



## Continuity of Care With Family Medicine Physicians: Why It Matters

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## Our Vision

Better data. Better decisions.  
Healthier Canadians.

## Our Mandate

To lead the development and maintenance of comprehensive and integrated health information that enables sound policy and effective health system management that improve health and health care.

## Our Values

Respect, Integrity, Collaboration,  
Excellence, Innovation

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Please note that the analyses and conclusions in this report do not necessarily reflect those of the individuals or organizations mentioned above.

# Executive Summary

Interactions with a family medicine physician and other front-line health care providers can be the first point of contact that people have with the health care system, and can impact their future use of hospital services. Past studies have shown that seeing the same family medicine physician, and developing an ongoing relationship with that physician, is an essential element of effective primary health care. Studies indicate that relational continuity of care helps to establish a patient–provider relationship built on effective communication and mutual understanding.<sup>1, 2</sup> High levels of continuity of care have been linked to improved health outcomes,<sup>3, 4</sup> reductions in emergency department use and reductions in hospitalizations.<sup>4–8</sup>

This study uses patient-level physician billing data, hospital discharge data and emergency department data to look at the relationship between continuity of care with a family medicine physician (i.e., relational continuity) and the use of avoidable hospital services in Saskatchewan and Alberta. For this study, avoidable hospital services include services for conditions that are often treated by hospitals (ambulatory care sensitive conditions [ACSCs]) and emergency departments (family practice sensitive conditions [FPSCs]) but may be more appropriately managed by primary health care, where the opportunity exists to do so.

In line with the literature, increased relational continuity of care was found to decrease the use of avoidable hospital services. Key findings from this study include the following:

- Patients were treated by the same family medicine physician 60.2% of the time in Alberta and 56.2% of the time in Saskatchewan.
  - Continuity of care increased as patient age increased.
- Patients with higher continuity scores were less likely to
  - Be hospitalized for an ACSC; and
  - Visit an emergency department for an FPSC.
- Seeing a family medicine physician may be more cost-effective than using hospital resources to treat ACSCs and FPSCs.

The report reinforces the importance of improved relational continuity of care. Looking for opportunities to increase continuity of care within primary health care could improve patient–provider relationships and the identification and management of chronic illnesses, and decrease unnecessary hospital use.

Furthermore, by decreasing the use of potentially avoidable hospital services, there is the potential to be more cost-effective in the delivery of care.

# Introduction

Interactions with a family medicine physician and other front-line health care providers can be the first point of contact that people have with the health care system. How people interact with this first point of contact can impact their future use of hospital services. Past studies have shown that seeing the same family medicine physician, and developing an ongoing relationship with that physician, is an essential element of effective primary health care. Studies indicate that continuity of care helps to establish a patient–provider relationship built on effective communication and mutual understanding.<sup>1,2</sup> High levels of continuity of care have been linked to improved health outcomes,<sup>3,4</sup> reductions in emergency department use and reductions in hospitalizations.<sup>4–8</sup>

This study builds upon past studies by focusing on the relationship between continuity of care and the use of avoidable hospital services for ambulatory care sensitive conditions (ACSCs) and family practice sensitive conditions (FPSCs). It explores the relationship between increased continuity of care and the number of hospitalizations for ACSCs and emergency department visits for FPSCs.

## Methodology

The study focuses on patient interactions with certain health services in Alberta and Saskatchewan over a 6-year period, from April 1, 2007, to March 31, 2013. The study focuses on these 6 years and these 2 provinces as this reflects what patient-level physician data is currently available to CIHI. It also allows us sufficient data to measure longitudinal relationships between patients and family medicine physicians. Pilot studies using 2007 to 2009 data and 2010 to 2012 data were conducted previously. Results from the pilot studies based on 3 years of data yielded the same results as this study.

## Data Sources

3 data sources were brought together to create a data set of patient interactions with their health system. This data set included an indicator to identify hospitalizations for ACSCs and emergency department visits for FPSCs.

- Patient interactions with their family medicine physicians between April 1, 2007, and March 31, 2013, are held in the Patient-Level Physician Billing Data Repository.
- Hospitalizations for ACSCs between April 1, 2012, and March 31, 2013, were identified using the Discharge Abstract Database.
- Unscheduled emergency department visits for FPSCs between April 1, 2012, and March 31, 2013, were identified using the National Ambulatory Care Reporting System.

Additionally, the Canadian MIS Database was used to create cost estimates for ACSCs and FPSCs for the 2012–2013 fiscal year. Data sources are described in more detail in Appendix A.

## Definitions and Calculations

### Continuity of Care

Within the literature, continuity of care includes several key domains related to the interdisciplinary team approach to services provided across the care continuum:

- Information continuity: Information transfer across team members, etc.
- Management continuity: Coordination of care between different providers
- Relational continuity: Ongoing relationship between a patient and a health care provider<sup>6</sup>

This study focuses on **relational continuity** of care as it examines the relationship between patients and family medicine physicians. For the purpose of this study, relational continuity is measured using a commonly accepted measure—the Usual Provider Continuity (UPC) index.<sup>9, 10</sup> The UPC is calculated as the number of visits to the most frequently visited provider divided by the total number of visits to all providers. In this study, “provider” refers to a family medicine physician.

$$\text{UPC} = \frac{\text{Number of visits to usual family medicine physician}}{\text{Total number of visits to all family medicine physicians}}$$

A UPC index score was calculated for all persons in the billing data with at least 2 visits to a family medicine physician over the 6-year study period.

Additionally, for the purposes of the predictive analyses, the UPC index score was categorized into 3 groups. Low UPC index scores ranged from 0.0 to <0.40, moderate UPC index scores ranged from 0.40 to <0.80 and high UPC index scores ranged from 0.80 to 1.00.

Previous studies have used a variety of cut-off points to segment their data into low, moderate and high scores. In some instances, UPC index scores were categorized into 2 groupings, with scores higher than 0.75 or 0.5 being considered high.<sup>5, 7, 11</sup> In other instances, scores were categorized into 3 groupings, with scores below 0.5 representing low continuity of care and scores higher than 0.8 representing high continuity of care.<sup>6</sup>

When analyzing our data, approximately one-quarter of patients were in the low (<0.4) and high (0.8+) categories. Additionally, the average UPC index score within our data was 0.56 in Saskatchewan and 0.60 in Alberta. Thus the selected cut-offs ensured an adequate sample in all 3 categories and allowed the average UPC index score to be in the middle of the moderate category. These cut-offs are also in line with those presented in the literature.

## Ambulatory Care Sensitive Conditions

ACSCs have been defined as conditions for which hospitalizations are largely preventable when they are managed by adequate primary health care on an outpatient basis. These conditions have been well documented in the literature<sup>12, 13</sup> and include

- Grand mal status and other epileptic convulsions;
- Chronic obstructive pulmonary diseases;
- Asthma;
- Diabetes;
- Heart failure;
- Pulmonary edema;
- Hypertension; and
- Angina.

For a full list of the conditions and respective diagnosis codes using the International Statistical Classification of Diseases and Related Health Problems (ICD), please see Appendix B.

## Family Practice Sensitive Conditions

FPSCs have been defined as conditions for which visits to an emergency department are largely unnecessary, because they have less than 1% chance of resulting in an admission to a hospital and can be appropriately managed at a family medicine physician's office. The FPSC methodology was originally developed by the Health Quality Council of Alberta.<sup>14, 15</sup> For the purposes of this analysis, we followed the Alberta definition, excluding 2 codes pertaining to death. For a full list of the 165 conditions that fall under this definition and the respective diagnosis codes using the ICD, please see Appendix C.

## Defining Urban and Rural Areas

For Alberta data, urban and rural areas were derived using patients' residential postal codes. Based on Statistics Canada's methodology, postal codes within census metropolitan areas (CMAs) or census agglomerations (CAs) were coded as urban, while postal codes outside of CMAs or CAs were coded as rural.

For Saskatchewan data, patients' residential postal codes were not available. The data set includes a residence code for each patient, which is then mapped to various geographic boundaries, including an urban/rural indicator, by the data provider—the Saskatchewan Ministry of Health.



## Statistical Analysis

Descriptive and predictive analyses (i.e., logistic regression) were conducted.

Stepwise logistic regression was performed to assess the strength of the association between continuity of care and ACSC hospitalizations/FPSC emergency visits. In line with the literature, demographic and health-related variables were included as control variables in the regression models. All variables used in past studies that were available in our data set were tested in the regression model.

To help ensure our study focused on measuring the impact of the patient–provider relationship, predictive analyses were limited to persons age 18 and older. When persons younger than 18 visit a family medicine physician, they may do so with a parent or guardian who will make health care decisions on their behalf, thus making it more difficult to isolate a true patient–provider relationship between the child and the provider.

Additionally, for the purposes of the predictive analyses, the UPC index score was categorized into 3 groups. Low UPC index scores ranged from 0.0 to <0.40, moderate UPC index scores ranged from 0.40 to <0.80 and high UPC index scores ranged from 0.80 to 1.00.

## Limitations

### Data Sources

This study is based on patient-level physician billing data provided by the physician. It does not analyze continuity of care from the patient’s perspective, nor does it allow patients to identify their primary family medicine physician and/or to evaluate their patient–provider relationship. It also does not provide us with information on how the family medicine physician’s practice is organized.

Some data on patient visits to family medicine physicians where the physician was paid through an alternative payment program (e.g., salary, sessional payments) can be identified in the billing data; however, the completeness of this data is unknown. To this end, this study focused on fee-for-service patient-level physician billing data to measure relational continuity of care. Fee-for-service data accounts for 63% of clinical payments to family medicine physicians in Saskatchewan and 86% of clinical payments to all physicians<sup>i</sup> in Alberta.

This study uses data from 2 provinces, and only for a 6-year period. Results may be different in other jurisdictions, where the range and mix of health care delivery models is different.

i. Currently Alberta Health is unable to provide a breakdown to CIHI of total billings by payment mode (e.g., fee-for-service, alternative payments such as salary or sessional) by physician specialty type.<sup>33</sup>

Data on emergency department visits in Saskatchewan was available for only 5 hospitals, all of which are located in urban areas within the 2 health regions of Saskatoon and Regina. These 5 hospitals represent approximately 43% of all emergency department visits in Saskatchewan. Due to the lack of emergency department data outside of Saskatoon and Regina, the analysis on FPSCs will focus only on Alberta.

## **Measure of Continuity of Care**

Relational continuity of care is measured based on visits with a particular physician, not with a clinic or health team. This is in line with other studies, which indicate that continuity of care is not about patients receiving care in the same location but from the same provider, thus building a patient–provider relationship where patient trust and open communication can be fostered.<sup>10, 16, 17</sup>

Relational continuity of care is measured over multiple years in this study. It is possible that over this time period, physicians will have moved in and out of the provinces studied, and/or that residents could have moved from one part of the province to another, requiring them to find a new family medicine physician. In both of these instances, the UPC index score would be affected.

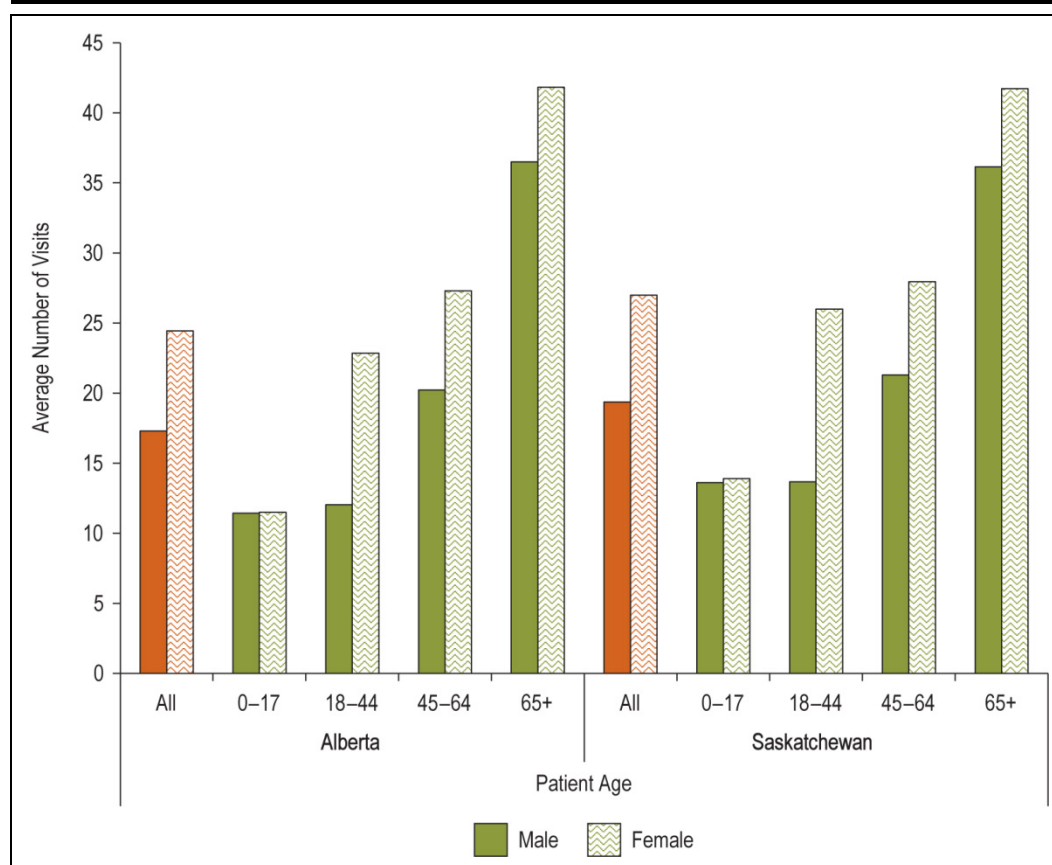
# Results

## Patients' Interactions With Their Family Medicine Physicians

Between 2007 and 2012,<sup>ii</sup> 4,128,905 residents visited a family medicine physician in Alberta. Over the same time period, 1,161,231 residents of Saskatchewan visited a family medicine physician. As illustrated in Figure 1, over the course of these 6 years, patients who visited a family medicine physician did so on average 21 times in Alberta and 23 times in Saskatchewan.

In both jurisdictions, men visited their family medicine physicians less frequently than women (17 versus 24 in Alberta and 19 versus 27 in Saskatchewan) and the average number of visits increased with age. Those age 65 and older visited their family medicine physician on average 39 times over the 6 years—about 3 times more frequently than those age 17 and younger (11 visits in Alberta and 14 visits in Saskatchewan).

**Figure 1: Average Number of Visits to Family Medicine Physicians Between 2007 and 2012 by Age, Alberta and Saskatchewan**



### Source

Patient-Level Physician Billing Data Repository, 2007 to 2012, Canadian Institute for Health Information.

ii. Throughout this analysis, references are to fiscal years. For example, 2012 refers to the period April 1, 2012, to March 31, 2013.

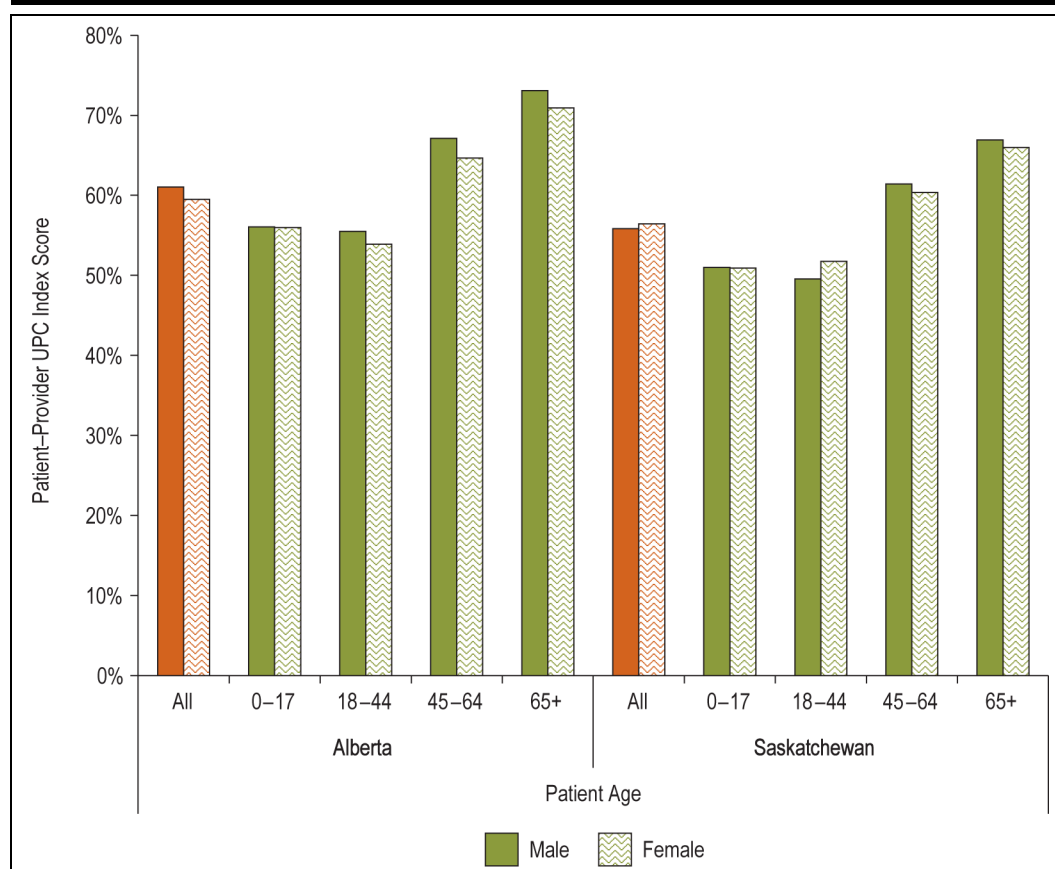
## Continuity of Care With Family Medicine Physicians

A patient–provider UPC index score was calculated for each person who visited a family medicine physician at least twice between 2007 and 2012—this represented 93.8% of patients in Alberta and 95.5% of patients in Saskatchewan.

Overall, patients were treated by the same family medicine physician 60.2% of the time in Alberta and 56.2% of the time in Saskatchewan.

Figure 2 shows that the likelihood of being treated by the same family medicine physician was nearly the same for men and women (i.e., the difference between the UPC index scores varied by 2 percentage points); however, likelihood did vary by age. While the UPC index scores were similar for patients in the 2 younger age groups (0 to 17 and 18 to 44), continuity started to increase for those age 45 and older. The UPC index scores increased by approximately 10 percentage points between patients age 18 to 44 and those age 45 to 64. Scores increased by an additional 6 percentage points for the oldest cohort, with patients age 65 and older seeing the same family medicine physician 71.9% of the time in Alberta and 66.4% of the time in Saskatchewan.

**Figure 2: Patient–Provider Continuity (UPC Index Scores) by Age, Alberta and Saskatchewan, 2007 to 2012**



**Note**

Based on all patients visiting a family medicine physician at least twice over the reference period.

**Source**

Patient-Level Physician Billing Data Repository, 2007 to 2012, Canadian Institute for Health Information.

When analyzing relational continuity of care by patient location, there is very little difference in patient–provider UPC index scores for those in urban or rural locations. In Alberta, the UPC index was 60% in both urban and rural areas,<sup>iii</sup> and in Saskatchewan the index was 57% in urban areas and 55% in rural areas.<sup>iv</sup>

As demonstrated in Figure 3, within Alberta there was also little variation by health zone, with continuity measures ranging from a low of 58% and 59% in the Central and Calgary zones, respectively, to a high of 65% in the South zone.

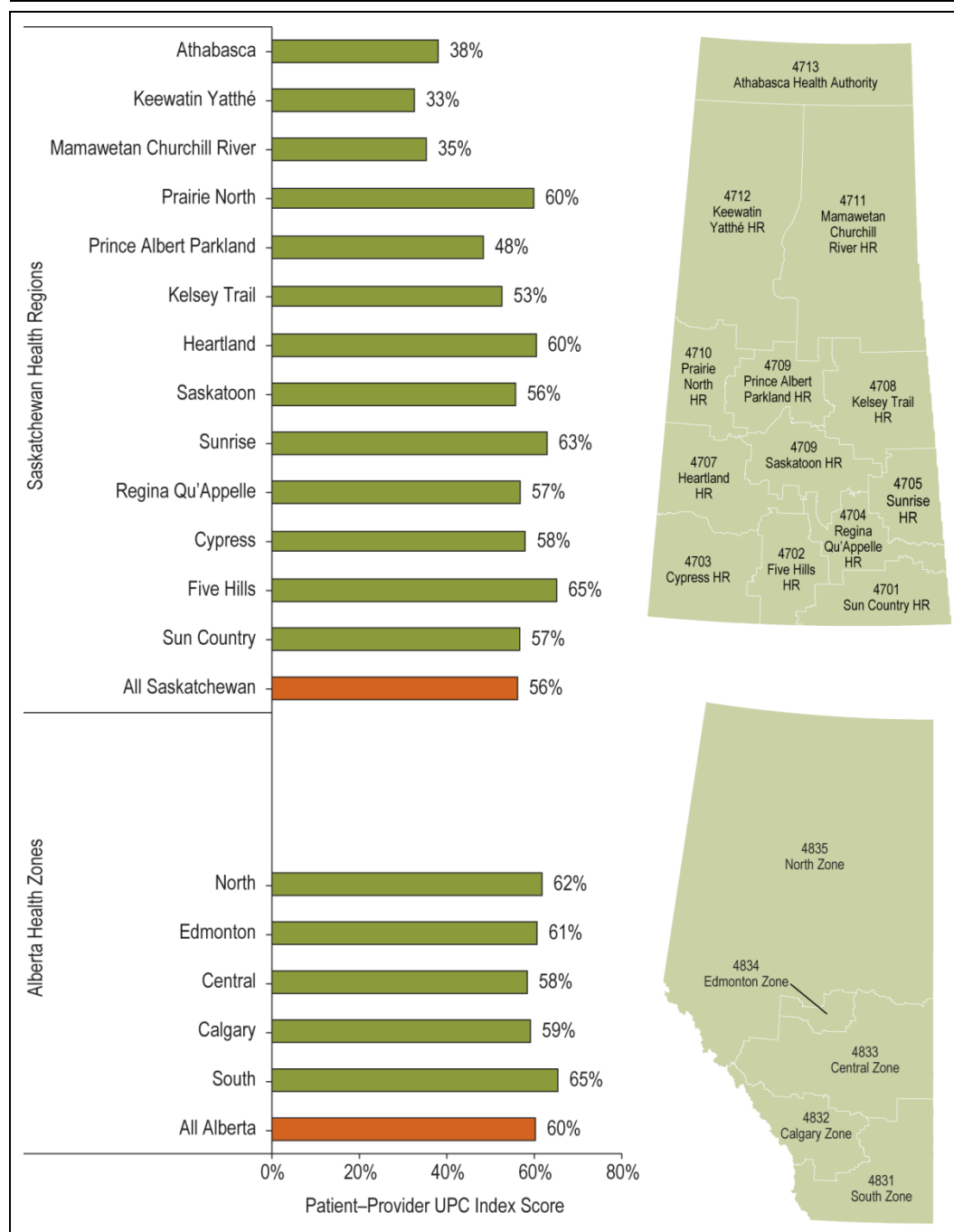
There was more variability in continuity of care between health regions in Saskatchewan, with levels being lower in the 3 most northern regions.<sup>v</sup> Continuity may be lower in the north for a few reasons. It is harder to recruit physicians to these areas, so often locum physicians (i.e., physicians who are brought into an area for a short period of time) are used to ensure patient access to a physician. Given that locum physicians are in the area for only a short time, there would naturally be more variability in the number of physicians a person would encounter for primary health care. Additionally, those who feel they do not have a “regular” family physician may be more likely to use multiple clinics or walk-in services for primary health care, which would decrease continuity of care. Based on Statistics Canada’s 2013 Canadian Community Health Survey results, residents in the 3 most northern regions of Saskatchewan were the least likely to indicate they had a regular medical doctor (58.7% in the northern regions, compared with 80.3% for Saskatchewan as a whole).<sup>18</sup>

iii. In Alberta, urban/rural was defined by assigning postal codes to statistical area classifications based on Statistics Canada’s definition.

iv. In Saskatchewan, postal codes were not available; therefore, urban/rural was defined by the Saskatchewan Ministry of Health using residence codes.

v. Lower continuity in the 3 northern regions appears to contradict findings that continuity is relatively similar in urban and rural locations. Based on 2011 Census data, only 10.6% of residents living in rural areas live within these 3 northern regions.<sup>34, 35</sup> Because these areas represent only a small proportion of rural residents in Saskatchewan, results from these areas do not have a significant impact on the overall results for rural Saskatchewan.

**Figure 3: Patient–Provider Continuity (UPC Index Scores) by Health Region, Alberta and Saskatchewan, 2007 to 2012**



**Notes**

Based on all patients visiting a family medicine physician at least twice over the reference period.  
Health regions as defined by Statistics Canada.

**Source**

Patient-Level Physician Billing Data Repository, 2007 to 2012, Canadian Institute for Health Information.

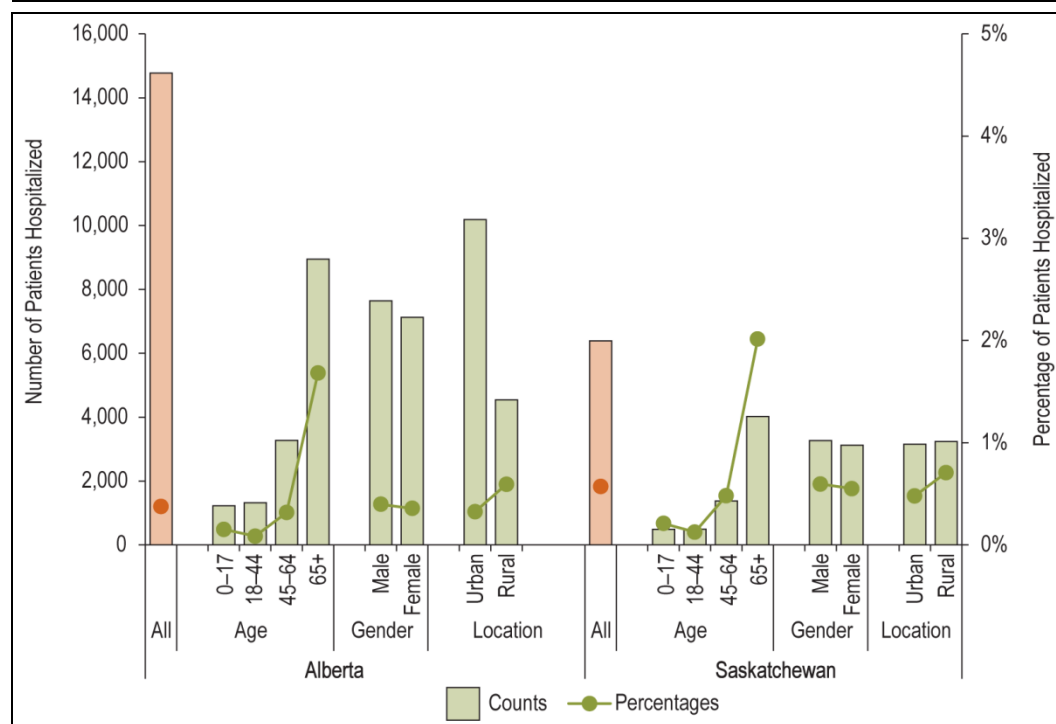
## Use of Hospital Services for ACSCs and FPSCs

### Hospitalizations for Ambulatory Care Sensitive Conditions

Of those who visited a family medicine physician between 2007 and 2011, 14,767 patients in Alberta and 6,389 patients in Saskatchewan were hospitalized with an ACSC between April 1, 2012, and March 31, 2013.<sup>vi</sup> This represents 0.4% of the patient population in Alberta and 0.6% of the patient population in Saskatchewan.

Figure 4 shows that, in both provinces, the likelihood of being hospitalized with an ACSC increased with age—approximately 2% of patients age 65 and older were hospitalized for an ACSC, compared with 0.2% of those younger than 18. Generally speaking, ACSCs are chronic conditions that are more prevalent among older populations; thus it is likely that hospitalization for these types of conditions would increase with age.<sup>19, 20</sup> The likelihood of being hospitalized with an ACSC was also slightly higher in rural areas compared with urban areas (0.6% versus 0.3% in Alberta and 0.7% versus 0.5% in Saskatchewan).

**Figure 4: Number and Percentage of Patients Hospitalized With an ACSC in Alberta and Saskatchewan in 2012, by Age, Gender and Location**



#### Notes

In Alberta, urban/rural was defined by assigning postal codes to statistical area classifications based on Statistics Canada's definition.

In Saskatchewan, postal codes were not available; therefore, urban/rural was defined by the Saskatchewan Ministry of Health using residence codes.

#### Source

Discharge Abstract Database, April 1, 2012, to March 31, 2013, Canadian Institute for Health Information.

vi. This does not represent all hospitalizations for ACSCs and emergency department visits for FPSCs. It includes only those hospitalizations/visits for people who had visited a family medicine physician over the past 5 years.

## Emergency Department Visits for Family Practice Sensitive Conditions

Of those who visited a family medicine physician between 2007 and 2011, 289,278 patients in Alberta had an unscheduled visit to an emergency department for an FPSC between April 1, 2012, and March 31, 2013. This represents 7.4% of Alberta's patient population.<sup>vii</sup>

The likelihood of having an unscheduled visit to an emergency department for an FPSC decreased with age, in contrast to the hospitalizations for ACSCs, which increased with age. The difference in emergency department usage patterns was most pronounced among the youngest patients. Overall, 17.1% of patients younger than 6 visited an emergency department, dropping to 8.8% for patients age 6 to 17. The percentage of patients visiting an emergency department for an FPSC continued to decline at a more moderate rate, to 5.5% among those age 65 and older. The range of conditions included in FPSCs is varied (examples include sunburns, respiratory infections, corns, unspecified lumps in breast, rashes, immunizations, contraceptive management, dermatitis and middle ear infections).<sup>viii</sup> Higher use of hospital services for these types of conditions may reflect a perceived lack of access to a regular family medicine physician, which is more prevalent among younger patients. According to findings from the Canadian Community Health Survey, persons age 20 to 34 were the least likely to indicate they have a regular medical doctor (71.9% compared with 84.5% for the entire Canadian population).<sup>21</sup>

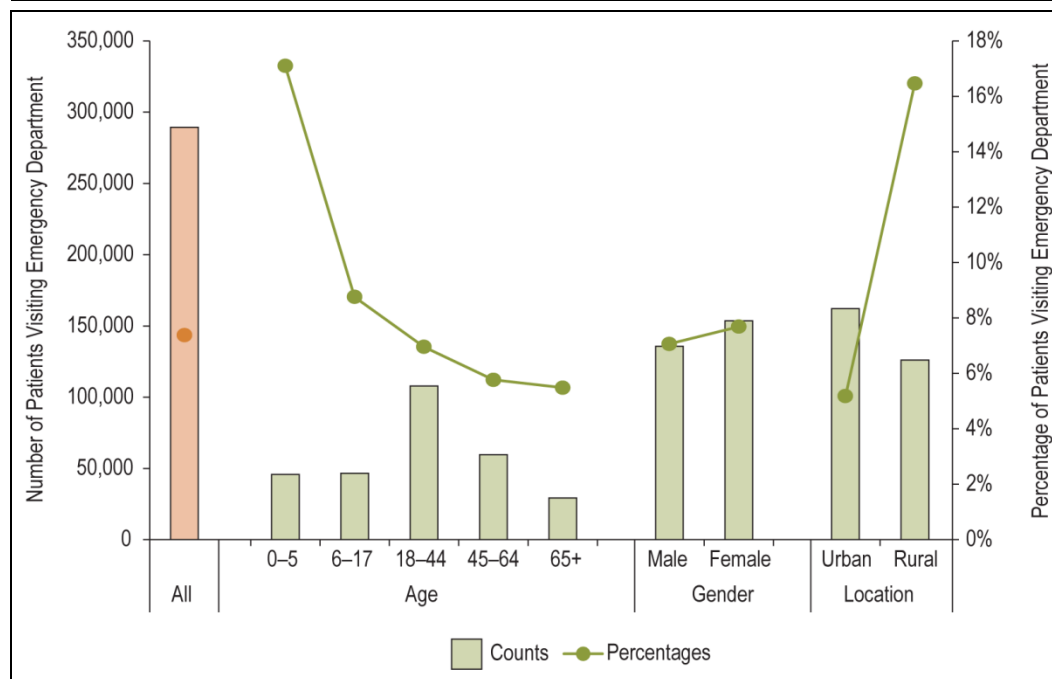
Similar to hospitalization rates for ACSCs, the likelihood of having an unscheduled visit to an emergency department for an FPSC was higher in rural areas than urban areas (16.5% versus 5.2%). It is important to consider the impact of health care delivery models in urban and rural areas when interpreting these findings. For example, challenges with access to alternative care settings may be greater in rural areas, or a broader range of services may be delivered in rural emergency departments. In some instances, rural hospitals are staffed by one's own family physician, which might lead one to view the hospital as an extension of office care.

vii. NACRS emergency department data includes only 5 hospitals in the urban regions of Saskatoon and Regina and does not include information for the rest of Saskatchewan. Consequently analysis of FPSCs in Saskatchewan was not conducted.

viii. For the full list of conditions defined as FPSCs, please refer to Appendix C.



**Figure 5: Number and Percentage of Patients Having an Unscheduled Visit to an Emergency Department for an FPSC in Alberta in 2012, by Age, Gender and Location**



**Note**

In Alberta, urban/rural was defined by assigning postal codes to statistical area classifications based on Statistics Canada's definition.

**Source**

National Ambulatory Care Reporting System, April 1, 2012, to March 31, 2013, Canadian Institute for Health Information.

## Impact of Relational Continuity of Care

One of the main premises of relational continuity of care is that seeing the same provider helps to build a relationship between the patient and provider, increasing patient trust and open communication between parties.<sup>6, 16</sup> This also leads to better illness identification and management,<sup>7, 22</sup> fewer hospitalizations for ACSCs<sup>22-24</sup> and fewer unscheduled emergency department visits for FPSCs.<sup>22, 23, 25</sup>

## Hospitalizations for Ambulatory Care Sensitive Conditions

The likelihood of being hospitalized with an ACSC was found to be dependent on many factors, including patient demographics and health status. Using logistic regression, we found that the odds of being hospitalized for an ACSC were greatest for

- Males;
- Patients age 65 and older;
- Patients living in rural areas; and
- Patients who were being treated by their family medicine physician for an ACSC.

Once these factors have been controlled for, one can isolate how health system usage impacts hospitalization. In line with other studies,<sup>22–24</sup> the results indicated that increased continuity of care with a family medicine physician decreases the odds of being hospitalized with an ACSC. Compared with those with a high UPC index score (0.8+), the odds of being hospitalized were

- 11% higher for those with a moderate UPC index score (0.4 to <0.8) in Alberta and 24% higher for those with a moderate UPC index score (0.4 to <0.8) in Saskatchewan; and
- 29% higher for those with a low UPC index score (<0.4) in Alberta and 73% higher for those with a low UPC index score (<0.4) in Saskatchewan.

**Table 1: Predictors of Hospitalizations for ACSCs—Logistic Regression Analysis**

	Alberta		Saskatchewan	
	Odds Ratio	95% Confidence Interval	Odds Ratio	95% Confidence Interval
<b>Variable of Interest</b>				
<b>UPC Index Score</b> Moderate vs. High*	1.105	1.064–1.148	1.238	1.163–1.318
<b>UPC Index Score</b> Low vs. High*	1.291	1.22–1.365	1.731	1.604–1.869
<b>Control Variables</b>				
<b>Gender</b> Male vs. Female*	1.147	1.108–1.187	1.159	1.1–1.221
<b>Age</b> 45–64 vs. 18–44*	2.4	2.243–2.569	2.333	2.094–2.598
<b>Age</b> 65+ vs. 18–44*	8.437	7.905–9.004	6.43	5.8–7.129
<b>Location</b> Rural vs. Urban*	1.607	1.548–1.668	1.193	1.132–1.258
<b>Presence of ACSC†</b> Yes vs. No*	4.853	4.635–5.082	6.202	5.708–6.739

#### Notes

\* Identifies the reference category.

† Identifies whether or not patients were being treated by their family medicine physicians for an ACSC.

p<0.001 for all variables.

In Alberta, urban/rural was defined by assigning postal codes to statistical area classifications based on Statistics Canada's definition. In Saskatchewan, postal codes were not available; therefore, urban/rural was defined by the Saskatchewan Ministry of Health using residence codes.

#### Sources

Patient-Level Physician Billing Data Repository, 2007 to 2012, and Discharge Abstract Database, April 1, 2012, to March 31, 2013, Canadian Institute for Health Information.

## Emergency Department Visits for Family Practice Sensitive Conditions

Similar to the results of the predictive analyses of hospitalization rates for ACSCs, the likelihood of having an unscheduled visit to an emergency department for an FPSC was found to be dependent on many demographic factors. Using logistic regression, we found that the odds of visiting an emergency department for an FPSC in Alberta<sup>ix</sup> were highest for females, younger patients (age 18 to 44) and those living in rural areas.

Once these factors have been controlled for, one can isolate how continuity of care impacts the use of emergency department services. The results indicated that increased continuity of care with a family medicine physician decreased the odds of visiting an emergency department for an FPSC. Compared with patients with a high UPC index score (0.8+), the odds of visiting an emergency department were

- 21% higher for those with a moderate UPC index score (0.4 to <0.8); and
- 43% higher for those with a low UPC index score (<0.4).

**Table 2: Predictors of Unscheduled Emergency Department Visits for FPSCs—Logistic Regression Analysis**

	Alberta	
	Odds Ratio	95% Confidence Interval
<b>Variable of Interest</b>		
<b>UPC Index Score</b> Moderate vs. High*	1.209	1.19–1.223
<b>UPC Index Score</b> Low vs. High*	1.428	1.41–1.448
<b>Control Variables</b>		
<b>Gender</b> Female vs. Male*	1.147	1.14–1.158
<b>Age</b> 45–64 vs. 65+*	1.123	1.11–1.139
<b>Age</b> 18–44 vs. 65+*	1.377	1.36–1.397
<b>Location</b> Rural vs. Urban*	3.965	3.93–4.004

### Notes

\* Identifies the reference category.

p≤0.001 for all variables, except UPC Index Score Moderate vs. High\*, where p = 0.0186.

In Alberta, urban/rural was defined by assigning postal codes to statistical area classifications based on Statistics Canada's definition.

### Sources

Patient-Level Physician Billing Data Repository, 2007 to 2012, and National Ambulatory Care Reporting System, April 1, 2012, to March 31, 2013, Canadian Institute for Health Information.

ix. NACRS emergency department data in Saskatchewan is incomplete and lacks regional diversity. To this end, analysis of FPSCs in Saskatchewan was not conducted.

## Impact of Using Hospital Services for Conditions That Can Be Managed by Family Medicine Physicians

Studies have shown that open communication and regular care from the same provider helps to identify chronic conditions and facilitate improved management of chronic illnesses to avoid or reduce many flare-ups that could warrant hospitalization.<sup>1, 2, 16, 19, 24</sup> Enabling and encouraging people to see the same family medicine physician, where this is possible, has the potential to reduce hospital and emergency department use and costs to the system.

There were 21,295 hospitalizations for ACSCs in Alberta and 9,278 hospitalizations for ACSCs in Saskatchewan<sup>x</sup> in 2012–2013, of which some could potentially have been avoided. Similarly, 576,703 unscheduled visits to emergency departments for FPSCs occurred in 2012–2013 in Alberta.<sup>xi</sup> Treating some of these patients in the community versus the hospital, where opportunities exist to do so, might help to decrease wait times in emergency departments.

Furthermore, there is a financial implication of treating people for ACSCs and FPSCs in hospitals. Hospital costs for ACSC admissions in 2012–2013 were estimated to be \$229,811,545 in Alberta (average of \$10,792 per stay) and \$71,469,337 in Saskatchewan (average of \$7,753 per stay). Additionally, Alberta spent an estimated \$120,593,142 on unscheduled emergency department visits for FPSCs (average of \$209 per visit) in 2012–2013.<sup>xii, 26</sup>

In many instances, ongoing management of chronic illnesses by a family physician, ideally the same one over time, may be more cost-effective than using hospital-based services to treat these conditions. For example, family medicine physicians bill their respective ministries of health \$33.20 in Saskatchewan<sup>27</sup> and \$35.91 in Alberta<sup>28</sup> for a patient visit.<sup>xiii</sup>

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x. This includes all hospitalizations for ACSCs and emergency department visits for FPSCs, not just those for persons who also visited a family physician. It also includes multiple visits for people who used hospital services for these conditions more than once.

xi. NACRS emergency department data in Saskatchewan is incomplete and lacks regional diversity. To this end, analysis of FPSCs in Saskatchewan was not conducted.

xii. Cost estimates represent the estimated average cost of services provided to the average patient. They include the costs incurred by the hospital in providing services and exclude physician fees. The estimated average cost for services provided to a hospital patient is generated by multiplying the Cost of a Standard Hospital Stay by the average Resource Intensity Weight for each patient group.

xiii. Saskatchewan price is based on fee service code 005B: Partial assessment or subsequent visit. Alberta price is based on fee service code 03.03A: Diagnostic interview and evaluation, described as limited.

## Conclusions

On average, in Alberta patients saw the same family medicine physician 60.2% of the time, while in Saskatchewan patients saw the same family medicine physician 56.2% of the time.

- As patients age, their attachment to their family medicine physician increases, with those older than 65 reporting the highest UPC index scores (71.9% in Alberta and 66.4% in Saskatchewan).
- While there was very little difference in UPC index scores by rurality (or health zone in Alberta), the northern regions of Saskatchewan had lower continuity scores. Those in northern Saskatchewan were also the least likely to indicate they had a regular doctor.

Patients' demographic characteristics, as well as their health status, are predictors of hospitalization for ACSCs. The odds of being hospitalized with an ACSC were higher for males, for older patients, among rural patients and among patients with pre-existing chronic illnesses. Controlling for demographics and health status, however, continuity of care was a predictor of hospitalization for ACSCs, with the odds of hospitalization decreasing as continuity of care increased. Compared with those with a high UPC index score, the odds of being hospitalized were

- 11% higher for those with a moderate UPC index score in Alberta and 24% higher for those with a moderate UPC index score in Saskatchewan; and
- 29% higher for those with a low UPC index score in Alberta and 73% higher for those with a low UPC index score in Saskatchewan.

Patient demographic characteristics are also predictors of unscheduled emergency department visits for FPSCs. The odds of visiting an emergency department for an FPSC were higher for females, for younger patients and among rural patients. Controlling for demographic factors, continuity of care was a predictor of emergency department visits for FPSCs, with the odds of visiting an emergency department decreasing as continuity of care increased. Compared with patients with a high UPC index score, the odds of visiting an emergency department were

- 21% higher for those with a moderate UPC index score; and
- 43% higher for those with a low UPC index score.

In line with other studies,<sup>3, 5–7, 19, 24, 25</sup> findings indicate that increasing relational continuity of care has the potential to reduce hospital and emergency department services. Findings from this analysis also indicate that providing care for patients with ACSCs and FPSCs through a continuous relationship with a family medicine physician whom the patient sees regularly may be more cost-effective.

## Considerations for the Future

Many factors combine to affect the health of individuals. This study focused on one aspect of primary health care, relational continuity of care, and used fee-for-service billing data to measure relational continuity. Findings from this study suggest that an established relationship with a family medicine physician is good for one's health as it allows many conditions to be diagnosed early and managed effectively,<sup>3, 4</sup> thus reducing the use of avoidable hospital services.<sup>4-8</sup>

Continuity of care and access to care are 2 important considerations for family medicine physicians, other primary health care providers and policy-makers to enable improvements to relational continuity.

Currently, the Saskatchewan and Alberta governments are making concerted efforts to improve access to primary health care by implementing a range of primary health care delivery models. The premise of these multi-provider delivery models is to provide coordinated care from interprofessional health care teams, helping to ensure comprehensive care and improved access to care.<sup>29, 30</sup> As programs are put in place to increase access to care, it is also important to consider the role continuity of care plays in providing comprehensive, high-quality care. Studies have shown that patients are more apt to develop a sense of continuity of care and reap the related rewards (e.g., increased satisfaction, disease detection and management) with an individual physician.<sup>4, 31</sup>

Future studies investigating the impact of continuity of care between other primary health care providers and delivery models would provide additional insight into the use of health care resources and improved outcomes for patients.

# Appendix A: Data Sources

## Description of Data Sources

### Patient-Level Physician Billing Data National Repository

Physician billing data provides information on payments to physicians through the provincial and territorial medical care plans and their service utilization. The National Physician Database (NPDB) contains physician-level aggregate data from 1989–1990 onward. Currently, CIHI is working with jurisdictions to collect physician billing data at the claims (or patient) level. At this time, as part of a pilot project, CIHI has obtained patient-level physician billing data for Alberta and Saskatchewan for the period April 1, 2007, to March 31, 2013. This includes both fee-for-service billing data and some shadow billings, which represent services provided by physicians who are paid by alternative payment plans (e.g., salary, capitation). Data quality checks indicate that some shadow billing is likely missing, the extent of which is unknown. CIHI is working with other jurisdictions to receive patient-level claims data.

### Discharge Abstract Database

Originally developed in 1963, the Discharge Abstract Database (DAD) captures administrative, clinical and demographic information on hospital discharges (including deaths, sign-outs and transfers). Some provinces and territories also use the DAD to capture day surgery. Data is received directly from acute care facilities, their respective health/regional authority or their ministry/department of health. Facilities in all provinces and territories except Quebec are required to report. Data from Quebec is submitted to CIHI directly by the ministère de la Santé et des Services sociaux du Québec. This data is appended to the DAD, resulting in the Hospital Morbidity Database.

### National Ambulatory Care Reporting System

The National Ambulatory Care Reporting System (NACRS) contains data for hospital-based and community-based ambulatory care, including day surgery, outpatient clinics and emergency departments. Client visit data is collected at time of service in participating facilities. CIHI receives data directly from participating facilities or from regional health authorities or ministries of health. CIHI estimates that NACRS contains 100% of emergency department visits in Alberta and 43% of emergency department visits in Saskatchewan for the 2012–2013 fiscal year.

### Canadian MIS Database

The Canadian MIS Database (CMDDB) contains financial and operational information on public hospitals and regional health authorities across Canada, from 1995–1996 onward. Most provinces and territories submit data through their respective ministries of health; this information forms the basis of management reporting, including annual general purpose financial statements, financial ratio analysis and operational budgeting. Day-to-day health service operations data is collected according to a standardized framework known as the *Standards for Management Information Systems in Canadian Health Service Organizations* (MIS Standards).

## Appendix B: Defining Ambulatory Care Sensitive Conditions

ACSCs are defined as any most responsible diagnosis (MRDx) of<sup>32</sup>

- Grand mal status and other epileptic convulsions  
ICD-9/9-CM: 345  
ICD-10-CA: G40, G41
- Chronic obstructive pulmonary diseases (COPD)  
Any MRDx code of  
ICD-9/9-CM: 491, 492, 494, 496  
ICD-10-CA: J41, J42, J43, J44, J47  
MRDx of acute lower respiratory infection, only when  
a secondary diagnosis of J44 in ICD-10-CA or 496 in  
ICD-9/9-CM is also present  
ICD-9/9-CM: 466, 480–486, 487.0  
ICD-10-CA: J10.0, J11.0, J12–J16, J18, J20, J21, J22
- Asthma  
ICD-9/9-CM: 493  
ICD-10-CA: J45
- Diabetes  
ICD-9: 250.0, 250.1, 250.2, 250.7  
ICD-9-CM: 250.0, 250.1, 250.2, 250.8  
ICD-10-CA: E10.0^^, E10.1^^, E10.63, E10.64, E10.9^^  
E11.0^^, E11.1^^, E11.63, E11.64, E11.9^^  
E13.0^^, E13.1^^, E13.63, E13.64, E13.9^^  
E14.0^^, E14.1^^, E14.63, E14.64, E14.9^^
- Heart failure and pulmonary edema  
ICD-9/9-CM: 428, 518.4  
ICD-10-CA: I50, J81  
Excluding cases with cardiac procedures.
- Hypertension  
ICD-9/9-CM: 401.0, 401.9, 402.0, 402.1, 402.9  
ICD-10-CA: I10.0, I10.1, I11  
Excluding cases with cardiac procedures.
- Angina  
ICD-9: 411, 413  
ICD-9-CM: 411.1, 411.8, 413  
ICD-10-CA: I20, I23.82, I24.0, I24.8, I24.9  
Excluding cases with cardiac procedures.



The list of cardiac procedure codes for exclusion is as follows:

- CCP: 47^^, 480^–483^, 489.1, 489.9, 492^–495^, 497^, 498^  
ICD-9-CM: 336, 35^^, 36^^, 373^, 375^, 377^, 378^, 379.4–379.8  
CCI: 1HA58, 1HA80, 1HA87, 1HB53, 1HB54, 1HB55, 1HB87, 1HD53, 1HD54, 1HD55, 1HH59, 1HH71, 1HJ76, 1HJ82, 1HM57, 1HM78, 1HM80, 1HN71, 1HN80, 1HN87, 1HP76, 1HP78, 1HP80, 1HP82, 1HP83, 1HP87, 1HR71, 1HR80, 1HR84, 1HR87, 1HS80, 1HS90, 1HT80, 1HT89, 1HT90, 1HU80, 1HU90, 1HV80, 1HV90, 1HW78, 1HW79, 1HX71, 1HX78, 1HX79, 1HX80, 1HX83, 1HX86, 1HX87, 1HY85, 1HZ53 rubric (except 1HZ53LAKP), 1HZ55 rubric (except 1HZ55LAKP), 1HZ56, 1HZ57, 1HZ59, 1HZ80, 1HZ85, 1HZ87, 1IF83, 1IJ50, 1IJ55, 1IJ57, 1IJ76, 1IJ86, 1IJ80, 1IK57, 1IK80, 1IK87, 1IN84, 1LA84, 1LC84, 1LD84, 1YY54LANJ

Exclusion criteria include

- Death before discharge; and
- Admission category recorded as newborn, stillbirth or cadaveric donor.

## Appendix C: Defining Family Practice Sensitive Conditions

FPSCs are defined as any MRDx of the following conditions, assuming they meet the following inclusion and exclusion criteria.

Inclusion criteria include

- Unscheduled emergency department visits between April 1, 2012, and March 31, 2013, for both Alberta and Saskatchewan;
- NACRS Submission Level 3 facilities and Saskatchewan facilities that were Level 1 or Level 3 submitting facilities but reported diagnosis codes to NACRS;
- Emergency department visits that met inclusion criteria 1 and 2, which resulted in the patient being discharged home; and
- Emergency department visits that met inclusion criteria 1 to 3 and had an FPSC as the main diagnosis. The FPSCs are listed below.

Exclusion criteria include

- Scheduled emergency department visits;
- Patients who died or were not discharged home; and
- Duplicate records (duplicates were identified using the defined methodology outlined in the NACRS manual).

List of most responsible diagnoses

- A07 Other protozoal intestinal diseases
- A56 Other sexually transmitted chlamydial diseases
- A59 Trichomoniasis
- A63 Other predominantly sexually transmitted diseases, not elsewhere classified
- A64 Unspecified sexually transmitted disease
- A74 Other diseases caused by chlamydiae
- B06 Rubella [German measles]
- B07 Viral warts
- B08 Other viral infections characterized by skin and mucous membrane lesions, not elsewhere classified
- B09 Unspecified viral infection characterized by skin and mucous membrane lesions
- B30 Viral conjunctivitis
- B35 Dermatophytosis
- B36 Other superficial mycoses
- B37 Candidiasis

- B65 Schistosomiasis [bilharziasis]
- B80 Enterobiasis
- B82 Unspecified intestinal parasitism
- B83 Other helminthiasis
- B85 Pediculosis and phthiriasis
- B86 Scabies
- C44 Other malignant neoplasms of skin
- D04 Carcinoma in situ of skin
- D16 Benign neoplasm of bone and articular cartilage
- D17 Benign lipomatous neoplasm
- D22 Melanocytic naevi
- D23 Other benign neoplasms of skin
- D24 Benign neoplasm of breast
- D29 Benign neoplasm of male genital organs
- D36 Benign neoplasm of other and unspecified sites
- E07 Other disorders of thyroid
- E29 Testicular dysfunction
- E53 Deficiency of other B group vitamins
- E61 Deficiency of other nutrient elements
- E78 Disorders of lipoprotein metabolism and other lipidaemias
- F40 Phobic anxiety disorders
- G43 Migraine
- G56 Mononeuropathies of upper limb
- H00 Hordeolum and chalazion
- H01 Other inflammation of eyelid
- H04 Disorders of lacrimal system
- H10 Conjunctivitis
- H11 Other disorders of conjunctiva
- H15 Disorders of sclera
- H18 Other disorders of cornea
- H43 Disorders of vitreous body
- H57 Other disorders of eye and adnexa
- H60 Otitis externa
- H61 Other disorders of external ear
- H65 Nonsuppurative otitis media

- H66 Suppurative and unspecified otitis media
- H68 Eustachian salpingitis and obstruction
- H69 Other disorders of Eustachian tube
- H72 Perforation of tympanic membrane
- H73 Other disorders of tympanic membrane
- H74 Other disorders of middle ear and mastoid
- H91 Other hearing loss
- H92 Otolgia and effusion of ear
- H93 Other disorders of ear, not elsewhere classified
- I78 Diseases of capillaries
- J00 Acute nasopharyngitis [common cold]
- J01 Acute sinusitis
- J02 Acute pharyngitis
- J06 Acute upper respiratory infections of multiple and unspecified sites
- J30 Vasomotor and allergic rhinitis
- J31 Chronic rhinitis, nasopharyngitis and pharyngitis
- J32 Chronic sinusitis
- J34 Other disorders of nose and nasal sinuses
- K00 Disorders of tooth development and eruption
- K01 Embedded and impacted teeth
- K02 Dental caries
- K04 Diseases of pulp and periapical tissues
- K05 Gingivitis and periodontal diseases
- K07 Dentofacial anomalies [malocclusion]
- K08 Other disorders of teeth and support structures
- K13 Other diseases of lip and oral mucosa
- L01 Impetigo
- L20 Atopic dermatitis
- L21 Seborrhoeic dermatitis
- L22 Diaper [napkin] dermatitis
- L23 Allergic contact dermatitis
- L24 Irritant contact dermatitis
- L25 Unspecified contact dermatitis
- L28 Lichen simplex chronicus and prurigo
- L29 Pruritus

- L30 Other dermatitis
- L42 Pityriasis rosea
- L43 Lichen planus
- L50 Urticaria
- L55 Sunburn
- L57 Skin changes due to chronic exposure to nonionizing radiation
- L60 Nail disorders
- L63 Alopecia areata
- L65 Other nonscarring hair loss
- L70 Acne
- L71 Rosacea
- L72 Follicular cysts of skin and subcutaneous tissue
- L73 Other follicular disorders
- L74 Eccrine sweat disorders
- L81 Other disorders of pigmentation
- L82 Seborrheic keratosis
- L84 Corns and callosities
- L85 Other epidermal thickening
- L90 Atrophic disorders of skin
- L91 Hypertrophic disorders of skin
- L92 Granulomatous disorders of skin and subcutaneous tissue
- M18 Arthrosis of first carpometacarpal joint
- M20 Acquired deformities of fingers and toes
- M22 Disorders of patella
- M53 Other dorsopathies NEC
- M67 Other disorders of synovium and tendon
- M70 Soft tissue disorders related to use, overuse and pressure
- M75 Shoulder lesions
- M76 Enthesopathies low limb excluding foot
- M77 Other enthesopathies
- M85 Other disorders of bone density and structure
- M92 Other juvenile osteochondrosis
- M94 Other disorders of cartilage
- N34 Urethritis and urethral syndrome
- N60 Benign mammary dysplasia

- N62 Hypertrophy of breast
- N63 Unspecified lump in breast
- N64 Other disorders of breast
- N72 Inflammatory disease of cervix uteri
- N89 Other noninflammatory disorders of vagina
- N91 Absent, scanty and rare menstruation
- N94 Pain and other conditions associated with female genital organs and menstrual cycle
- N97 Female infertility
- O92 Other disorders of breast and disorders of lactation associated with pregnancy and the puerperium
- P37 Other congenital infectious and parasitic diseases
- P78 Other perinatal digestive system disorders
- Q10 Congenital malformations of eyelid, lacrimal apparatus and orbit
- Q66 Congenital deformities of feet
- R05 Cough
- R21 Rash and other nonspecific skin eruption
- R30 Pain associated with micturition
- R36 Urethral discharge
- R71 Abnormality of red blood cells
- Z00 General examination and investigation of persons without complaint and reported diagnosis
- Z02 Examination and encounter for administrative purposes
- Z09 Follow-up examination after treatment for conditions other than malignant neoplasms
- Z11 Special screening examination for infectious and parasitic diseases
- Z12 Special screening examination for neoplasms
- Z13 Special screening examination for other diseases and disorders
- Z20 Contact with and exposure to communicable diseases
- Z23 Need for immunization against single bacterial diseases
- Z24 Need for immunization against certain viral diseases
- Z25 Need for immunization against other viral diseases
- Z26 Need for immunization against other infectious diseases
- Z27 Need for immunization against combinations of infectious diseases
- Z29 Need for other prophylactic measures
- Z30 Contraceptive management
- Z31 Procreative management
- Z32 Pregnancy examination and test

- Z41 Procedures for purposes other than remedying health state
- Z45 Adjustment and management of implanted device
- Z46 Fitting and adjustment of other devices
- Z47 Other orthopaedic follow-up care
- Z48 Other surgical follow-up care
- Z51 Other medical care
- Z53 Persons encountering health services for specific procedures, not carried out
- Z56 Problems related to employment and unemployment
- Z64 Problems related to certain psychosocial circumstances
- Z70 Counseling related to sexual attitude, behavior and orientation
- Z76 Persons encountering health services in other circumstances
- Z92 Personal history of medical treatment

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