



Profiling Acute Inpatient Care for Sparsely Populated Areas in Western Canada



Canadian Institute
for Health Information

Institut canadien
d'information sur la santé



Who We Are

Established in 1994, CIHI is an independent, not-for-profit corporation that provides essential information on Canada's health system and the health of Canadians. Funded by federal, provincial and territorial governments, we are guided by a Board of Directors made up of health leaders across the country.

Our Vision

To help improve Canada's health system and the well-being of Canadians by being a leading source of unbiased, credible and comparable information that will enable health leaders to make better-informed decisions.

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It should be noted that the analyses and conclusions in this report do not necessarily reflect the opinions of the advisory group or their affiliated organizations.

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Sparsely Populated Initiative

The Canadian Institute for Health Information (CIHI) has considerable experience with the challenges of providing information about the services that are offered in sparsely populated areas. In these areas, numbers are small and health regions may not have the level of analytical resources found in highly populated areas. To help support this client group, the Western office has been working with representatives from sparsely populated areas to

- Better understand their data and information requirements;
- Get advice on priorities for analysis;
- Receive feedback on selected draft analyses;
- Advise CIHI on dissemination strategies; and
- Act as a sounding board for CIHI.

Although the initiative is Western Canadian in context, it is hoped that this work will contribute to a pan-Canadian approach for supporting the information and data needs of decision-makers who are involved in health policy and effective delivery of health services in sparsely populated areas.

Executive Summary

- In Western Canada, one-quarter of the population lives in sparsely populated areas, distributed over an area covering 93% of the land mass.
- Of the 2,376,292 residents of sparsely populated areas in Western Canada, 8.5% experienced one or more hospitalizations during 2009–2010.
- Nearly one in five hospitalizations (19%) were for frequent users (three or more hospitalizations during the year), while 60% of hospitalizations were for patients who experienced a single hospitalization.
- Three out of four patients in sparsely populated areas lived within 30 minutes of a hospital, and 95% lived within a one-hour drive of the closest hospital.
- The vast majority of hospitals in sparsely populated areas were smaller community hospitals (86%), and 97% of closest hospitals were located within the boundaries of patients' health authorities.
- Only 57% of hospitalizations occurred in the hospital closest to the patient's home.
- Most hospitalizations (68%) occurred exclusively within a patient's health authority, while about one-quarter (27%) of hospitalizations occurred exclusively outside of a patient's health authority.
- Hospitalizations involving transfers between hospitals within and outside of a patient's health authority were relatively infrequent (only 5% of all hospitalizations).
- When patients travelled outside their health authority for acute inpatient care, 62% of hospitalizations were in teaching hospitals (which were not available in sparsely populated regions).
- The five larger community hospitals in sparsely populated health authorities (2% of hospitals in these areas) accounted for 42% of hospitalizations within sparsely populated health authorities.
- Pregnancy and childbirth were the most common reasons for being hospitalized, both within and outside of the patient's health authority (18% and 17%, respectively).
- Relative to external hospitalizations, hospitalizations occurring exclusively within a patient's health authority were more likely to involve the respiratory system and mental diseases and disorders.
- Relative to internal hospitalizations, hospitalizations occurring exclusively outside of a patient's health authority were more likely to involve disorders of the musculoskeletal system and connective tissue, significant trauma, injury, poisoning and toxic effects of drugs.

Background

This report aims to

- Introduce the populations and health authorities located in sparsely populated areas in Western Canada; and
- Describe the hospital utilization patterns of populations in sparsely populated areas in Western Canada and the contribution of hospitals within sparsely populated health authorities to the provision of this care.

A substantial portion of the population lives in rural and northern areas of Western Canada (British Columbia, Alberta, Saskatchewan, Manitoba, the Yukon, the Northwest Territories and Nunavut). The Western office of the Canadian Institute for Health Information (CIHI) established the Sparsely Populated Regions Advisory Group to better understand the requirements of, and to develop analysis relevant to, health authorities located in sparsely populated areas in Western Canada.

The advisory group includes senior/executive representatives from sparsely populated areas located in Western Canada and two health service researchers with experience working with sparsely populated areas. CIHI is represented by the Vice President, Western Canada and Developmental Initiatives; the Manager, Client Affairs for Manitoba and Nunavut; and the Manager, Research and Analysis for the Western office.

The purposes of the Sparsely Populated Regions Advisory Group are to

- Focus on understanding how sparsely populated areas use information to inform decision-making and determine where further information or analysis is needed;
- Advise CIHI's Western office on priorities for analysis (while the focus will be primarily on Western Canada, including the territories, the approach will have pan-Canadian applicability);
- Provide feedback on selected draft analyses prepared by CIHI's Western office to ensure the content is applicable to sparsely populated areas;
- Advise CIHI's Western office on dissemination strategies for sparsely populated areas and other jurisdictions or forums (possibly including presentations by advisory group members); and
- Act as a sounding board for CIHI's program areas regarding data collection, analysis and knowledge transfer to sparsely populated areas.

This report is the outcome of collaboration between CIHI and the Sparsely Populated Regions Advisory Group to answer questions about how populations in sparsely populated areas make use of acute inpatient care and about the contribution of hospitals within sparsely populated health authorities to the provision of this care. Acute inpatient care is a key component of the continuum of health services in Canada. It provides necessary treatment for a disease or severe episode of illness for a short period of time, with the goal of discharging patients as soon as they are deemed healthy and stable. More so than in highly populated areas, health authorities in sparsely populated areas are primarily meant to serve the populations within their boundaries. To facilitate planning, a full understanding of inpatient care in these areas requires attention to hospital utilization by the population as a whole, both within and outside of the area.

Sparsely Populated Areas

To define sparsely populated areas, we began with Statistics Canada's definition of health regions:

Health Regions are defined by Provincial/Territorial governments as the geographical areas of responsibility for regional health boards (i.e. legislated) or as regions of interest to health care authorities.ⁱ

The provincial/territorial governments organize the delivery of acute inpatient care in a variety of ways, causing differences among health regions.

- In British Columbia, six health authorities are responsible for delivering health care (five geographic health authorities and one with responsibility for province-wide programs). The five geographic health authorities are composed of health service delivery areas (HSDAs). Statistics Canada's health regions are defined by the HSDAs, which are governed at the health authority level.
- Health services in Alberta are delivered by Alberta Health Services (AHS). AHS is the provincial health authority responsible for overseeing the planning and delivery of health supports and services to Albertans. Working in partnership with Alberta Health and Wellness, the AHS Board governs all health services in the province across five health zones. Currently, Statistics Canada's health regions are defined by the now-extinct regional health authority boundaries in Alberta.
- In Saskatchewan and Manitoba, health services are delivered through regional health authorities, which are defined by Statistics Canada as health regions.
- The Yukon's health care services are delivered through the Department of Health and Social Services. The Yukon is defined by Statistics Canada as a single health region; this definition was used in this report to define the sparsely populated health region.
- In the Northwest Territories, health services are delivered through eight health and social services authorities (HSSAs): seven geographic HSSAs and one referral hospital. The Northwest Territories is defined by Statistics Canada as a single health region.
- In Nunavut, the Department of Health and Social Services is responsible for health services and social programming. Nunavut's health services are decentralized on a regional basis. Nunavut is defined by Statistics Canada as a single health region.

i. Statistics Canada, *Health Indicators* (Ottawa, Ont.: Statistics Canada, 2011).

Members of the Sparsely Populated Regions Advisory Group were consulted when adapting Statistics Canada's health region boundaries to define sparsely populated areas for the purposes of this report. Sparsely populated areas are geographically defined administrative areas primarily meant to serve the populations within their boundaries. Furthermore, sparsely populated areas do not contain a census metropolitan area, as defined by Statistics Canada. Areas containing a census metropolitan area are referred to as highly populated areas.

For the most part, sparsely populated areas in Western Canada parallel the health region boundaries defined by Statistics Canada. However, there are a few exceptions:

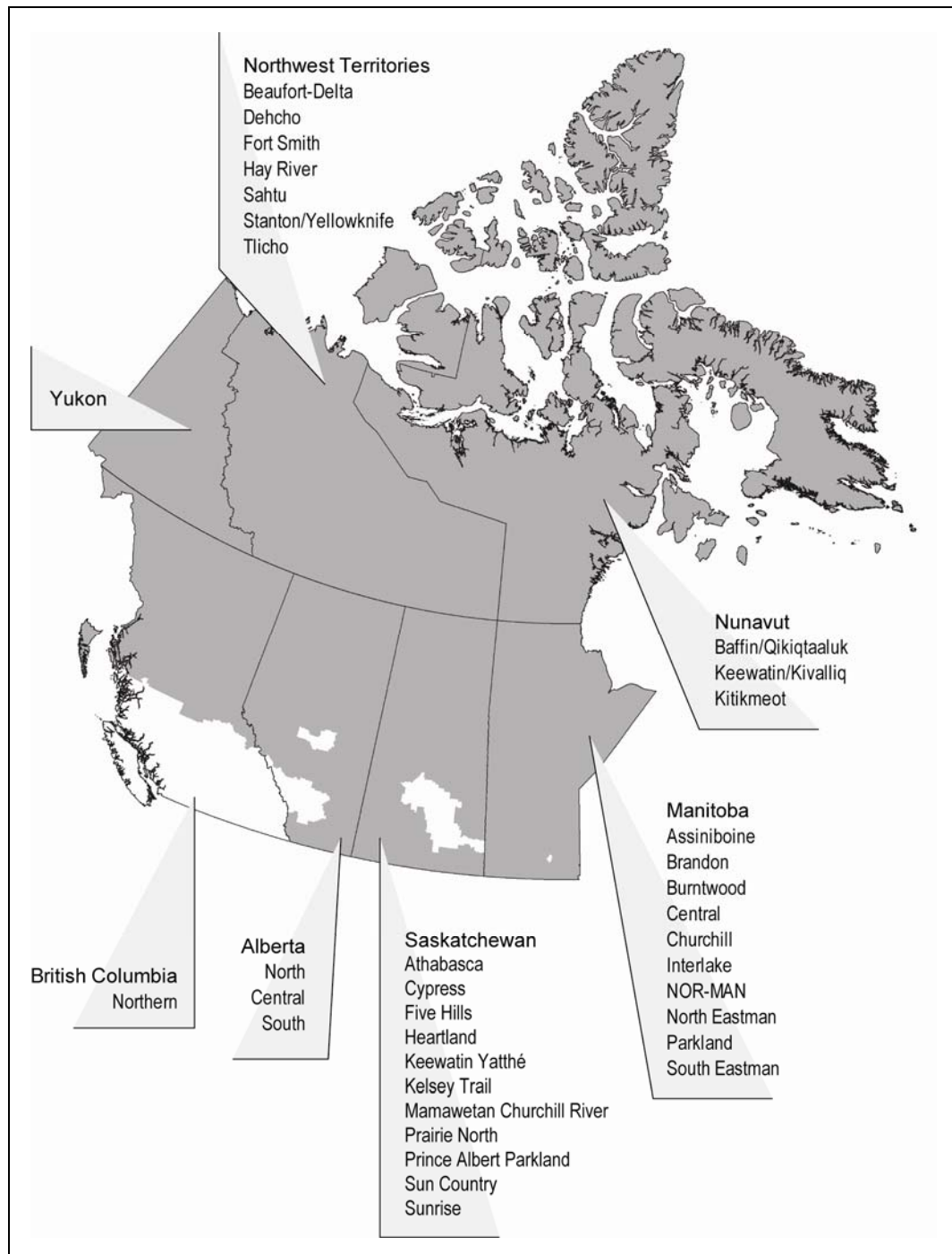
- The five geographical health authorities are used to define sparsely populated areas in British Columbia.ⁱⁱ
- The five health zones are used to define sparsely populated areas in Alberta.
- The seven geographical HSSAs are used to define sparsely populated areas in the Northwest Territories.ⁱⁱⁱ
- The three regions of Nunavut are used to define its sparsely populated areas.

There are 36 sparsely populated areas in Western Canada (Figure 1). One-quarter (25%) of the population lives in sparsely populated areas, distributed over an area covering 93% of the land mass in Western Canada.

ii. The Provincial Health Services Authority is responsible for province-wide programs and is not associated with a geographical area in which people reside.

iii. Stanton HSSA is a referral hospital, not a geographical area.

Figure 1: Sparsely Populated Areas in Western Canada



Note

The sparsely populated areas are shaded.

Source

Canadian Institute for Health Information.

Population Size and Density

Total population and population density (population per square kilometre) for sparsely populated areas in Western Canada are presented in Figure 2. Information on highly populated areas is presented as well for context. The 36 sparsely populated areas generally had smaller, lower-density populations than the highly populated areas in Western Canada.

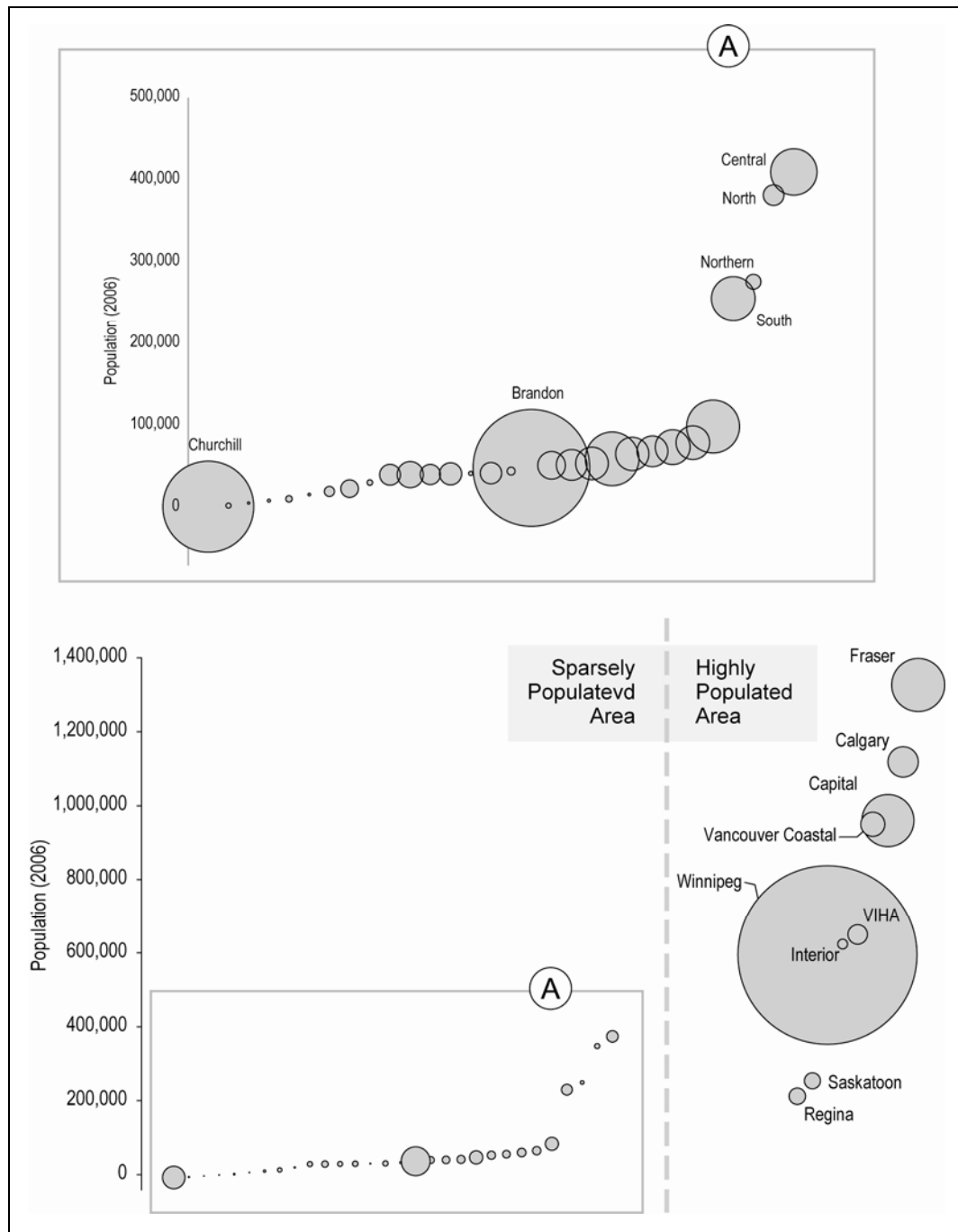
A closer look at sparsely populated areas in Western Canada is also presented in Figure 2. Two groups of regions appear to deviate from the general pattern of small, low-density populations:

- In Manitoba, Churchill and Brandon were outliers on population density (among sparsely populated areas). This is due to the extremely small land area of these two regions. The populations of these regions are much smaller than the population of even the smallest of the highly populated areas (Regina, Saskatchewan) (the population of Churchill is less than 1% that of Regina and the population of Brandon is 20% that of Regina).
- Sparsely populated areas in B.C. and Alberta were larger than most sparsely populated areas. Furthermore, population densities for Central Zone and South Zone in Alberta were comparable to that of the least-dense highly populated area (Interior, B.C.).

How to Interpret This Figure

In this figure, the circles represent individual areas. The centre of the circle represents the total population size (along the y-axis). The size of the circle depicts population density (population per square kilometre), with larger circles depicting higher-density populations. For example, Winnipeg, Manitoba, had a population of 646,541 and the highest population density in Western Canada (1,088 people per square kilometre). The labels identify highly populated areas for comparison.

Figure 2: Population Density as a Function of Population Size, Western Canada



Notes

VIHA: Vancouver Island Health Authority.

Due to restrictions on available population data, the Northwest Territories is presented as a single region in this figure.

Labels identify highly populated areas.

Source

Statistics Canada, 2006 Census of Population.

Availability of Acute Inpatient Care

The number and category (based on volume) of hospitals available within sparsely populated health authorities were used to gauge availability of acute inpatient care for populations living in these areas. Hospitals were assigned to one of four standard peer groups.^{iv} Teaching hospitals are those with full membership in the Association of Canadian Academic Healthcare Organizations (ACAHO). Non-teaching hospitals were allocated to larger, medium or smaller community hospital peer groups based on their volumes, using inpatient cases, total weighted cases and inpatient days.

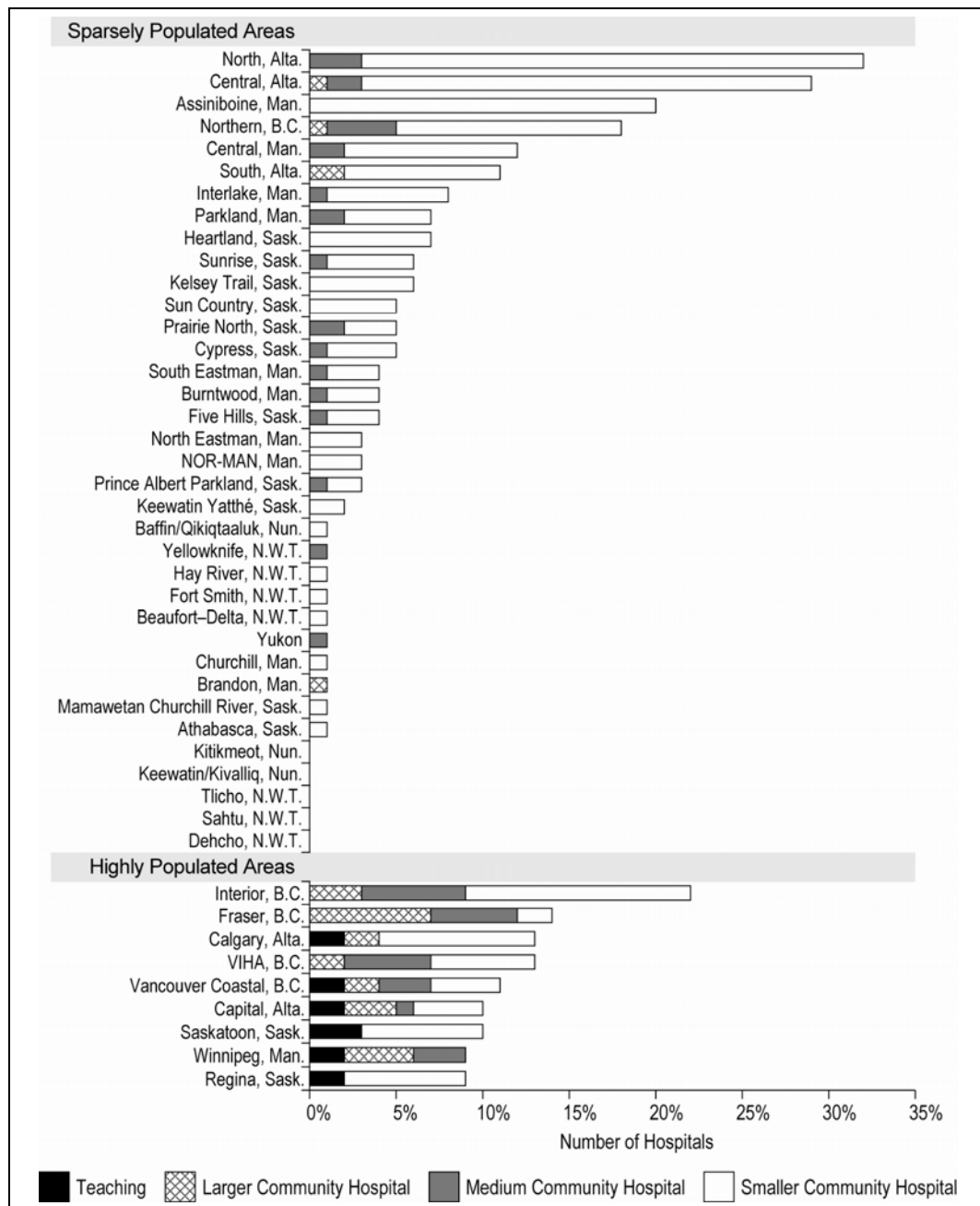
The distribution of acute care hospitals by standard peer group in health authorities across Western Canada is presented in Figure 3. As expected, the availability of acute inpatient care in sparsely populated areas differs considerably from that in highly populated areas.

- The vast majority of hospitals in sparsely populated areas were smaller community hospitals (175 of 204, or 86%), accounting for 77% of all smaller community hospitals in Western Canada.
- Only five hospitals (2%) in sparsely populated areas were larger community hospitals. No teaching hospitals were located in these areas.^v
- In highly populated areas, 36 hospitals (32%) were teaching or larger community hospitals, accounting for all teaching hospitals and 82% of larger community hospitals in Western Canada.
- Five sparsely populated areas did not contain a hospital: Dehcho, Sahtu and Tlicho in the Northwest Territories and Keewatin/Kivalliq and Kitikmeot in Nunavut.
- Sparsely populated areas in B.C. and Alberta had a relatively large number of hospitals. This was consistent with their relatively large population size.
- Assiniboine, Manitoba, had 20 smaller community hospitals. This was 2.5 to 7 times higher than the number of facilities in other sparsely populated areas with a similar population size and density (Interlake, Manitoba, and Prairie North and Prince Albert Parkland, Saskatchewan).

iv. The peer groups used were those defined in the Canadian Hospital Reporting Project. See the appendix for more information.

v. Though Prince George General Hospital in Northern Health Authority, B.C., is a larger community hospital, it is associated with the University of British Columbia's medical program.

Figure 3: Number of Hospitals, by Standard Peer Group, by Health Region, Western Canada



Note

VIHA: Vancouver Island Health Authority.

Source

Discharge Abstract Database, 2009–2010, and Organization Index Institution File, Canadian Institute for Health Information; Postal Code Conversion File (PCCF+), Statistics Canada.

How to Interpret This Figure

The bars in the figure present the number of hospitals in each peer group for a given health authority. For example, Interlake, Manitoba, had one medium and seven smaller community hospitals. Highly populated health regions are presented for comparison.

Proximity to Acute Inpatient Care

Travel time by car (at posted speed limits) to the closest available hospital was used to gauge proximity of acute inpatient care for populations living in sparsely populated areas.^{vi} While geographic access is not always sufficient for people to get the care they need, it is an essential prerequisite for care.

Figure 4 presents the percentage of people in sparsely populated areas that lived within various travel times by car (at posted speed limits) to inpatient acute care, as well as those who lived in areas which were unable to be mapped.

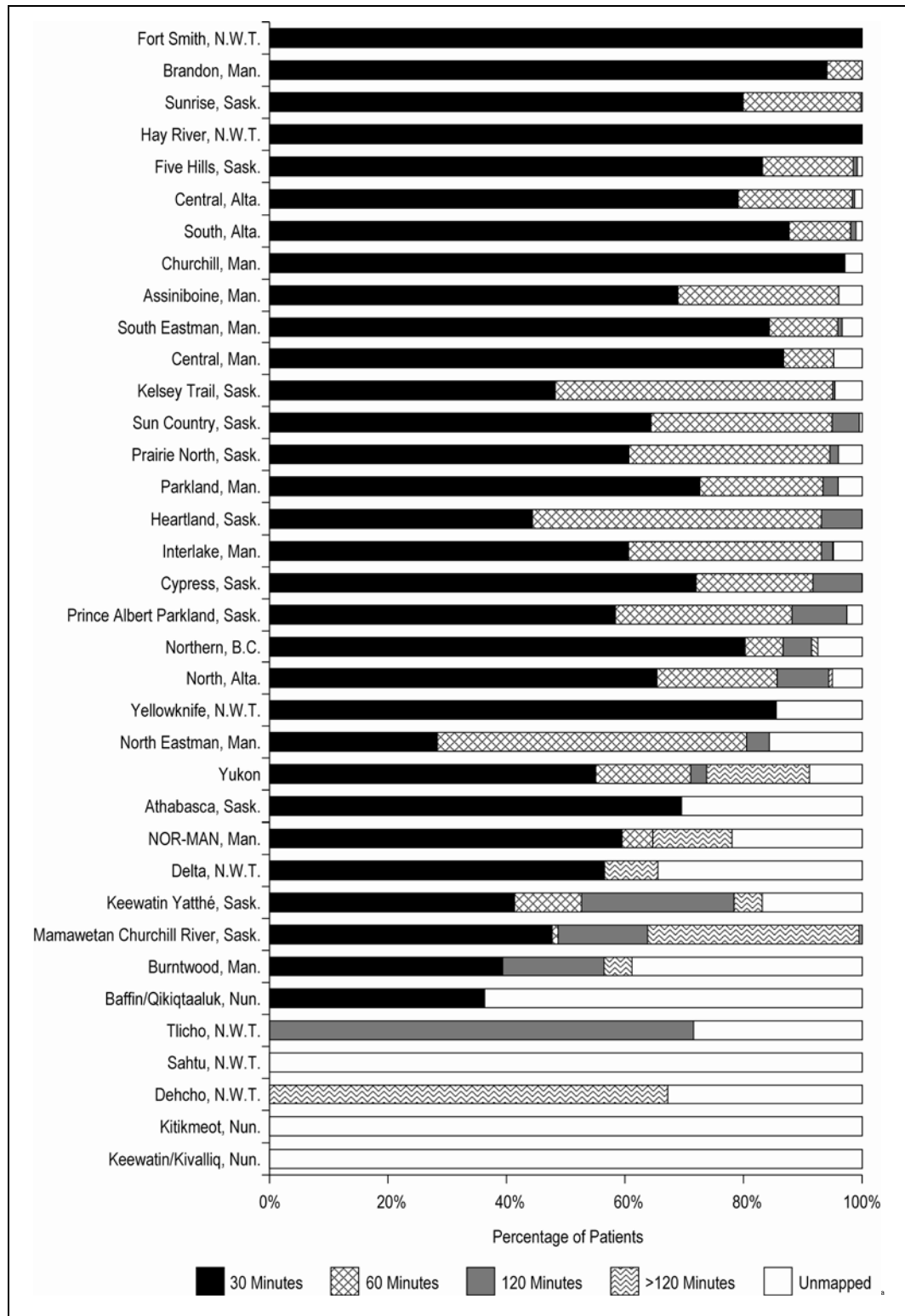
- Among patients who could be mapped, three out of four patients in sparsely populated areas (75%) lived within 30 minutes of a hospital, and 95% lived within a one-hour drive of the closest hospital.
- Almost all (97%) of closest hospitals were within patients' health authorities.
- Overall, 6% of hospitalizations were unable to be mapped. These unmapped areas were primarily located in Nunavut, the Northwest Territories and the northern areas of Saskatchewan and Manitoba.

How to Interpret This Figure

The bars in the figure show the percentage of the total population in each sparsely populated area within a given drive time to the closest hospital. For example, all patients from Fort Smith, Northwest Territories, were within 30 minutes of the closest hospital, whereas 67% of patients in Dehcho, Northwest Territories, were more than 120 minutes from the closest available hospital (the rest were unable to be mapped).

vi. The results presented are estimated travel times and do not necessarily reflect actual travel times, which may vary based on traffic volume, individual driving behaviour and weather conditions, among other potential factors.

Figure 4: Proximity to Closest Hospital for Patients From Sparsely Populated Areas, Western Canada



Source

Discharge Abstract Database, 2009–2010, and Organization Index Institution File, Canadian Institute for Health Information; Postal Code Conversion File (PCCF+), Statistics Canada; ArcGIS 10, ESRI.

Hospital Utilization of Populations Living in Sparsely Populated Areas

Health care organizations throughout the Western world continually strive to improve the quality and efficiency of hospital services. Hospital utilization data is a valuable tool in assisting health service planners and policy-makers to organize and plan services as a means to improve care. Administrative data can be used to examine demographic trends in health service utilization, as well as the volume and length of stay related to certain diseases, conditions and interventions. The timely and efficient movement of patients into, through and out of the acute care system is necessary to balance demand with capacity.

This report profiles a population's use of acute inpatient care. It does not include outpatient, day surgery or emergency department hospital services.

Descriptive statistics were derived by determining a patient's area of residence and identifying the area in which the hospitals he or she used were located.

Key Terms

- *Hospitalization*: The terms “episode” and “hospitalization” are used interchangeably throughout this report. These terms refer to distinct interactions with acute inpatient care in Canada. Transfers between acute hospitals were considered part of a single episode. Looking at hospitalizations allows us to characterize how patients in sparsely populated regions interacted with the acute care system.
- *Patient*: Individual patients may have had more than one hospitalization in the year. Linking hospitalizations across patients allows us to characterize who used acute care services in sparsely populated regions.^{vii}

In 2009–2010, of the 2,376,292 residents of sparsely populated regions in Western Canada, 202,950 (8.5%) experienced one or more hospitalizations. These patients experienced a total of 269,207 hospitalizations.

vii. Hospitalizations for patients are used to depict hospital utilization for geographic populations, so all discharges attributed to a given patient needed to have the same area of residence to be included in the analysis. Overall, very few patients (less than 1%) were excluded for having discharges with more than one region of residence during the fiscal year, reflecting the low mobility of this population. According to the 2006 census, 92% of people living in sparsely populated regions in Western Canada lived at the same address or in the same census subdivision one year previously.

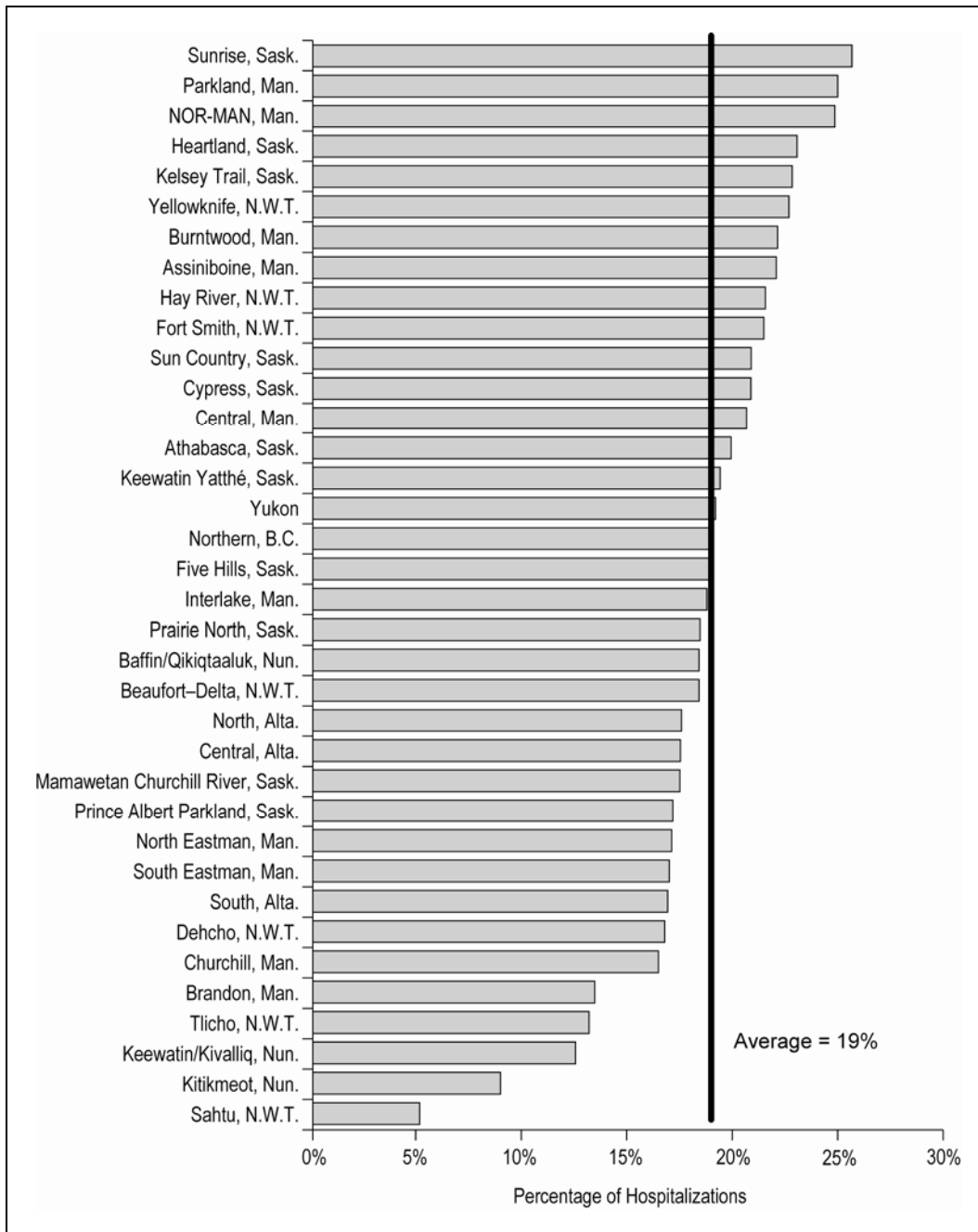
Frequency of Acute Inpatient Service Use

Exploring the hospital utilization patterns of those who lived in sparsely populated areas may help highlight the use and availability (or lack thereof) of inpatient care. Furthermore, identifying frequent users of inpatient services may help raise questions about gaps in the system and opportunities for preventive efforts or the need to develop alternatives to hospitalization. Frequent users are defined as individuals with at least three inpatient hospitalizations.

The percentage of hospitalizations from a given area attributable to patients who visited the hospital three or more times over the study year is presented in Figure 5.

- Overall, 60% of hospitalizations were for patients who experienced a single hospitalization, while 19% were for patients who experienced three or more hospitalizations.
- The percentage of hospitalizations attributable to patients who had three or more hospitalizations ranged fivefold across sparsely populated areas, from 5% in Sahtu, Northwest Territories, to 26% in Sunrise, Saskatchewan.

Figure 5: Percentage of Hospitalizations for Frequent Users From Sparsely Populated Areas, Western Canada



Source

Discharge Abstract Database, 2009–2010, and Organization Index Institution File, Canadian Institute for Health Information; Postal Code Conversion File (PCCF+), Statistics Canada.

How to Interpret This Figure

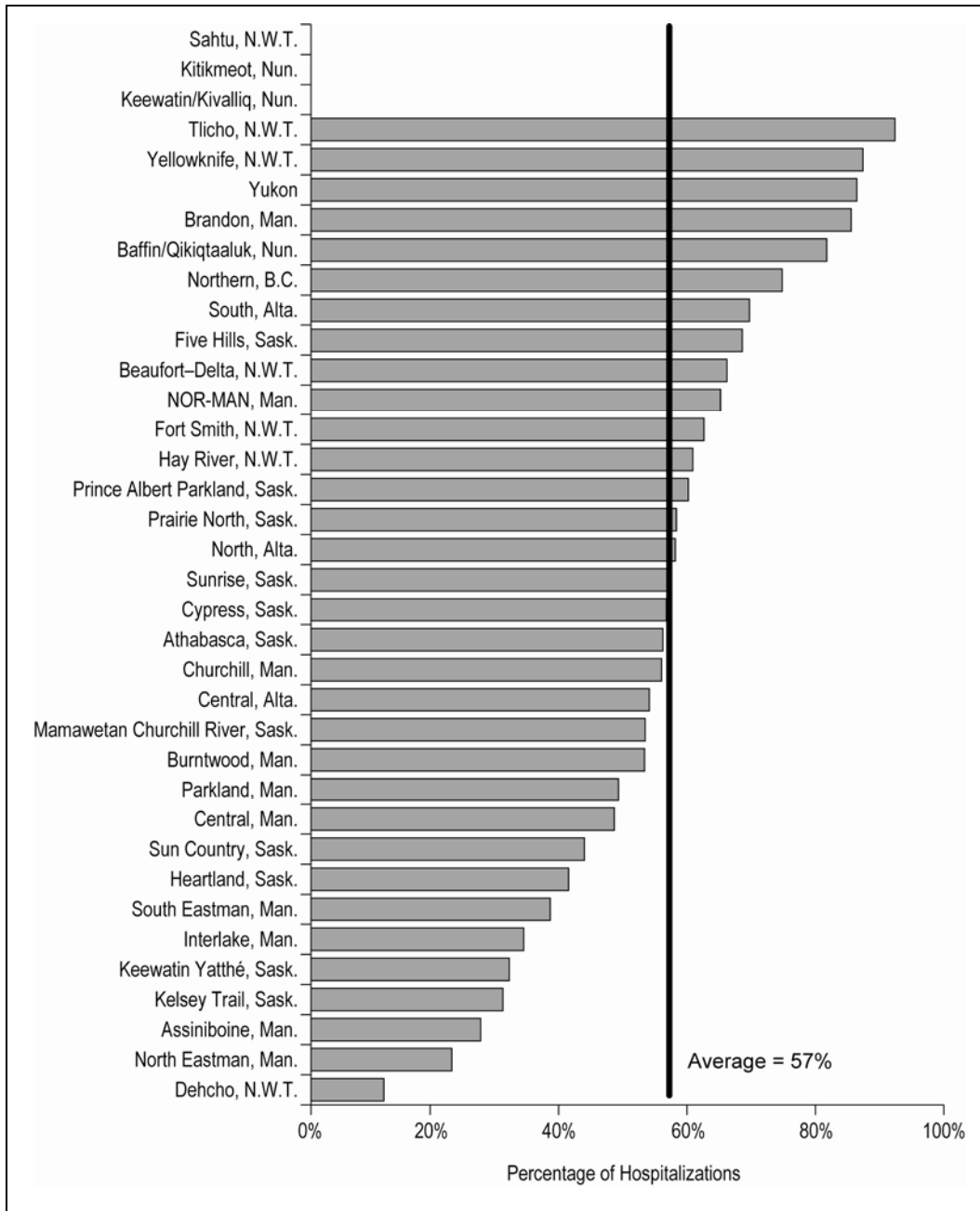
The bars in this figure represent the percentage of hospitalizations from a given area that was accounted for by frequent users during 2009–2010. The solid line depicts the overall average for comparison

Location of Acute Inpatient Use

This section describes the contribution of hospitals within sparsely populated health authorities to the overall hospital utilization patterns of populations living within their boundaries.

Earlier, we showed that 75% of patients in sparsely populated areas lived within 30 minutes of a hospital and that 95% lived within an hour of the closest hospital. However, examining the actual hospital visited, we see that only 57% of hospitalizations used the closest available hospital (see Figure 6).

Figure 6: Percentage of Hospitalizations Using Closest Hospital



Source

Discharge Abstract Database, 2009–2010, and Organization Index Institution File, Canadian Institute for Health Information; Postal Code Conversion File (PCCF+), Statistics Canada; ArcGIS 10, ESRI.

How to Interpret This Figure

The bars in this figure show the percentage of hospitalizations from a given area that occurred in the closest available hospital during 2009–2010. The solid line depicts the overall average for comparison. Hospitalizations for patients from Sahtu, Northwest Territories, and Kitikmeot and Keewatin/Kivalliq, Nunavut, could not be mapped using a road network (see Figure 4).

Given that only 3% of closest hospitals are external to the boundary of patients' health authorities, the discrepancy between proximity (Figure 4) and use (Figure 6) leads to the question, Where do populations from sparsely populated areas go? More specifically, if patients are not using the closest hospital, are they travelling to another hospital within their health authority or to hospitals external to their health authority? To determine the contribution of hospitals within sparsely populated health authorities to the care received by patients within their boundaries, it is important to recognize that hospitalizations can occur within a patient's area of residence and/or require travel to another region.

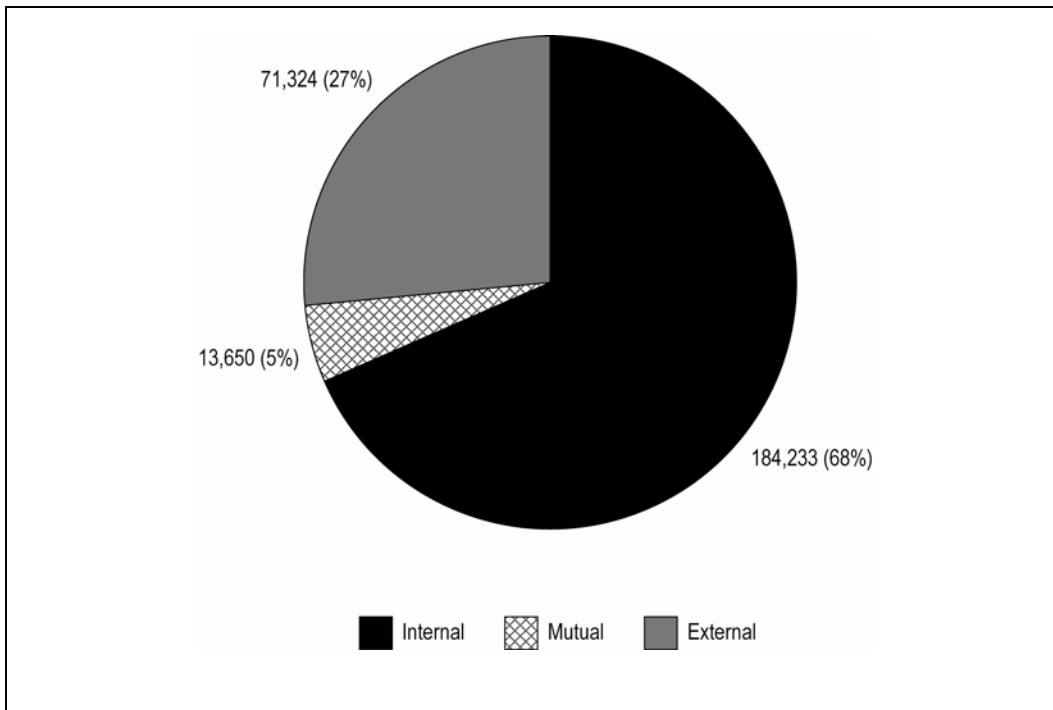
Key Terms

- *Internal episodes*: Hospitalizations that occur exclusively within a patient's health authority.
- *External episodes*: Hospitalizations that occur exclusively outside of a patient's health authority.
- *Mutual episodes*: Hospitalizations that involve transfers between hospitals within and outside of a patient's health authority.

Figure 7 presents the percentage of hospitalizations that involved hospitals in various locations.

- Most hospitalizations (68%) occurred exclusively within a patient’s health authority, and sparsely populated health authorities were involved in 73% of hospitalizations experienced by patients living within their boundaries (internal and mutual).
- About one-quarter (27%) of hospitalizations occurred exclusively outside of a patient’s health authority.

Figure 7: Number and Percentage of Hospitalizations in Various Locations



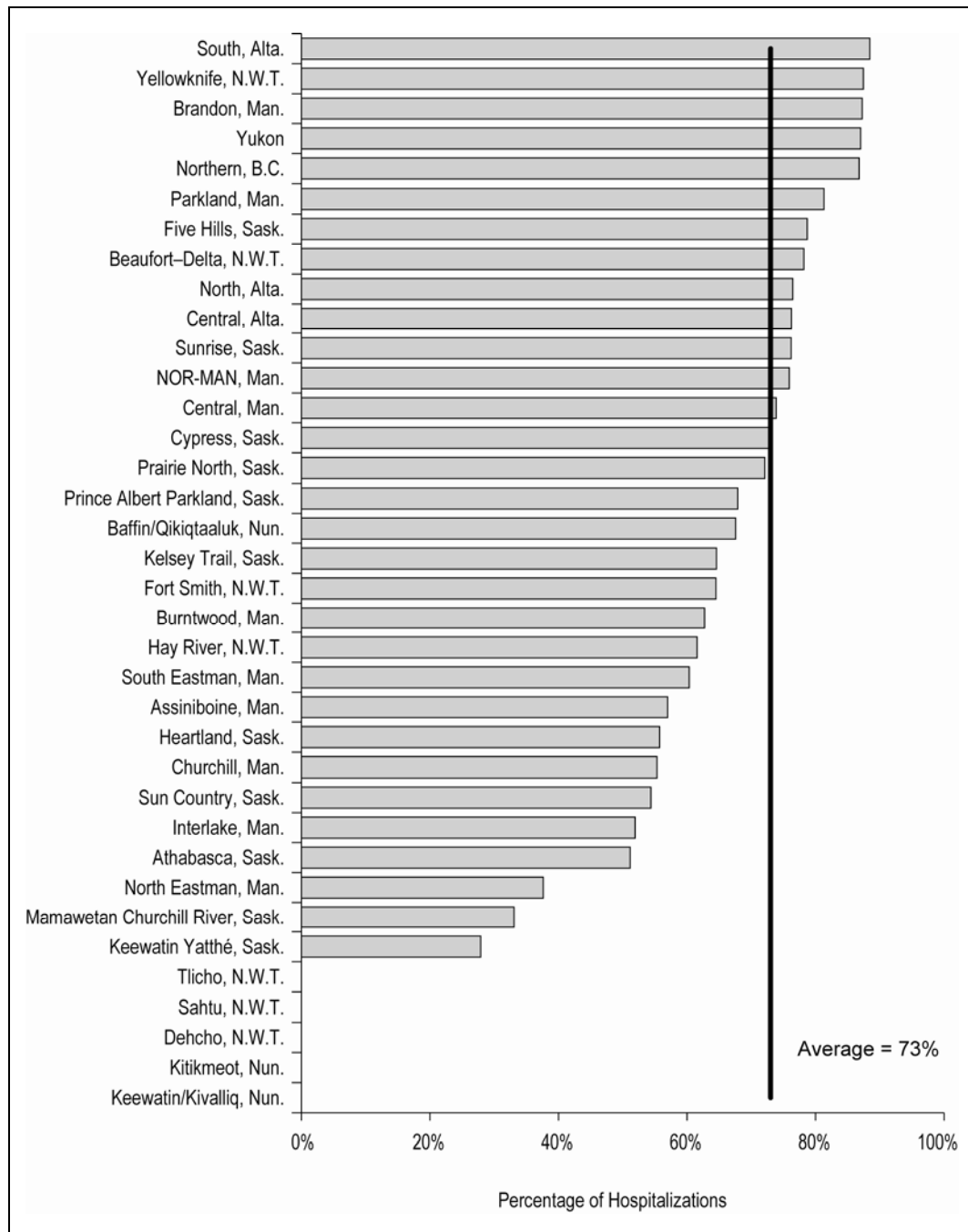
Source

Discharge Abstract Database, 2009–2010, and Organization Index Institution File, Canadian Institute for Health Information; Postal Code Conversion File (PCCF+), Statistics Canada.

Figure 8 presents the contribution of sparsely populated health authorities to the provision of acute inpatient care to patients living within their boundaries (internal and mutual episodes).

- Among areas that had hospitals, the contribution of sparsely populated health authorities to the provision of acute inpatient care to patients living within their boundaries ranged from 28% in Keewatin Yatthé, Saskatchewan, to 88% in South Zone, Alberta.

Figure 8: Percentage of Hospitalizations Involving Patients' Own Health Authority



Source

Discharge Abstract Database, 2009–2010, and Organization Index Institution File, Canadian Institute for Health Information; Postal Code Conversion File (PCCF+), Statistics Canada.

How to Interpret This Figure

The bars in this figure represent the percentage of hospitalizations from a given area that involved visiting a hospital within the patient's sparsely populated health authority during 2009–2010. The solid line depicts the overall average for comparison. Five sparsely populated areas did not contain a hospital: Dehcho, Sahtu and Tlicho in the Northwest Territories and Keewatin/Kivalliq and Kitikmeot in Nunavut (see Figure 3).

What Kind of Hospitals Do Patients Use?

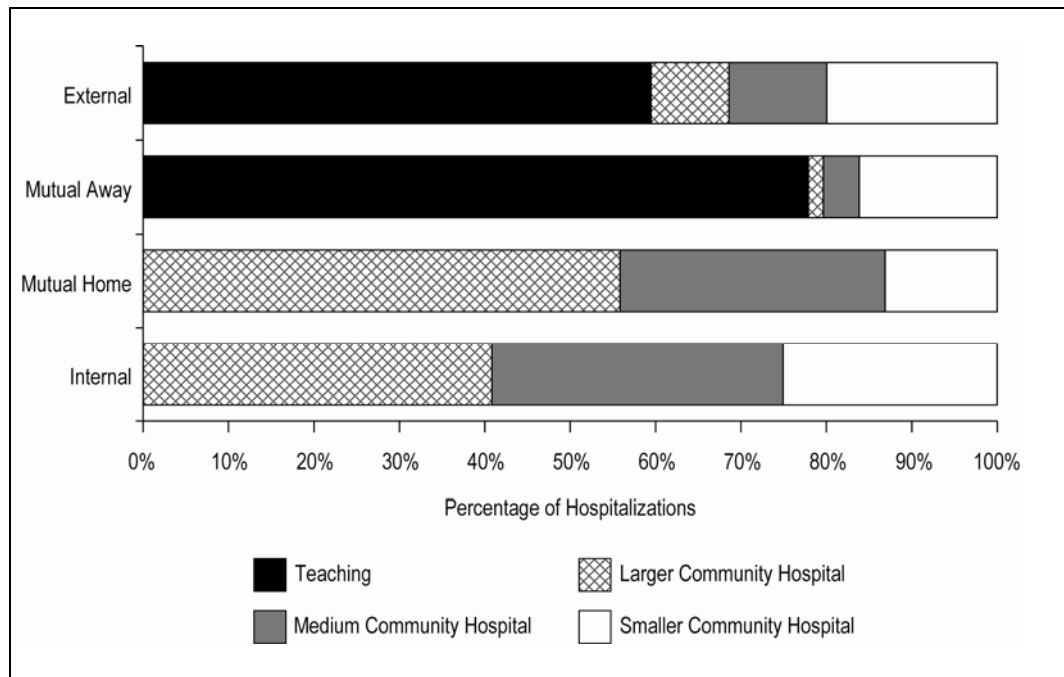
Hospitals were assigned to one of four standard peer groups. Teaching hospitals are those with full membership in ACAHO. Non-teaching hospitals were allocated to the larger, medium or smaller community hospital peer groups based on their volumes, using inpatient cases, total weighted cases and inpatient days.

Using standard peer groups to categorize hospitals, Figure 3 showed that the availability of acute inpatient care differed considerably between sparsely populated and highly populated areas in Western Canada. Furthermore, nearly a third of hospitalizations among residents of sparsely populated areas (32%, external and mutual) made use of acute inpatient care provided outside their health authorities.

Figure 9 presents the distribution of hospital use by peer group for hospitalizations involving various locations.

- When patients travelled outside their health authority for acute inpatient care (external and mutual away), 62% of hospitalizations were in teaching hospitals (which were not available in sparsely populated regions).
- Though there were only five larger community hospitals in sparsely populated health authorities (2% of hospitals in these areas), they accounted for 42% of hospitalizations within sparsely populated health authorities.

Figure 9: Percentage of Hospitalizations in Various Locations, by Peer Group



Source

Discharge Abstract Database, 2009–2010, and Organization Index Institution File, Canadian Institute for Health Information; Postal Code Conversion File (PCCF+), Statistics Canada.

How to Interpret This Figure

Mutual hospitalizations are separated in this figure to distinguish between the contributions of hospitals within sparsely populated health authorities (home) versus those of hospitals outside sparsely populated health authorities (away). This depicts the contribution of hospitals within sparsely populated health authorities to the care received by patients within their boundaries (internal and mutual home) and the care received by patients external to their boundaries (external and mutual away).

Why Do Patients Use Hospitals?

This section contains analyses by major clinical category (MCC). MCC is a national classification system developed by CIHI that identifies either a body system (for example, the respiratory system) or other specific types of clinical problems (such as mental disorders and burns). Assignment to an MCC is generally determined by a patient's most responsible diagnosis during the hospitalization.

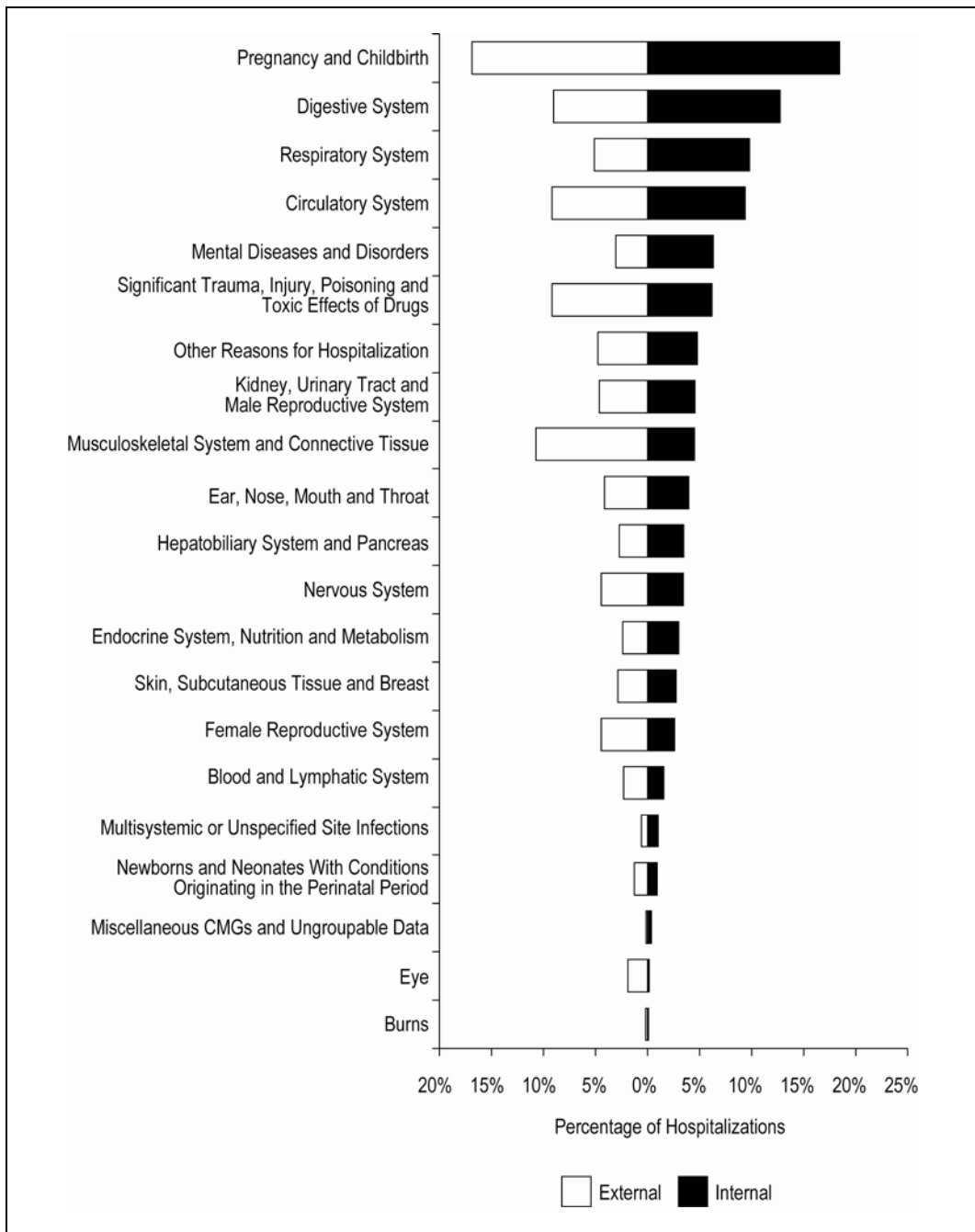
Hospitalizations were grouped according to MCCs. This allowed us to identify the clinical issue determined to have been responsible for the greatest portion of the patient's length of stay.^{viii} Because case mix variables are derived from discharges rather than episodes, analyses were restricted to patients who had either no transfers (internal and external) or up to two transfers (mutual, separated into home and away). Analyses of the reasons for hospitalization are presented for the three hospitalization types, followed by a presentation of the relative contribution of the various hospitalization types to each MCC.

Though larger community hospitals accounted for only 2% of hospitals in sparsely populated areas, these five hospitals provided care for 42% of hospitalizations. A large minority of patients was never hospitalized within their area of residence. These patients tended to use hospitals with a range of services not available in sparsely populated regions (teaching or larger community hospitals). Figure 10 compares the MCCs for hospitalizations occurring exclusively within patients' health authorities with those occurring exclusively outside patients' health authorities.

- The MCC Pregnancy and Childbirth was the most common reason for being hospitalized, both internally and externally (18% and 17%, respectively).
- Relative to external hospitalizations, hospitalizations occurring exclusively within a patient's health authority were more likely to involve the MCCs Respiratory System and Mental Diseases and Disorders.
- Relative to internal hospitalizations, hospitalizations occurring exclusively outside of a patient's health authority were more likely to involve two MCCs: Musculoskeletal System and Connective Tissue; and Significant Trauma, Injury, Poisoning and Toxic Effects of Drugs.

viii. See CIHI's website at www.cihi.ca for a full description of the CMG+ methodology.

Figure 10: Major Clinical Categories for Internal and External Hospitalizations



Source

Discharge Abstract Database, 2009–2010, and Organization Index Institution File, Canadian Institute for Health Information; Postal Code Conversion File (PCCF+), Statistics Canada.

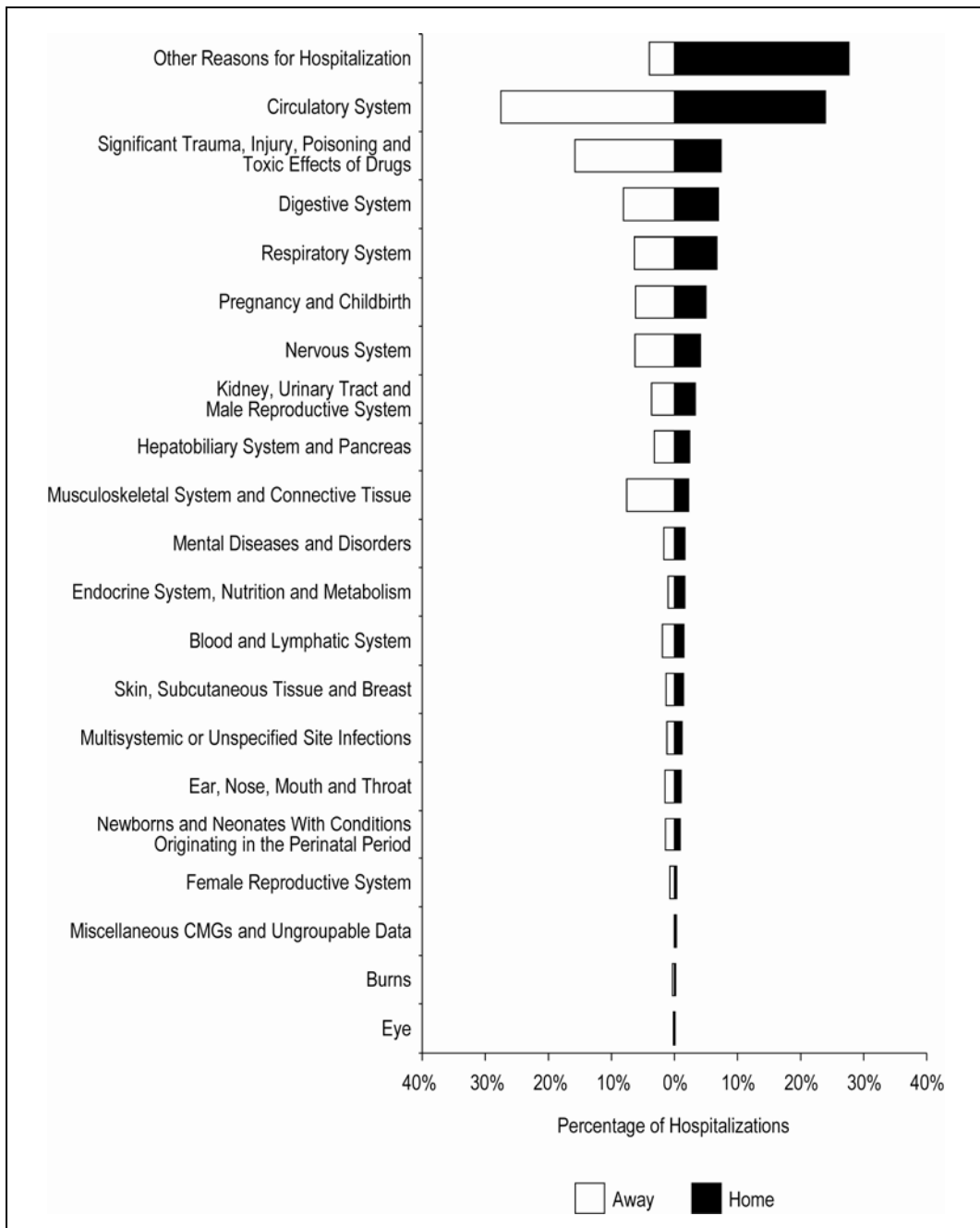
How to Interpret This Figure

Internal episodes are hospitalizations that occurred exclusively within a patient’s area of residence. External episodes are hospitalizations that occurred exclusively outside of a patient’s area of residence.

Figure 11 presents the MCCs for mutual hospitalizations. Only 5% of hospitalizations (13,650) involved a transfer between hospitals that required crossing the boundary of the health authority.

- Relative to internal and external episodes, mutual episodes were most likely to involve the MCCs Circulatory System, Trauma or Other Reasons for Hospitalization.
- For several MCCs, there was a distinct pattern in terms of the contribution of the patients' health authorities (home) and external hospitals (away). Hospitalizations for the MCCs Trauma and Musculoskeletal System and Connective Tissue were more common among hospitals outside of a patient's health authority. For these MCCs, the contribution of hospitals within a patient's health authority was accounted for by patients returning and being classified to MCC Other Reasons for Hospitalization, predominantly for convalescence, rehabilitation or palliative care.
- For mutual episodes involving the MCCs Pregnancy and Childbirth, Digestive System, Circulatory System and Respiratory System, however, hospitalizations within and outside of a patient's health authority had the same MCC. The role of hospitals outside of a patient's region of residence during these episodes may have involved services unavailable at hospitals within a patient's region of residence.

Figure 11: Major Clinical Categories for Mutual Hospitalizations



Source

Discharge Abstract Database, 2009–2010, and Organization Index Institution File, Canadian Institute for Health Information; Postal Code Conversion File (PCCF+), Statistics Canada.

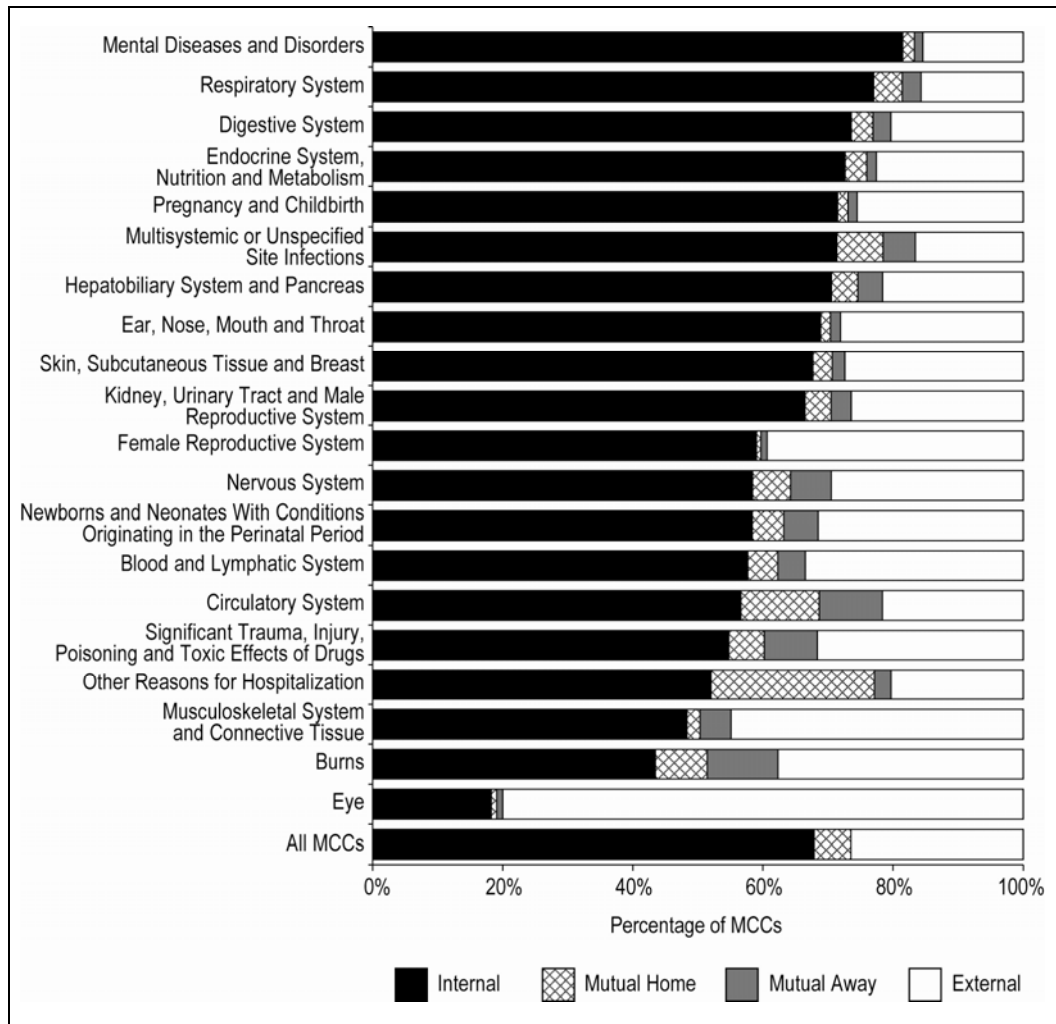
How to Interpret This Figure

Mutual episodes are hospitalizations that involved transfers between hospitals within and outside of a patient’s health authority. Mutual hospitalizations are separated to distinguish between the contributions of hospitals within sparsely populated health authorities (home) and external hospitals (away).

Figure 12 presents the relative contribution of various hospital locations to the different MCCs. Some of the more common reasons patients were hospitalized were the following:

- Internal hospitalizations had large shares of the MCCs Mental Diseases and Disorders, Respiratory System, Digestive System, and Pregnancy and Childbirth;
- External hospitalizations had large shares of the MCCs Musculoskeletal System and Connective Tissue; Significant Trauma, Injury, Poisoning and Toxic Effects of Drugs; and Nervous System; and
- Mutual hospitalizations had relatively large shares of the MCCs Circulatory System and Other Reasons for Hospitalization.

Figure 12: Major Clinical Categories, by Hospitalization Location



Source

Discharge Abstract Database, 2009–2010, and Organization Index Institution File, Canadian Institute for Health Information; Postal Code Conversion File (PCCF+), Statistics Canada.

Discussion

Hospitals within sparsely populated health authorities are tasked with providing care to small, low-density populations. In Western Canada, hospitals are generally located relatively close to the populations they serve. However, the hospitals in these areas are small, and comparatively few patients use the closest hospital available to them.

The role of hospitals in providing health care to residents of sparsely populated areas differs from that of hospitals in highly populated areas. For instance, smaller hospitals have a much lower service volume and cannot enjoy the same economies of scale as larger hospitals. Nor do smaller hospitals have access to equipment that is as technologically advanced as the equipment in teaching and larger community hospitals. Also, hospitals located in sparsely populated areas face a different set of personnel challenges. Health care requires highly trained personnel, as well as specialized equipment, facilities and transportation systems, making its provision in smaller centres especially challenging. Hospitals in these locations find it harder to recruit and retain staff and physicians.

Despite these differences, this report points out the role played by community hospitals in sparsely populated areas of Western Canada. These hospitals provided care for the majority of residents, and they played a crucial role in follow-up care when patients returned to their health authority after receiving treatment in larger, external hospitals.

This examination of hospital use by residents of sparsely populated areas in Western Canada is broad and must be seen as a preliminary but important first step. It does not provide a complete picture of all of the factors that need to be considered by health regions when evaluating the roles played by their hospitals, but it does provide perspective on several critical issues.

It is important to note that there is considerable variation in the scale of operations among hospitals in sparsely populated areas. This may account for some of the variations seen in this analysis. However, a full examination of these variations is beyond the scope of this report. It is important to keep in mind that this report was not designed to indicate whether sparsely populated areas are providing outstanding or poor service to patients living in their boundaries. Rather, it enables planners to paint a picture of the role hospitals in sparsely populated areas play in the lives of people living within their boundaries.

Appendix: Technical Notes

It is important to note that the methodology used was developed specifically for this report. For this reason, the results presented in this report may differ from those in other CIHI publications, which may have a different focus and/or use a different methodology.

Data Sources

- Discharge Abstract Database (DAD), 2009–2010, Canadian Institute for Health Information
- Postal Code Conversion File (PCCF+), Statistics Canada
- Organization Index Institution File, Canadian Institute for Health Information
- Census of Canada, 2006, Statistics Canada

Inclusion Criteria

- Discharged from an acute care facility
- Discharged between April 1, 2009, and March 31, 2010

Exclusion Criteria

- Unknown gender
- Invalid health card number
- Newborns, stillbirths and cadaveric donors
- Potential duplicate records

Key Analytical Variables

Patient province and region were obtained using the patient's postal code (as recorded in the DAD) and PCCF+.

Facility province and region were obtained using the facility's postal code (as recorded in the Organizational Index) and PCCF+.

The standard peer groups were developed based on literature reviews and consultations with internal and external experts. Hospitals were assigned to one of four standard peer groups: T (teaching), H1 (larger community hospital), H2 (medium community hospital) and H3 (smaller community hospital).

Teaching hospitals are those with full membership in ACAHO. According to ACAHO, its members are either stand-alone teaching hospitals with their own governance structure or they comprise a network of single-hospital organizations or multi-site regional facilities. Members have clinical programs ranging from primary care to highly specialized health services that are governed by a regional (or provincial) health authority structure. A distinguishing characteristic of ACAHO members is that they have formal institution-to-institution partnerships with universities and work closely with them to provide undergraduate and postgraduate medical education.

Non-teaching hospitals were allocated to larger, medium or smaller community hospital peer groups based on their volumes, using inpatient cases, total weighted cases and inpatient days. Hospitals were categorized as H1 if they met two of the following three criteria:

- More than 8,000 inpatient cases
- More than 10,000 weighted cases
- More than 50,000 inpatient days

Hospitals that did not meet the above criteria were classified as H2 or H3 depending on the hospital's total weighted cases (H2: 2,000 or more weighted cases, H3: fewer than 2,000 weighted cases). Borderline cases were reviewed and reassigned based on averages across multiple years. Please note that the hospital-level peer group for multi-site hospitals was assigned based on the hierarchy of the site-level peer groups. The hierarchical order is T, H1, H2 and H3.

MCC was derived using CIHI's CMG+ grouper (methodology year 2010).

Unique patient IDs were created using health card number, birth year, health card province code and gender code.

Episodes of care were constructed as follows:

- Transfers from one acute hospital to another were considered the same episode of care if the transfer to/from acute/emergency/ambulatory care was indicated in the readmit abstract or in the previous abstract; and
- Admission to an acute facility occurred within 12 hours before or 24 hours after another acute discharge.

The proximity analysis was performed using the “closest facility” feature of the Network Analyst extension of ESRI’s ArcGIS 10 software program. This feature can calculate travel time for a set of origins (patients) and the closest destinations (hospitals), with travel time being a function of posted speed limit and road length. The road network data used was produced by Statistics Canada, with speed limit assignments carried out by Earth-To-Map GIS Inc., a geographic information system (GIS) consulting company located in Ottawa, Ontario. Patients and hospitals were mapped (geocoded) using postal codes, with latitude and longitude derived from the PCCF+ Version 5G, which provides automated geographic coding based on Statistics Canada’s PCCF.

All hospitals were included in the analysis; however, patient data was excluded for three reasons:

- The PCCF+ did not produce a latitude and longitude for certain postal codes;
- The patient’s postal code was mapped to a location more than two kilometres from the road network; and
- An incomplete (or fragmented) road network between the patient and hospital prevented a complete travel time calculation (this occurred in the more remote regions only).

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