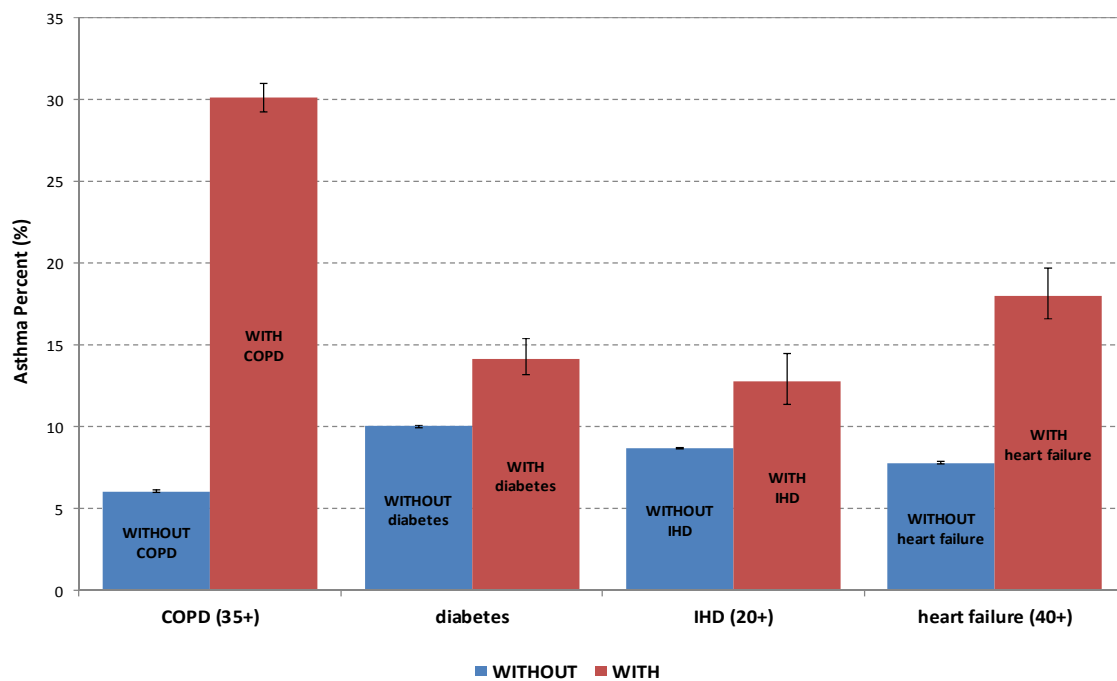
**Figure 1: Asthma (ages 1 year and older) Age-standardized Prevalence and Case Counts by Health Region, Saskatchewan, 2012/13**



In the 2012/13 fiscal year, asthma prevalence:

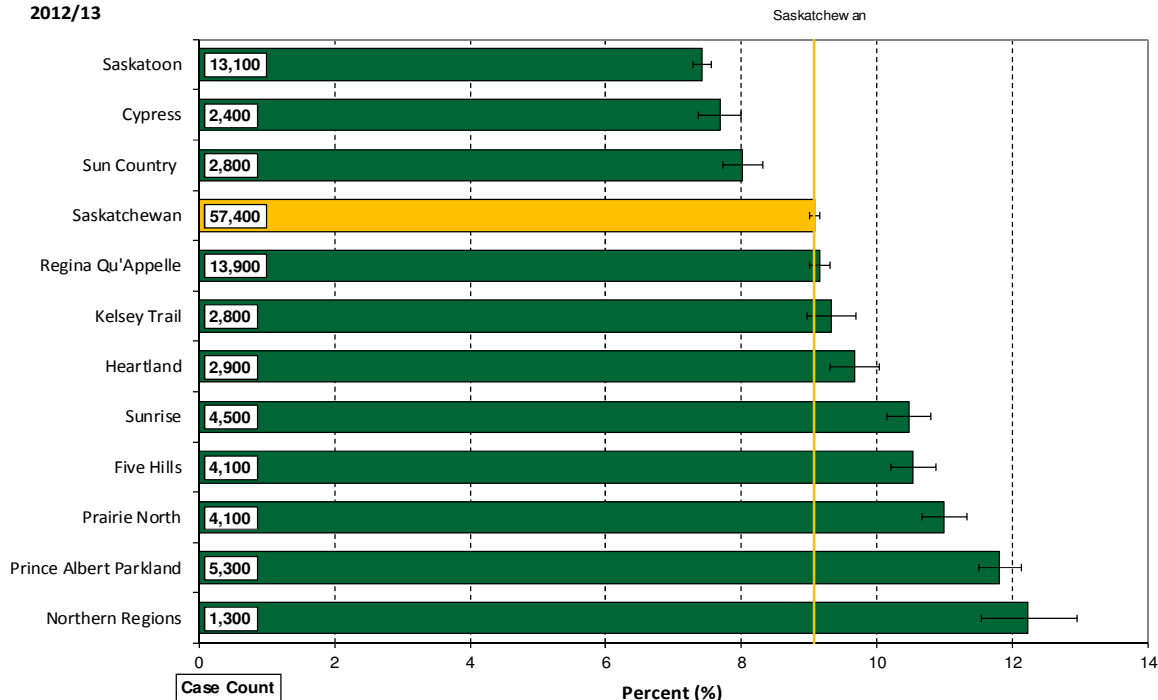
- was significantly lower than Saskatchewan in the combined Northern, Prairie North, Kelsey Trail, Cypress, Saskatoon, and Heartland health regions;
- was significantly higher than Saskatchewan in the Sunrise, Five Hills, and Regina Qu'Appelle health regions; and
- was significantly higher among those with one of the other four chronic diseases than those without, specifically:
  - \* 5.0 times higher among those with COPD,
  - \* 1.4 times among those with diabetes,
  - \* 1.5 times among those with IHD, and
  - \* 2.3 times among those with heart failure.

**Figure 2: Asthma (ages 1 year and older) Age-standardized Prevalence by Co-morbid Disease Status, Saskatchewan, 2012/13**



# Chronic Obstructive Pulmonary Disease (COPD)

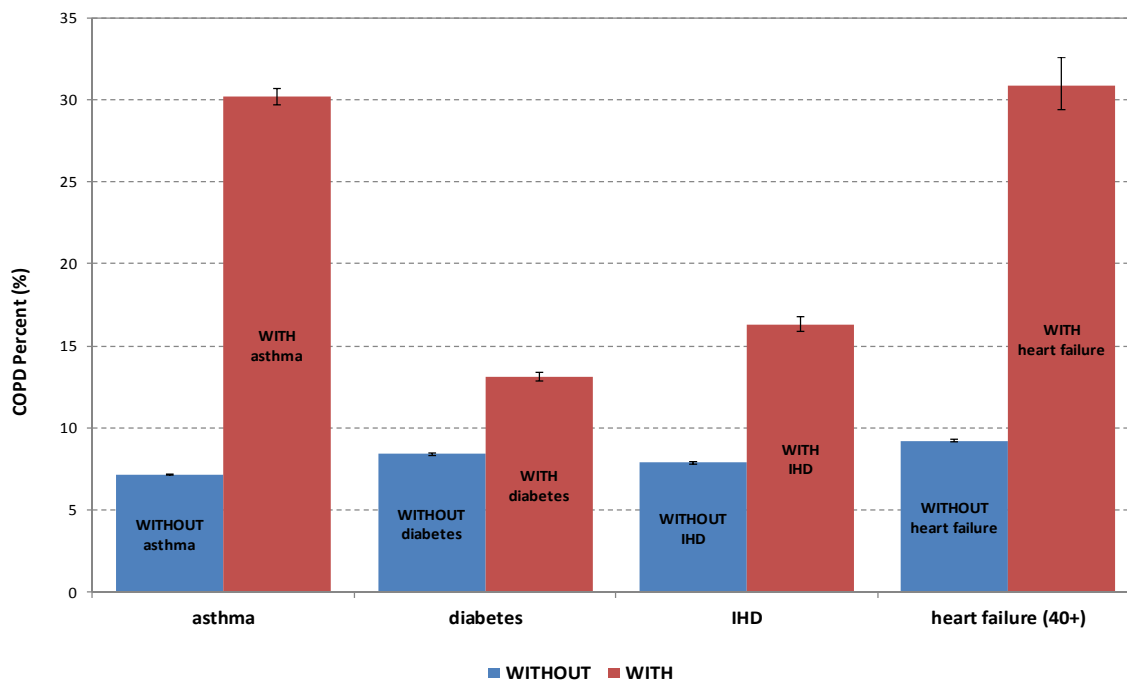
Figure 3: COPD (ages 35 years and older) Age-standardized Prevalence and Case Counts by Health Region, Saskatchewan, 2012/13



In the 2012/13 fiscal year, COPD prevalence:

- was significantly lower than Saskatchewan in the Saskatoon, Cypress, and Sun Country health regions;
  - was significantly higher than Saskatchewan in the Heartland, Sunrise, Five Hills, Prairie North, Prince Albert Parkland, and combined Northern health regions; and
- was significantly higher among those with one of the other four chronic diseases than those without, specifically:
    - \* 4.2 times higher among those with asthma,
    - \* 1.6 times higher among those with diabetes,
    - \* 2.1 times higher among those with IHD, and
    - \* 3.4 times higher among those with heart failure.

Figure 4: COPD (ages 35 years and older) Age-standardized Prevalence by Co-morbid Disease Status, Saskatchewan, 2012/13



Chronic bronchitis and emphysema, together with similar respiratory illnesses, are collectively known as chronic obstructive pulmonary disease (COPD). COPD is characterized by progressive and chronic airflow limitation that is not fully reversible and is most commonly diagnosed in individuals 35 years of age and older. COPD is largely preventable as the majority of cases are caused by smoking.

Important management strategies are smoking cessation, vaccinations for respiratory organisms, rehabilitation, and drug therapy (often using inhalers).

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

- One or more inpatient hospital separations with a diagnostic code ICD-9 491, 492, 496 or ICD-10-CA J41-J44 in any field of the hospital service record; OR
- one or more medical claims with a diagnostic code ICD-9 491, 492, 496.

The COPD case definition applies to individuals 35 years of age and older.

# Diabetes

Diabetes is characterized by the body's inability to sufficiently produce and/or use insulin – a hormone produced by the pancreas that assists with the conversion of glucose (sugar) into energy.

Diabetes increases the risk of heart disease and stroke, blindness, kidney disease, peripheral nerve problems, and amputation. These risks may be reduced by controlling blood sugar with a healthy diet, exercise, weight loss and medications.

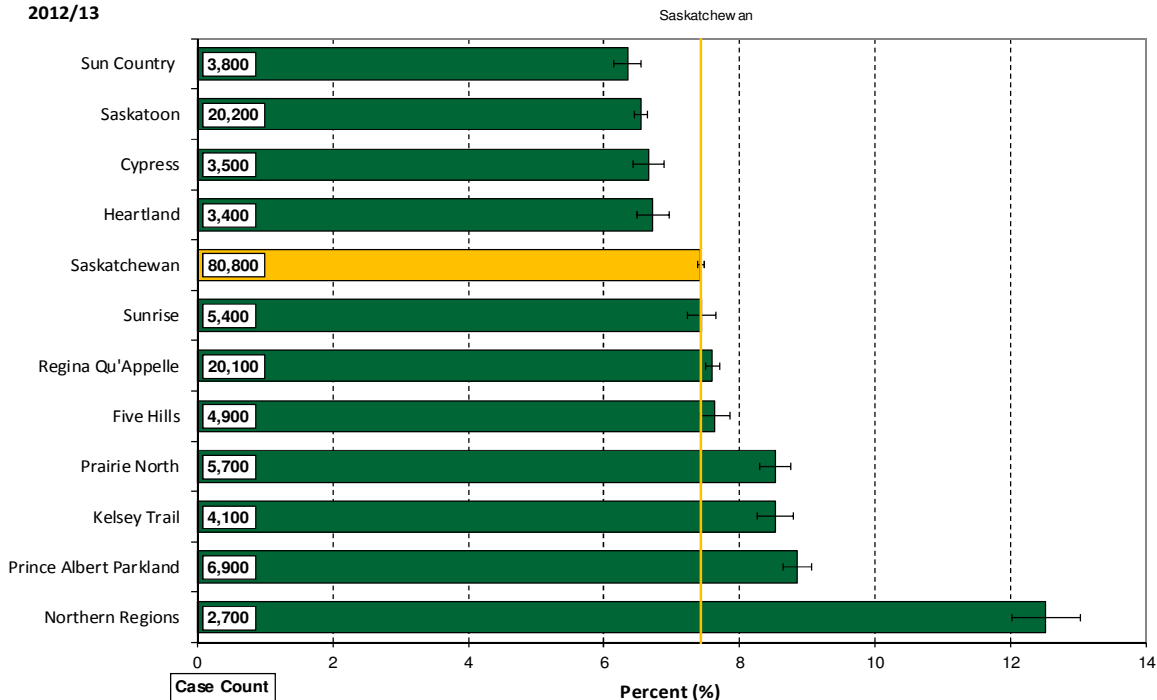
For surveillance purposes, the diabetes case definition requires that an individual must have EITHER:

- One or more inpatient hospital separations with an ICD-9 code 250 or ICD-10-CA code E10 to E14, in any field of the hospital service record; OR
- two or more medical claims with a diagnostic code ICD-9 250 within two years.

These diagnostic codes include both type 1 and type 2 diabetes. The case definition does not include temporary gestational diabetes. Therefore, the case criteria exclude females aged 10 to 54 diagnosed with diabetes 120 days preceding or 180 days after any pregnancy-related hospital visit (as identified by a set of obstetric diagnostic codes).

The diabetes case definition applies to individuals one year of age and older.

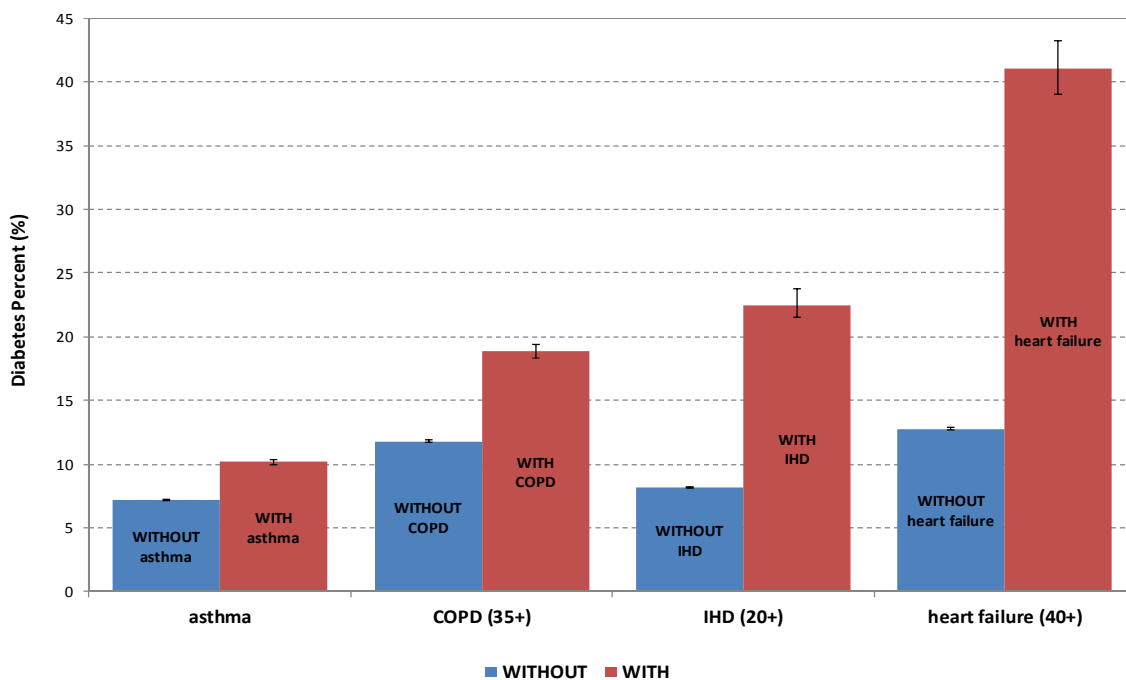
**Figure 5: Diabetes (ages 1 years and older) Age-standardized Prevalence and Case Counts by Health Region, Saskatchewan, 2012/13**



In the 2012/13 fiscal year, diabetes prevalence:

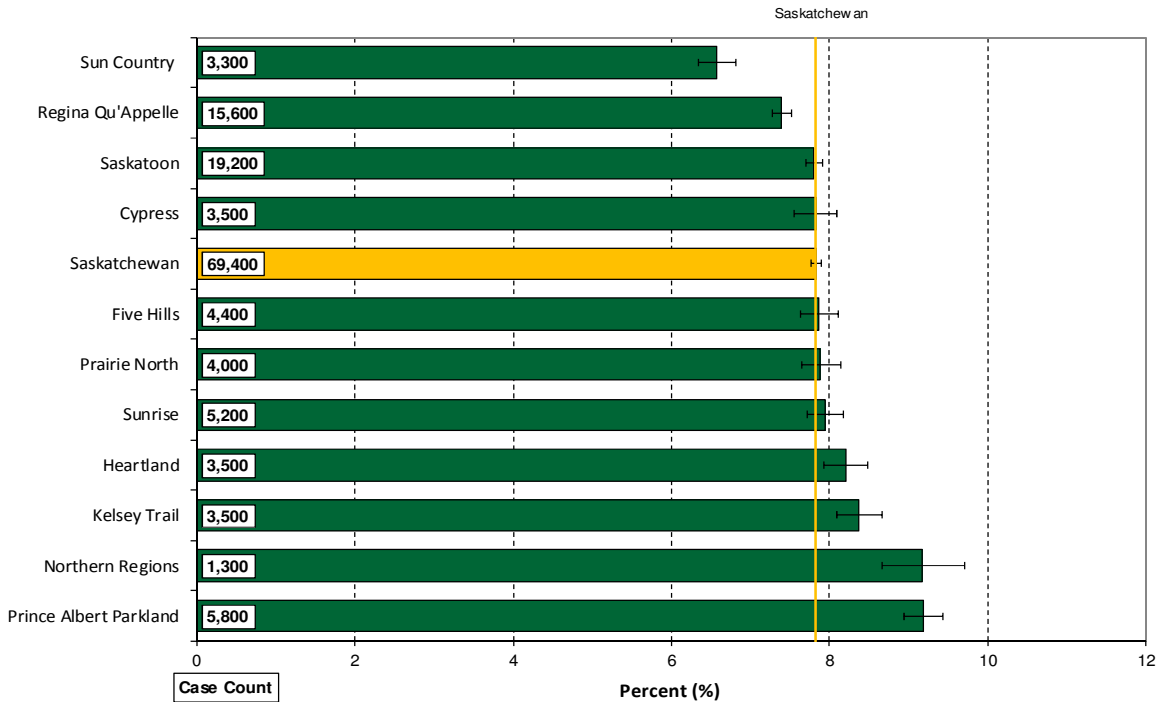
- was significantly lower than Saskatchewan in the Sun Country, Saskatoon, Cypress, and Heartland health regions;
- was significantly higher than Saskatchewan in the Regina Qu'Appelle, Prairie North, Kelsey Trail, Prince Albert Parkland, and combined Northern health regions; and
- was significantly higher among those with one of the other four chronic diseases than those without, specifically:
  - \* 1.4 times higher among those with asthma,
  - \* 1.6 times higher among those with COPD,
  - \* 2.8 times higher among those with IHD, and
  - \* 3.2 times higher among those with heart failure.

**Figure 6: Diabetes (ages 1 years and older) Age-standardized Prevalence by Co-morbid Disease Status, Saskatchewan, 2012/13**



# Ischemic Heart Disease (IHD)

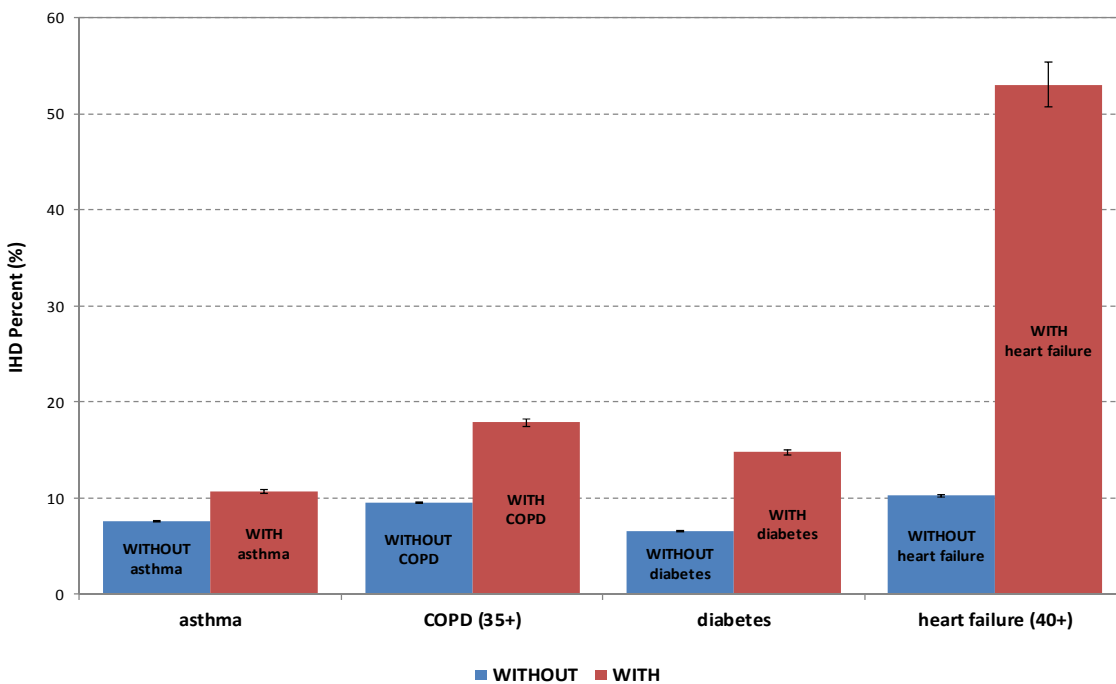
Figure 7: IHD (ages 20 years and older) Age-standardized Prevalence and Case Counts by Health Region, Saskatchewan, 2012/13



In the 2012/13 fiscal year, IHD prevalence:

- was significantly lower than Saskatchewan in the Sun Country and Regina Qu'Appelle health regions;
- was significantly higher than Saskatchewan in the Heartland, Kelsey Trail, combined three Northern, and Prince Albert Parkland health regions; and
- was significantly higher among those with one of the other four chronic diseases than those without, specifically:
  - \* 1.4 times higher among those with asthma,
  - \* 1.9 times higher among those with COPD,
  - \* 2.2 times higher among those with diabetes, and
  - \* 5.2 times higher among those with heart failure.

Figure 8: IHD (ages 20 years and older) Age-standardized Prevalence by Co-morbid Disease Status, Saskatchewan, 2012/13



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.

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

- 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), or a 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.II.50, 1.II.54, 1.II.57.GQ, 1.II.76 in any procedure field of the hospital service record; 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.

# Heart Failure

Heart failure is generally defined as the inability of the heart to supply sufficient blood flow to meet the needs of the body. Heart failure 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.

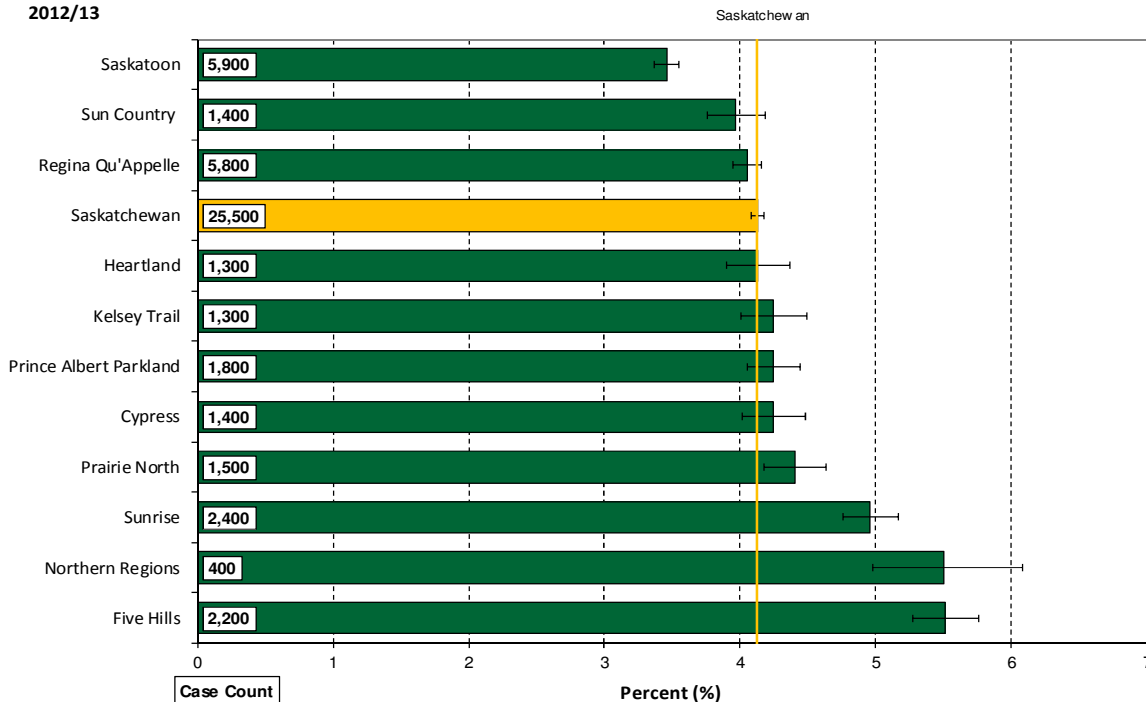
Common causes of heart failure include heart attack and other forms of IHD, long-term hypertension, valvular heart disease, cardiomyopathy (disease of the heart muscle), and the effects of lung disease such as COPD.

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 record; 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.

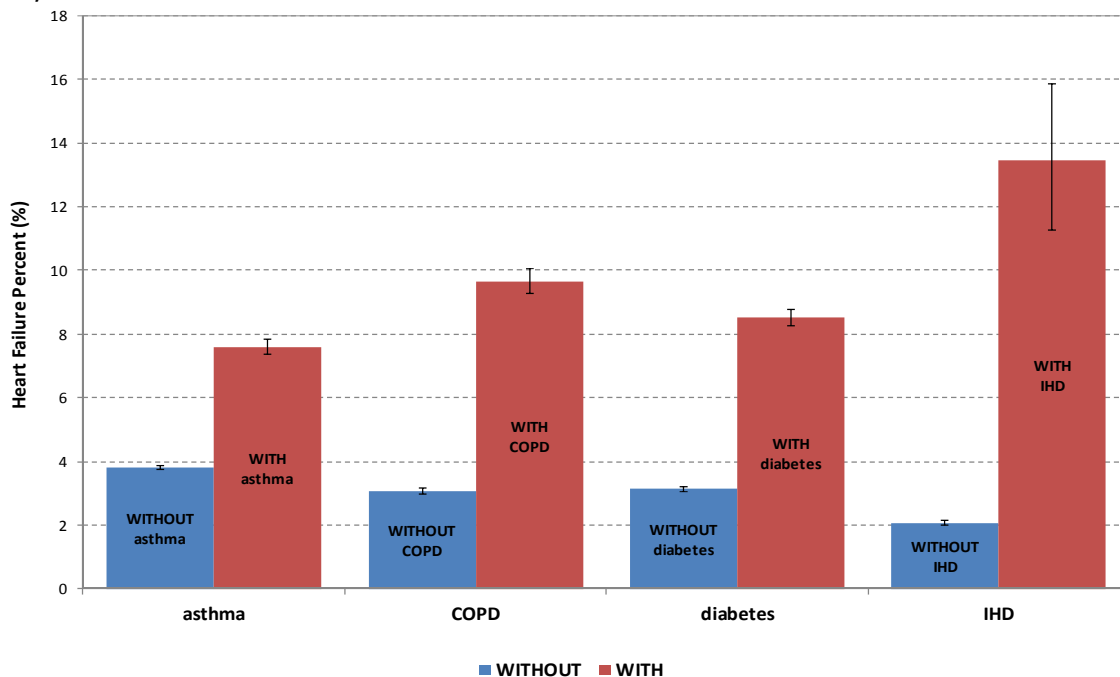
**Figure 9: Heart Failure (ages 40 years and older) Age-standardized Prevalence and Case Counts by Health Region, Saskatchewan, 2012/13**



In the 2012/13 fiscal year, heart failure prevalence:

- was significantly lower than Saskatchewan in the Saskatoon health region;
- was significantly higher than Saskatchewan in the Sunrise, combined three Northern, and Five Hills health regions; and
- was significantly higher among those with one of the other four chronic diseases than those without; specifically:
  - \* 2.0 times higher among those with asthma,
  - \* 3.1 times higher among those with COPD,
  - \* 2.7 times higher among those with diabetes, and
  - \* 6.5 times higher among those with IHD.

**Figure 10: Heart Failure (ages 40 years and older) Age-standardized Prevalence by Co-morbid Disease Status, Saskatchewan, 2012/13**



## Five Chronic Diseases Multi-morbidity

Individuals may have more than one chronic disease, and co-morbidity among chronic diseases is a major determinant for levels of health service use and mortality risk. Therefore, multimorbidity (occurrence of multiple diseases at the same time) has important implications for primary care and disease management. Table 1 shows levels of multimorbidity among the five chronic diseases.

In 2012/13, there were about 257,000 (23%) SK residents with at least one of the five chronic diseases. Of these, about three quarters (75%) had one of the diseases alone. About 950 residents had all five of the diseases at the same time.

The most common of the five diseases was asthma with about 117,000 cases (10%). Among asthma cases, about 80% had asthma alone. Of those who had at least one of the other four chronic diseases, the majority (68%) or almost one-third of asthma cases 40 years and older had COPD.

The second most common of the five diseases was diabetes with about 81,000 cases (7%). Of these, about 44% had at least one additional chronic disease.

The third most common of the five diseases was IHD with about 69,000 cases. Of these, more than half (59%) had at least one additional of the five chronic diseases.

Almost one-third of residents with IHD also had diabetes.

The fourth most common of the five diseases was COPD with about 57,000 cases. Of these, almost two-thirds (62%) had at least one additional chronic disease. More than one-quarter of residents with COPD also had asthma and almost one-third also had IHD.

The least common of the five diseases was heart failure with about 26,000 cases. Of these, only about 14% had heart failure alone, about one-third (34%) had one additional, and another third (32%) had two additional chronic diseases. About two-thirds of residents with heart failure also had IHD, and about 40% had COPD and/or diabetes.

“Prevalence” is the total number of people known to be living with a disease at any time during a specific period. It provides an estimate of the importance and burden of disease at a given time, and is widely used in public health monitoring and planning. Prevalence is influenced by both incidence and duration of a disease. A high prevalence of a disease may reflect a high incidence where new cases rapidly occur, or prolonged duration, where those with the condition survive for a long time. Conversely, a low prevalence may indicate fewer new cases or a shorter survival of those with a chronic disease.

Prevalence of a disease is often expressed as a proportion of the total population, such as a percentage.

**Table 1: Levels of multimorbidity among five chronic diseases, Saskatchewan, 2012/13.**

	Asthma N=117,100	COPD N=57,400	Diabetes N=80,800	IHD N=69,400	Heart Failure N=25,500	At least One Disease N=257,200
1 disease alone	80%	38%	56%	41%	14%	75%
2 diseases	12%	34%	26%	34%	34%	17%
3 diseases	5%	18%	12%	17%	32%	6%
4 diseases	2%	8%	5%	7%	16%	2%
all 5 diseases	1%	2%	1%	1%	4%	0.4%

**Note:** Chronic diseases are not mutually exclusive and individuals can have more than one chronic disease.

## Technical Notes

### Method:

Chronic disease estimates are based on the infrastructure and case definitions of 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) which includes all residents eligible for Saskatchewan Health benefits;
- hospital services which include data on inpatient separations for beneficiaries treated in hospitals; and
- medical services which include physician and nurse practitioner service claims.

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

Ascertainment of chronic disease cases in the CCDSS starts with the 1995/96 fiscal year.

### Calculations:

Age standardization allows comparisons to be made among areas 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 2011 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.

### Limitations:

The administrative data used do not capture people with undiagnosed chronic disease, or who do not access the healthcare system.

A reported ICD code is assumed to be diagnostic and not a differential diagnosis.

The case definitions do not capture services provided in hospital-based emergency departments or outpatient clinics.

Persons with physician-diagnosed chronic conditions may be excluded if they receive their care in a setting where services are not billed on a fee-for-service basis. Services delivered by physicians in salaried or contractual arrangements are not captured if the service information is not submitted through "shadow billing".

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 inevitably comprise an increasing proportion of reported cases over time.

Provincial administrative data exclude 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.

Co-morbid combinations of individual chronic disease case definitions were not validated and their sensitivity and specificity are not known.