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Is Geographical Isolation Associated with Poorer Outcomes for Northern Manitoba First Nation Communities?

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Abstract

This study tested the assumption that geographical isolation is associated with poorer population health outcomes among First Nations in Manitoba. Our results show higher premature mortality rates (PMR) in northern communities, declining slower than for any other Manitoba communities. Our results also show lower ambulatory care sensitive conditions (ACSC) hospitalization rate in the North, suggesting barriers to prevention and early diagnosis. There remains a large gap in ACSC hospitalization rates between First Nations and all Manitobans. Further research is warranted to understand the relationship between the changes in the rates of ACSC and the difference in the rates between northern and southern communities.

Keywords

Primary care, primary health care, Aboriginal, Indigenous, First Nations, avoidable hospitalizations, mental health, chronic conditions, geography, remoteness

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The Truth and Reconciliation Commission of Canada acknowledged that addressing jurisdictional disputes, ensuring sustainable funding, and recognizing the value of “[Indigenous]¹ healing practices” (p. 163) are key measures to improving the health and social outcomes of Indigenous Peoples in Canada. It called upon all levels of government to acknowledge that the current state of Indigenous health in Canada is a direct result of previous Canadian government policies and put forward 94 Calls to Action to address these issues (Truth and Reconciliation Commission of Canada, 2015).

Previous studies have reported higher rates of avoidable hospitalizations, poorer health outcomes, and shorter life expectancy among First Nation peoples compared to other Canadians (Green et al., 2013; Lavoie et al., 2010; Lyons et al., 2014; Ospina et al., 2015; Riediger et al., 2015). A recent study conducted in Manitoba showed that the inequity gap is widening (Katz et al., 2019).

It is a common assumption that communities located at significant distances from urban centres, where physician services and secondary care are available, have worse health outcomes compared to communities that are located closer to care. This problematic assumption is largely based on an expectation that local services delivery, often managed by First Nations themselves, are likely substandard and/or create additional barriers to care (National Advisory Committee on SARS and Public Health, 2003), and that geographical barriers to access healthcare and other services provided off reserve is a major detriment to the health of First Nations. At times, “traditionalism” (an assumption that northern communities have experienced less colonial disruption and hold values that align more readily with their cultural past) is hinted at as being partially to blame for poorer outcomes. This assumption, however, remains empirically untested.

In the Canadian context, it is important to understand the role of the federal government in the delivery of health services to First Nation communities. Constitutionally, healthcare is the responsibility of provincial governments. Since the formation of a federal health department in 1919, the federal government assumed greater responsibility for the provision of health and curative services in First Nation communities (Lavoie, 2018) primarily to segregate First Nation peoples and protect settler populations from “contagions” assumed to be carried by First Nation peoples (Lux, 2016). Since the 1950s, this has resulted in the development of federally funded health services on reserve. These include nursing stations delivering a limited scope of primary healthcare (PHC) services, and smaller health offices or health centres in communities that can, at least theoretically, access health services off reserve in close-by communities (Health Canada & First Nations and Inuit Health Branch [FNIHB], 2012). A more detailed description of these models is provided in Table 1.

¹ The Commission used the word *Aboriginal* to align with the terminology embedded in federal policy. The term includes First Nations, Métis, and Inuit. More recently, the term Indigenous has become the preferred terminology and is replacing the word Aboriginal in policy and practice. We opted to use the word *Indigenous* throughout the article for clarity when referring to all three identity groups.

Table 1. Health Facility Designation Criteria

Type of facility	Number of communities		Community characteristics (the community should meet a majority of the following criteria)					Federally funded health services available in the community
	Across Canada	Manitoba	On-reserve population	Level of isolation	Proximity of health services	Access	Community infrastructure	
No on-reserve facility	130	2	Generally, less than 300	Non-isolated, or at close proximity to a federal nursing station	Access to PHC is through a provincial point of care, often located close to the community	Year-round roads	Variable	None
Health office	61	24	0 to 750 total on-reserve population	Non-isolated or semi-isolated (or isolated depending on road access)	Hospital accessible by road in less than two hours	All weather road or air access	Adequate community services	Part-time, often non-resident nursing staff Screening and prevention services only
Health station	136	0	Over 100	Remote-isolated or semi-isolated	Over 150 km from a service centre but within 50 km of a nursing station or other federally funded facility. Hospital accessible by road in less than two hours	Accessible by air or road from a federal facility, poor road conditions	Limited community services	Part-time, often non-resident nursing staff Screening and prevention services only
Health centre	204	11	Over 100	Non-isolated or semi-isolated	Hospital accessible by road in less than two hours, occasional unavailability of local ambulance and first response services	All weather road or air access, poor road conditions	Limited community services	Emergency, screening, and prevention services available five days per week, with limited or no after-hours care locally
Nursing station	75	22	Over 500	Remote or isolated	Nearest hospital more than two hours away, limited availability of local ambulance and first response services	No year-round road access to other healthcare facilities	Limited community services	Local access to screening, prevention, emergency care, and treatment services on a 24/7 basis PHC delivered by primary care nurses with an expanded scope of practice, community health nurses, and paramedical staff

Note. Sources: Health Canada & FNIHB, 2003; Lavoie et al., 2005

It is important to note that federal funding does not cover family physician and specialist care, which are provided free of charge to all Canadians, including First Nations, by provincial healthcare systems. In some communities, on-reserve services are supplemented by visiting physician services (Lavoie et al., 2020). Elsewhere, physician care is accessed off reserve. In addition, provincial health systems provide a variety of preventive and supportive health services to which, theoretically, First Nations living on reserve can access to the same extent as their provincial counterparts. In reality, however, jurisdictional confusion remains, resulting in substantial gaps in services (The Jordan's Principle Working Group, 2015; Lavoie et al., 2015), which perpetuates distrust, differential access to care, and health inequities.

Manitoba has 63 First Nation communities. Although these communities are located along rivers that were once vibrant traditional economic centres, colonial economic development undermined and displaced these economic centres, shifting the seat of economic decision-making away from those communities to southern locales, thereby entrenching and perpetuating systems of economic marginalization (Lavoie, Boyer, & Kornelsen, 2018; Lavoie, Kornelsen, et al., 2016). Of these First Nations, 22 are now considered "isolated" and most have no permanent road access. These 22 northern First Nation communities access PHC on reserve through a nursing station, while most First Nations in the south operate health centre and health office models with funding from the federal government (Lavoie et al., 2010; Martens et al., 2005).

In this study, the performance of the healthcare system serving First Nation peoples living in southern (non-isolated and semi-isolated) and northern (isolated and remote-isolated) First Nation communities was represented by the rates of episode of hospitalization for ambulatory care sensitive conditions (ACSC) and the length of hospital stay (LOS) for these conditions. ACSC are defined as diseases or conditions that are unlikely to lead to hospitalization if managed in a timely and effective manner through PHC services (Billings et al., 1993).

Hospitalization for ACSC is a very well recognized tool to measure access to PHC services (Gao et al., 2014; Lavoie et al., 2010; Ricketts et al., 2001; Rosano et al., 2013; Van Loenen et al., 2016; Van Loenen, et al., 2014). Several studies have reported that higher rates of ACSC indicate barriers to PHC services (Busby et al., 2015; Lavoie et al., 2010; Lavoie, Ward, et al., 2018; Longman et al., 2015). We have previously used these indicators to identify gaps in the delivery of PHC and provided recommendations to policymakers to transform the healthcare system within these communities (Lavoie et al., 2010, 2011, 2019; Lavoie, Ward, et al., 2018). We acknowledge that hospitalizations are linked to diagnoses and referrals: Rates of hospitalization may be lower when conditions remain undiagnosed as a result of barriers to PHC, potentially resulting in premature mortality. Rates may also be lower as a result of early diagnosis and effective management in PHC. To discern between these two potential explanations, we have argued elsewhere that rates of hospitalization for ACSC should be used in tandem with premature mortality rates (Lavoie et al., 2019).

Methods

Partnership

The Innovation Supporting Transformation in Community-Based Primary Healthcare Research Project (iPHIT) is a five-year partnership between university-based researchers from the University of Manitoba, the First Nations Health and Social Secretariat of Manitoba, and eight First Nation

communities in Manitoba, which range from non-isolated to remote communities and are served by health offices, health centres, or nursing stations. The overall objective of this innovative, strengths-based program of research is to expand our knowledge of various models of PHC in rural, remote, and First Nation communities, and to learn from First Nation and rural and remote communities who have developed effective community based PHC.

Source of Data

We used administrative health data (1984-2014) from the Manitoba Population Research Data Repository housed at the Manitoba Centre for Health Policy, University of Manitoba. The Repository is a comprehensive collection of administrative, registry, survey, and other data that includes the vast majority of residents of Manitoba including residents of First Nation communities. The data used for this study included vital statistics files, the population health registry file for the provincial insured population, the hospital discharge abstract, and census data files. The study included all Manitoba residents eligible to receive health benefits under the Manitoba Health Services Insurance Plan. Six-digit postal codes were used to identify the population associated with each community. Registered members of First Nation communities represent 96.6% of the overall on-reserve population, others are non-Status (who may be First Nation children not eligible for registration as “Indians” under the Indian Act), Métis, or non-Indigenous individuals who depend on the same services (Lavoie et al., 2010, 2019).² Ethical approvals for this study were received from the University of Manitoba Health Research Ethics Board and data access approval from the Government of Manitoba Health Information Privacy Committee, and both ethical approval and data access from the Manitoba First Nations Health Information Research Governance Committee (HIRGC).

Variables

Table 2 provides definitions of the dependent variables. We used two dependent variables in this study: episodes of hospital care for ACSC and LOS. We used a previously created definition for ACSC, which is based on the Canadian Institute for Health information (2006) and the Victorian Government Department of Human Resources (Ansari et al., 2002), adapted for Manitoba First Nations to align with their epidemiological profile (Lavoie et al., 2010). We then expanded this definition to add mental health-related ACSC, to align with Manitoba First Nations’ concept of PHC (Kyoon-Achan et al., 2019). The categories of ACSC explored in this study are shown in Table 3. Overall, 29 ACSC were defined using three-, four-, and five-digit International Statistical Classification of Disease codes (ICD-9-CM and ICD-10-CM), which enabled cross-sectional and longitudinal comparison of hospitalization rates among communities.

² All data used for this analysis are protected under the privacy policies of the Manitoba Centre for Health Policy, and within the terms of the institutional review board approval for this study and are not publicly available. The datasets generated and/or analyzed during the current study are not publicly available due privacy and confidentiality issues.

Table 2. Definition of Dependent Variables

Measure of hospitalization	Definition of hospitalization measure
Rates of hospital care episodes	The discrete number of hospitalization episodes from admission to discharge. Hospitalizations were treated as a single episode when readmission to another hospital occurred within one day, to account for transfers from one hospital to another.
Rates of length of stay per admission	An average of the number of days in hospital for each episode of care.

Table 3. Categories of Ambulatory Care Sensitive Conditions (ACSC) Explored

Categories of ACSC	Conditions
Chronic conditions	Diabetes; diabetes with complications; hypertension; asthma; acute bronchitis; chronic obstructive pulmonary disease; pneumonia; epilepsy; angina, heart failure and pulmonary edema; iron deficiency anemia
Acute conditions	Dental conditions; cellulitis; severe ear, nose, and throat infections
Mental health	Schizophrenia and mood disorder
Vaccine preventable conditions	Hepatitis A and B; influenza; hemophilic influenza; measles; mumps; rubella; meningitis; tuberculosis; tetanus; poliomyelitis; pertussis
All ACSC	All conditions combined

Our main independent variable was isolation level as reflected by the location of the community (south or north of the 53rd parallel). There is no single, universally accepted definition of concepts such as rural and remote. Most definitions generally focus on geography, population density, or access to services such as healthcare (Lavoie, Wong, et al., 2016; Wakerman, 2004). The “right” definition is context dependent. For our analysis, the First Nation communities on the eastern side of Lake Winnipeg in Manitoba were grouped together with those above the 53rd parallel due to their isolation from any major urban centre. This breakdown is based on our collective in-depth knowledge of these communities’ access to care, and on federal indexes of isolation, which take into consideration federal services

provided on reserve (Health Canada & FNIHB, 2012). Some indexes misrepresent First Nations' reality. For example, Statistics Canada's recent set of remoteness and accessibility indices shows northern Manitoba First Nation communities as having no access to health services (Alasia et al., 2017), where other resources, which reflect our collective experience of these communities, show them as having access to services delivered in nursing stations and generally better health outcomes than southern First Nation communities with access to provincial services within driving distance (Lavoie et al., 2010). For this article, we defined First Nation communities as those recognized as Indian Reserves under the Indian Act.

For the purpose of this study, we included under the variable *non-First Nation rural communities* all Manitoba communities with a population of less than 8,000 ($n = 183$) because all First Nation communities in Manitoba have fewer than 8,000 residents. We then divided communities into southern and northern communities. Southern and northern labels were attached to communities where members normally reside, and not to the location of their care experience. Table 4 shows the population in each category.

Table 4. Population per Category of Community

	Average	
	1984-1988	2010-2014
First Nation northern Manitoba	27,051	41,418
First Nation southern Manitoba	27,948	32,425
Non-First Nation rural Manitoba	365,727	393,061
All Manitoba	1,055,061	1,186,947

Data Analysis

Data was analyzed using generalized estimating equation (GEE) models, controlling for age, sex, and socioeconomic status with postal codes used as an ecological measure using census data, to identify differences and trends in hospitalization rates for ACSC and LOS. GEEs are used as a method for analyzing correlated longitudinal data. Trends in rates of ACSC hospitalization and LOS by residents living on First Nation reserves were identified from 1984 to 2014. Observations with a missing value for the model variables (e.g., age, sex, socioeconomic status) were excluded from the analysis. The structure of the working correlation matrix used to model the correlation of the responses from subjects was exchangeable (or compound symmetry). Because of the relatively small sample size, we used a rolling five-year average to increase the number of episodes of care, as a five-year average is more stable than single-year data for comparisons.

Results

Premature Mortality Rates (PMR)

Table 5 shows that between 2005 and 2014, the average PMR was significantly higher for First Nations living in northern (7.27 deaths per 1,000 occurring in those between 0 and 75 years of age) or southern contexts (5.92), compared to non-First Nation rural communities (2.95) and all of Manitoba (3.26). We note that the PMR for northern First Nations is slightly higher than for southern First Nations. We also note that the PMR has been declining in both northern (1.25%) and southern First Nations (1.40%), albeit at a much slower rate when compared to Manitoba non-First Nation rural communities (4.62%) and all of Manitoba (3.51%). All differences are statistically significant.

Table 5. Comparison of Premature Mortality Rate (PMR), 2005-2014

	Adjusted PMR rate	Probability that PMR is different from All Manitoba (<i>p</i> -value)	Direction	Percentage change	<i>p</i> -value
First Nation northern Manitoba	7.27 (6.92-7.62)	.00*	Decreasing	1.25	.0494*
First Nation southern Manitoba	5.92 (5.62-6.23)	.00*	Decreasing	1.40	.0177*
Non-First Nation rural Manitoba	2.95 (2.89-3.01)	.00*	Decreasing	4.62	<.0001*
All Manitoba	3.26 (3.23-3.29)		Decreasing	3.51	<.0001*

Note. The PMR is the age- and sex-adjusted average annual premature mortality rates, which is the number of deaths per 1,000 occurring in those between 0 and 75 years of age.

Hospitalization Rates for All (Combined) ACSC

Table 6 and Figure 1 show that, between 1984 and 2014, First Nation peoples living in southern communities had significantly higher hospitalization rates for all ACSC (313.69 in 1984-1988; 105.23 in 2010-2014) compared to northern First Nation communities (189.32 in 1984-1988; 94.17 in 2010-2014) and all Manitoba (85.90 in 1984-1988; 36.24 in 2010-2014). The hospitalization rates for these ACSC decreased by 2.29% during the same period in northern First Nation communities, by 4.41% in southern First Nation communities, by 3.08% in non-First Nation rural communities, and by 3.77% in all Manitoba. These results were statistically significant.

Table 6. Age-, Sex-, and Socioeconomic Status-Adjusted Hospitalization Rates for Ambulatory Care Sensitive Conditions (ACSC) per 1,000 Population, 1986-2014

	1984-1988		2010-2014		1984-2014		
	Rate	<i>p</i> -value (compared to All Manitoba)	Rate	<i>p</i> -value (compared to All Manitoba)	Direction	% change	<i>p</i> -value
All ACSC							
First Nation northern Manitoba	189.32 (158.56-226.05)	.0000*	94.17 (70.77-125.32)	.00*	Decreasing ^a	2.29	<.0001*
First Nation southern Manitoba	313.69 (259.07-379.84)	.0000*	105.23 (79.20-139.79)	.00*	Decreasing ^b	4.41	<.0001*
Non-First Nation rural Manitoba	111.29 (96.23-128.71)	.0005*	39.58 (30.47-51.42)	.51	Decreasing ^c	3.77	<.0001*
All Manitoba	85.90 (61.35-120.27)		36.24 (35.90-36.58)		Decreasing ^d	3.08	<.0001*
Chronic ACSC							
First Nation northern Manitoba	75.85 (59.50-96.70)	.0000*	44.30 (34.90-56.24)	.00*	Decreasing ^a	2.37	<.0001*
First Nation southern Manitoba	112.42 (88.30-143.13)	.0000*	65.13 (52.92-80.15)	.00*	Decreasing ^b	2.84	<.0001*
Non-First Nation rural Manitoba	49.77 (41.05-60.35)	.0871	20.56 (17.542-24.27)	.10	Decreasing ^c	3.60	<.0001*
All Manitoba	42.07 (32.50-54.44)		17.85 (17.61-18.09)		Decreasing ^d	3.56	<.0001*

Table 6. Age-, Sex-, and Socioeconomic Status-Adjusted Hospitalization Rates for Ambulatory Care Sensitive Conditions (ACSC) per 1,000 Population, 1986-2014 (continued)

	1984-1988		2010-2014		1984-2014		
	Rate	<i>p</i> -value (compared to All Manitoba)	Rate	<i>p</i> -value (compared to All Manitoba)	Direction	% change	<i>p</i> -value
Acute ACSC							
First Nation northern Manitoba	55.22 (45.85-66.50)	.0000*	10.98 (7.19-16.76)	.00*	Decreasing ^a	5.91	<.0001*
First Nation southern Manitoba	76.61 (61.87-94.86)	.0000*	13.52 (8.72-20.97)	.00*	Decreasing ^b	6.41	<.0001*
Non-First Nation rural Manitoba	24.69 (21.22-28.73)	.0010*	6.09 (4.10-9.03)	.50	Decreasing ^c	4.42	<.0001*
All Manitoba	19.13 (12.60-29.04)		5.31 (5.18-5.44)		Decreasing ^d	4.62	<.0001*
Mental health ACSC							
First Nation northern Manitoba	10.38 (7.39-14.57)	.2210	29.58 (18.97-46.11)	.00*	Increasing ^a	5.49	<.0001*
First Nation southern Manitoba	14.95 (11.23-19.91)	.2933	21.22 (13.66-32.96)	.01*	Increasing ^b	1.52	.0153*
Non-First Nation rural Manitoba	14.10 (11.16-17.82)	.4277	9.87 (6.67-14.61)	.30	Decreasing ^c	0.72	.0007*
All Manitoba	12.83 (7.82-21.03)		12.14 (11.94-12.33)		Increasing ^d	0.07	.9533

Table 6. Age-, Sex-, and Socioeconomic Status-Adjusted Hospitalization Rates for Ambulatory Care Sensitive Conditions (ACSC) per 1,000 Population, 1986-2014 (continued)

	1984-1988		2010-2014		1984-2014		
	Rate	<i>p</i> -value (compared to All Manitoba)	Rate	<i>p</i> -value (compared to All Manitoba)	Direction	% change	<i>p</i> -value
Vaccine preventable ACSC							
	12.73 (10.47-15.47)	.0000*	8.32 (5.58-12.39)	.00*	Decreasing ^a	1.00	.1317
	14.38 (11.56-17.88)	.0000*	1.87 (1.87-1.18)	.01*	Decreasing ^b	8.08	<.0001*
	5.91 (5.10-6.85)	.0000*	0.81 (0.60-1.11)	.23	Decreasing ^c	7.57	<.0001*
	4.36 (3.06-6.21)		0.98 (0.98-1.04)		Decreasing ^d	6.27	<.0001*

^a First Nation northern Manitoba slope differs from 0.

^b First Nation southern Manitoba slope differs from 0.

^c Non-First Nation rural Manitoba slope differs from 0.

^d All Manitoba 0 slope differs from 0.

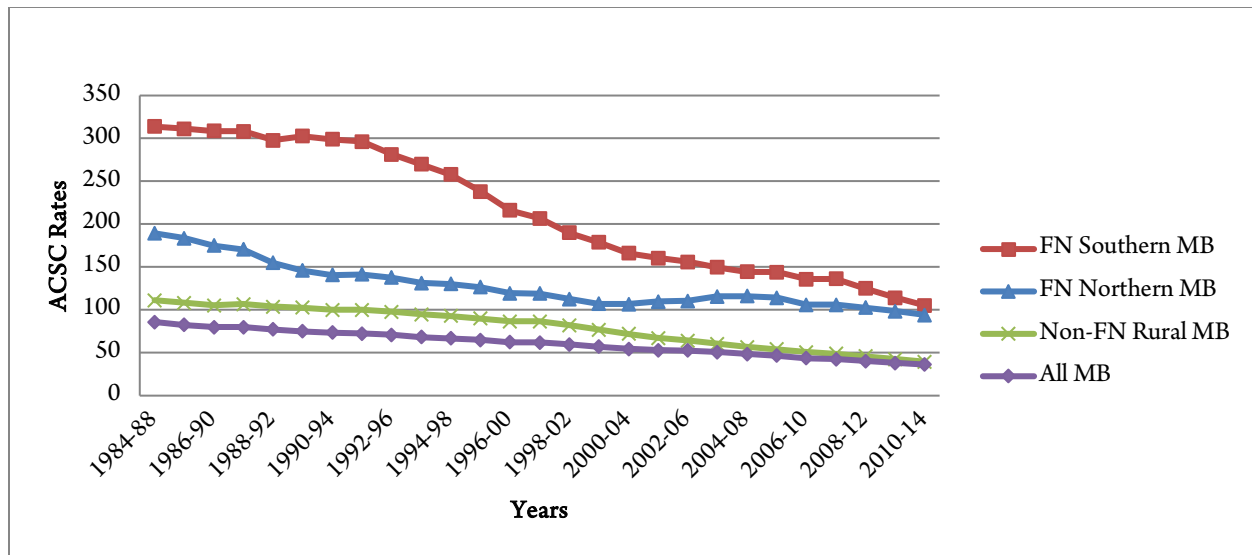


Figure 1. Age- and socioeconomic status-adjusted ambulatory care sensitive conditions (ACSC) rates for all ACSC (per 1,000 population). FN is First Nations. MB is Manitoba.

Hospitalization Rates for Acute and Chronic ACSC

The hospitalization rates for chronic (Table 6 and Figure 2) and acute (Table 6 and Figure 3) ACSC were higher in southern (chronic ACSC 112.42 per 1,000 in 1984-1988 and 65.13 in 2010-2014; acute ACSC 76.61 in 1984-1988 and 13.52 in 2010-2014) and northern First Nation communities (chronic ACSC 75.85 per 1,000 in 1984-1988 and 44.30 in 2010-2014; acute ACSC 55.22 in 1984-1988 and 10.98 in 2010-2014) compared to all Manitoba ($p < .0001$). However, the hospitalization rates for these conditions (acute and chronic) were higher in southern First Nation communities compared to northern First Nations. Between 1984 and 2014, the rate of decline for acute conditions was 6.41% in southern First Nation communities and 5.91% in northern First Nation communities. The rate of decline for chronic conditions was 2.84% in the southern First Nation communities and 2.37% in the northern First Nation communities.

Hospitalization Rates for Vaccine Preventable ACSC

For vaccine preventable ACSC (Table 6 and Figure 4), the rates were higher in northern (12.73 per 1,000 in 1984-1988; 8.32 in 2010-2014) compared to southern First Nation communities (14.38 per 1,000 in 1984-1988; 1.87 in 2010-2014; $p < .0001$). Between 1984 and 2014, the hospitalization rates for these conditions did not decline in northern First Nation communities, whereas they declined by 8.08 ($p < .0001$) in southern First Nation communities. We conducted a sub-analysis (data not shown) and found the higher rates of hospitalization for these conditions are related to the higher rates of tuberculosis (TB) in northern communities.

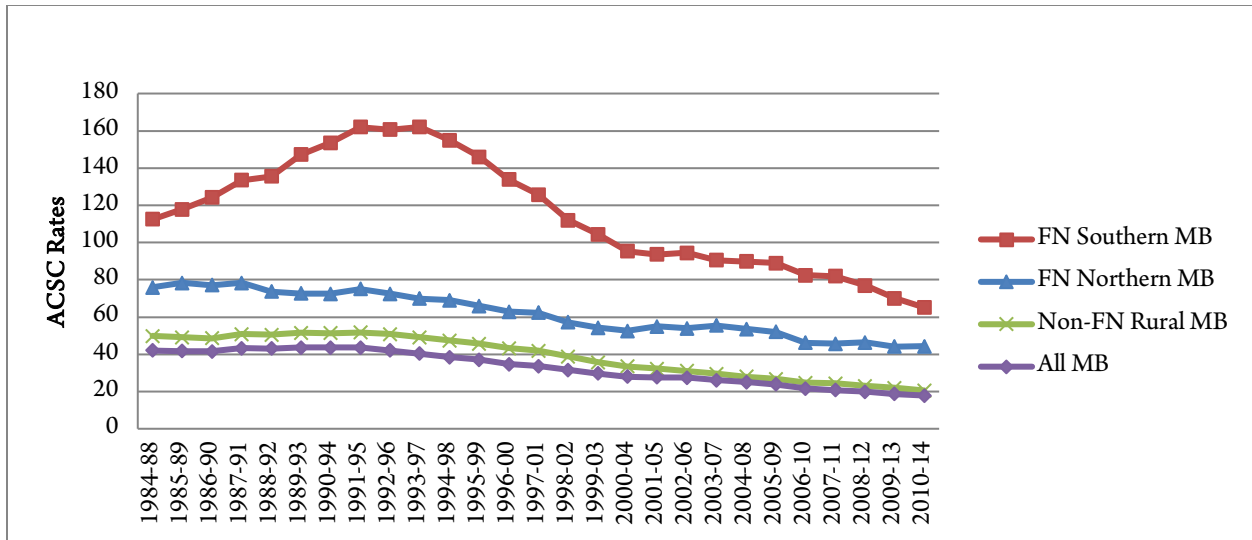


Figure 2. Age-, sex-, and socioeconomic status-adjusted rates for chronic ambulatory care sensitive conditions (ACSC; per 1,000 population). FN is First Nations. MB is Manitoba.

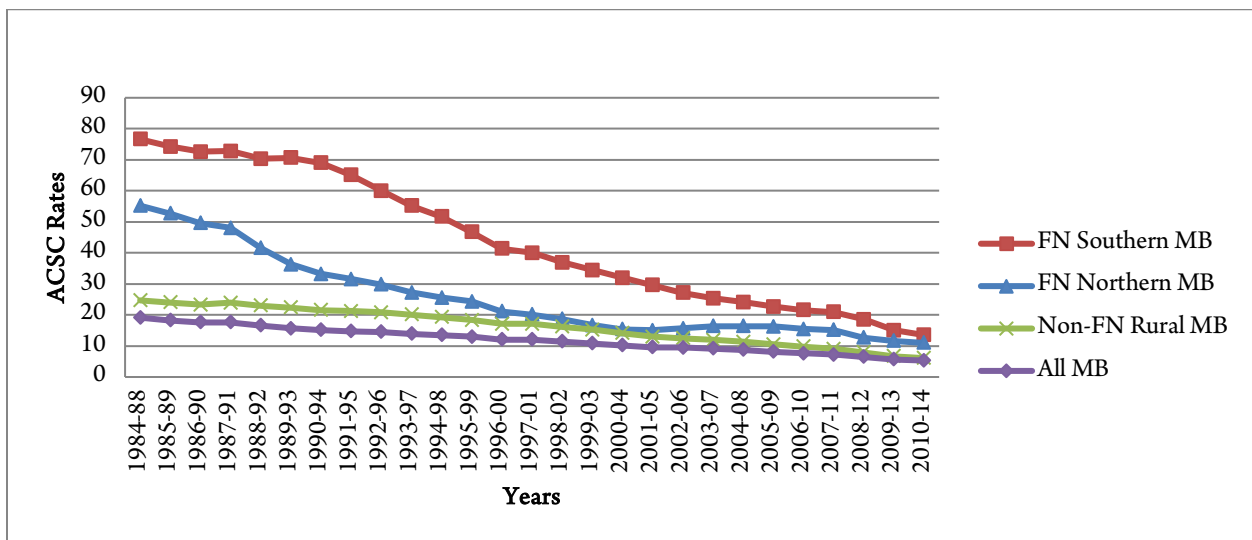


Figure 3. Age-, sex-, and socioeconomic status-adjusted rates of hospitalization for acute ambulatory care sensitive conditions (ACSC; per 1,000 population). FN is First Nations. MB is Manitoba.

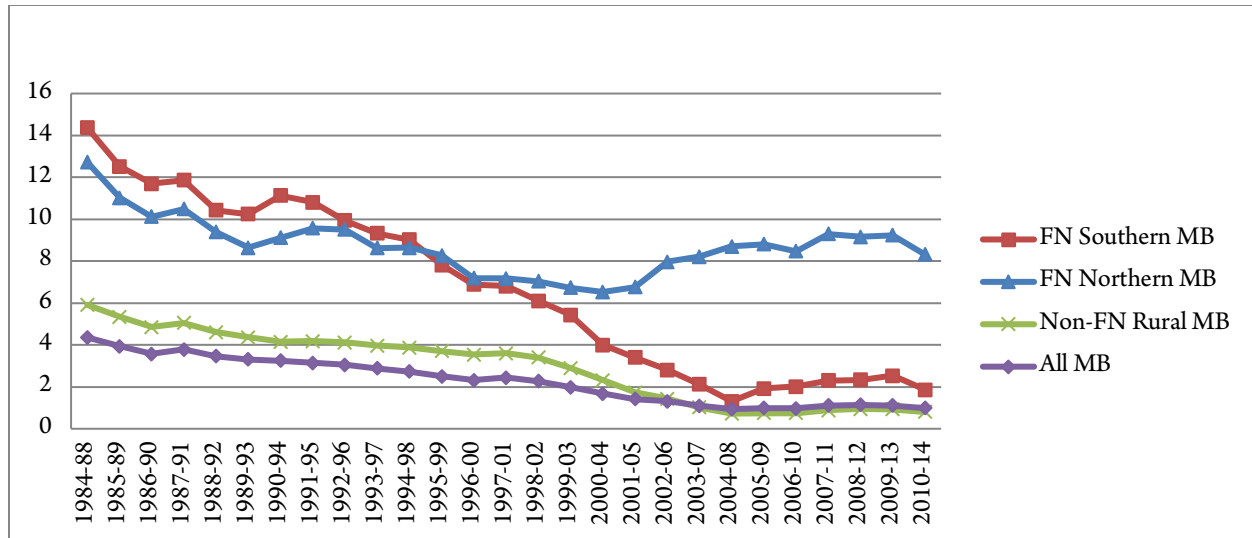


Figure 4. Age-, sex-, and socioeconomic status-adjusted rates of hospitalization for vaccine preventable ambulatory care sensitive conditions (ACSC; per 1,000 population). FN is First Nations. MB is Manitoba.

Mental Health-Related ACSC

Our data shows that between 1984 and 2014, the hospitalization rates for mental health-related conditions were significantly higher in northern First Nation communities (10.38 per 1,000 in 1984-1988; 29.58 in 2010-2014) compared to southern First Nation communities (14.95 per 1,000 in 1984-1988; 21.22 in 2010-2014; $p < .0001$). Further, the gaps in rates of hospitalization for mental health-related ACSC have continuously widened when compared to all Manitoban and non-First Nation rural communities, increasing between 1984 to 2014 in southern and northern First Nation communities by 1.52% ($p = .015$) and 5.49% ($p < .0001$), respectively. In comparison, the rates decreased in rural non-First Nation areas during the same period.

Length of Stay (LOS)

The LOS did not change significantly between 1984 and 2014 for acute, chronic, and all ACSC. The exception was for mental health-related conditions, where the LOS increased by 1.67% only for southern First Nation communities ($p = .003$). The LOS for mental health-related ACSC (Figure 5) was consistently significantly shorter for First Nation communities compared to all Manitoba. The LOS for all other ACSC increased significantly for all Manitoba (change 0.63%, $p = .0011$) but not for First Nations.

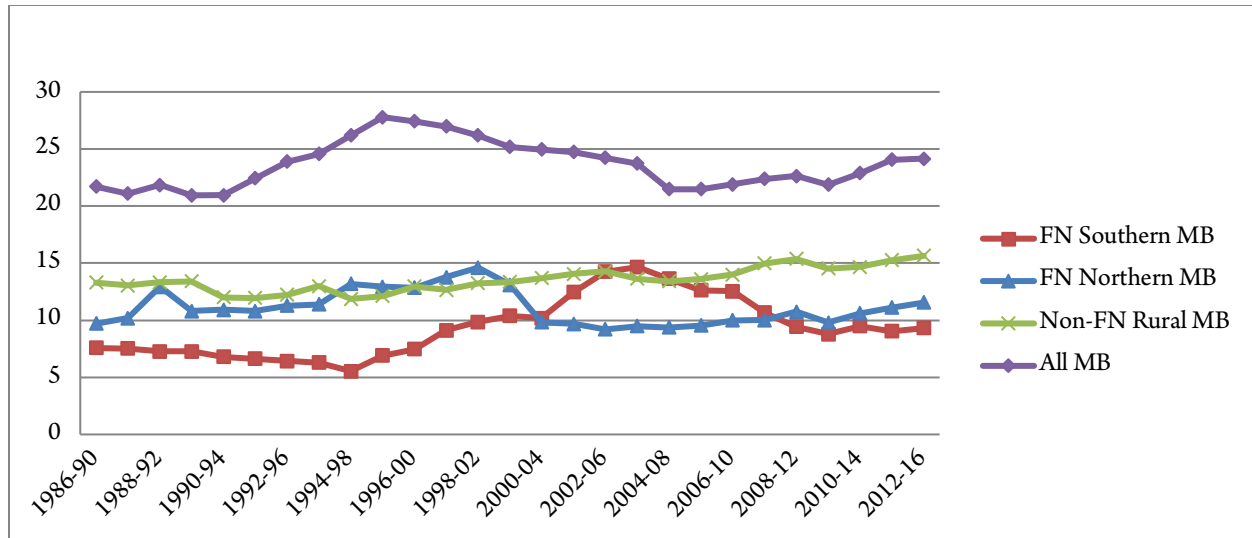


Figure 5. Age-, sex-, and socioeconomic status-adjusted length of stay (LOS) rates for mental health-related ambulatory care sensitive conditions (ACSC). FN is First Nations. MB is Manitoba.

Discussion

This study sheds light on differences in hospitalization rates for ACSC between southern and northern First Nation communities and compares these rates to all of Manitoba. We show that the hospitalization rates for acute and chronic ACSC are higher in the southern First Nations compared to the northern First Nation communities. The rates are significantly higher in northern and southern First Nation communities compared to all Manitoba. We note that rates are declining along with PMR, suggesting that rates of hospitalization are dropping at least in part due to decreased need for hospitalization. Even though the rates for acute and chronic conditions are decreasing over time in southern and northern First Nation communities, and in all other jurisdictions, it still clearly demonstrates the continuing inequities between all First Nation communities and all other Manitobans.

This study has many strengths. First, the use of administrative healthcare data to assess the performance of rural and remote healthcare systems is innovative and is an effective method to measure the performance of healthcare systems at a fairly low cost. The available data allowed us to run several GEE models and to run separate analyses on acute, chronic, vaccine preventable, and mental health ACSCs, and detect variations between different communities. Second, Indigenous scholars and proponents have advocated for many years for shifting the focus of research to be more responsive to local concerns and to reflect the voice and values of First Nation communities (Smylie & Anderson, 2006). This involves, first and foremost, developing a respectful, ethical relationship with First Nations and determining what is important to them. The reported results are just one study from a large collaborative project (the iPHIT as described above). The overall objective of this innovative, strength-based program of research is to learn about PHC in rural, remote, and First Nation communities and learn from First Nation communities about their innovation in developing effective community-based PHC. The iPHIT project

involved First Nations in every aspect of the research process (Kyoon-Achan, Lavoie, et al., 2018, 2019; Kyoon-Achan, Philips-Beck, et al., 2018).

We acknowledge that this study has limitations. First, we recognize that our definition of mental health-related ACSC is limited because current administrative data cannot reliably identify conditions such as post-traumatic stress disorder (PTSD) or mental health-related substance misuse. Second, the hospitalization rates for ACSC do not reflect the quality of acute care and supportive services in the community, delays in diagnosis, or medical transportation issues in First Nation communities (Lavoie et al., 2015). Also, the study does not control for many social determinants of health. However, it is important to note that the southern and the northern First Nation communities we are comparing encounter very similar challenges, such as lack of local infrastructure, which includes unavailability of clean water, inadequate housing, and limited access to services and opportunities, as a result of common federal policies (Lavoie, 2018). Finally, the study does not report on community-based programs available in any of the First Nation communities, and whether there are more effective community-based programs in First Nation communities served with different models of care. However, even when considering these programs, it is clear that the objective of closing the healthcare equity gap is far from having been achieved.

Our results are consistent with a previous study, which reported that First Nation communities in Manitoba that were located close to an urban centre in southern Manitoba had worse health outcomes (defined as higher rates of hospitalization for ACSC; Lavoie et al., 2010) and premature mortality rates (Katz et al., 2019) compared to isolated communities. Lavoie and colleagues (2010) showed that on-reserve services provided primarily in nursing stations by nurse practitioners and/or nurses working with an expanded scope of practice are better able to address the needs of those living with chronic and acute conditions compared to the other models of on-reserve care. The nursing station model is the predominant model for providing PHC services in isolated northern First Nation communities. These results suggest that better access to PHC services provided in First Nation communities could be one of the reasons for the observed results. Communities themselves generally also highlight that their continued participation in subsistence economies, use of their language, and practice of their ceremonies are key factors.

PHC is an integral part of the healthcare system of any community, and better access to quality PHC was associated with lower hospitalization for ACSC (Gibson et al., 2013; Starfield et al., 2005). Nevertheless, PHC is not the only determinant of ACSC: The health status of the population, personal and collective resilience, overcrowded houses, coordination of care, geographical location, systematic racism, stigma, and socioeconomic opportunities are all important determinants of health that have been shown to be associated with higher or lower hospitalization rates for ACSC (Gibson et al., 2013; Muenchberger & Kendall, 2010). Thus, it is extremely important not to ignore the role of social determinants of health in both southern and northern First Nation communities in relation to hospitalization for ACSC.

While this study looked at differences in hospitalization rates based on geographical location, it did not control for all the previously listed determinants of ACSC and all the programs available to residents. There are important variations in the distribution of these social determinants of health across southern and northern First Nation communities (Katz et al., 2019). Crowded houses, poverty, malnutrition, lack

of access to responsive PHC services, stigma, and lack of culturally appropriate practices are all important factors contributing to the higher rates of hospitalizations (Dehghani et al., 2018). Equitable and culturally appropriate healthcare services in all First Nation communities is only one, albeit important, action to reduce health disparities.

In the current study, the hospitalization rates for mental health-related conditions were higher in First Nation communities compared to the rest of Manitoba. Reports show that First Nation peoples continue to bear a disproportionate burden of physical and emotional illness (Green et al., 2013; Katz et al., 2019; Lavoie et al., 2010; Campbell et al., 2015). In Manitoba, the delivery of mental health services in First Nation communities is fragmented; services are not comprehensive, less accessible, and rarely available on a 24/7 basis (Bombay, 2015; Patel, 2019). This study also shows that the LOS for mental health-related conditions is shorter for First Nation peoples compared to other Manitobans. It is important to note that the results for all Manitoba overrepresent urban-based populations, who are more likely to be hospitalized at higher levels of acuity only. We therefore expect urban-centric data to show longer LOS.

Still, our results could indicate that First Nation peoples are discharged from hospitals before receiving the care they need, and this could result in a revolving door of admission and re-admission for mental healthcare. While a growing impetus to integrate comprehensive mental healthcare into PHC services is occurring globally, integration has been fraught with challenges (Mossialos & Wenzl, 2016; World Health Organisation, 2008). Challenges vary but are commonly characterized by fiscal constraints, organizational issues, availability of medical technologies and public health surveillance systems, the cultural and technical competence of health professionals working with marginalized groups and urban rural bias (Lavoie, Kornelsen et al., 2016; Spont et al., 2011; World Health Organisation, 2008). Nevertheless, integrating mental health services into PHC could reduce stigma, improve access to mental healthcare services, and improve social integration (World Health Organisation, 2008). The communities involved in the iPHIT program of research have clearly indicated that from their perspective, mental health is an integral component of all care, including PHC (Kyoon-Achan et al., 2019). These communities integrate PHC and mental health seamlessly using the Medicine Wheel as a model that takes a holistic approach to pursue overall health (Kyoon-Achan, Philips-Beck, et al., 2018).

Conclusion

The results presented in this article have important implications for health services policy planning and the incorporation of equity perspective to the objectives of health research in First Nation communities. There is a large gap in hospitalization rates for ACSC between First Nations and other Manitobans, and the hospitalization rates for chronic and acute ACSC are higher in the southern rather than the northern (isolated) First Nation communities. However, the hospitalization rates for mental health-related conditions have been increasing since 1984 and are higher in northern compared to southern First Nation communities. Urgent action is needed to address the mental health challenges faced by northern First Nation communities.

Organizational-level interventions to promote the provision of more equitable, responsive, and respectful PHC services for First Nation peoples living on reserves in Manitoba are needed to close the equity gap within this population (Browne et al., 2016). Considerations should be made for policies to

better support traditional healing practices; while initiatives have emerged (Blignault et al., 2018; Browne et al., 2018; Drost, 2019; Fijal & Beagan, 2019; Logan et al., 2020), these have been localized and have yet to receive systemic federal support. Also, critical actions are required to address the distribution of resources and the needs of Indigenous Peoples, supporting the Truth and Reconciliation Commission of Canada's Calls to Action, which begins with recognizing and implementing healthcare rights of First Nation peoples as identified in international law, constitutional law, and under the Treaties. Systematic social and health inequities in southern and northern First Nations communities will only be addressed through equitable rights-based funding, equitable access to PHC in each First Nation community, and through active involvement of Indigenous Peoples in Canada in developing long-term structural changes. First Nations' inherent right to self-determination also requires moving their research knowledge into action. Data from this research is important for future program planning to deliver healthcare services in First Nation communities in Manitoba.

The 2015 Truth and Reconciliation Commission report (Truth and Reconciliation Commission of Canada, 2015) urged the federal government to implement Calls to Action 18 and 19, which involves expanding the scope and mandate of health facilities in southern communities to include essential PHC services in all First Nation communities. Access to PHC services is only one measure, improving the living conditions for all First Nations living on reserve, reducing systemic and jurisdictional barriers, addressing racism within the healthcare system, and a coordinated effort by all levels of government will all be necessary to close the gap between First Nations and all other Manitobans (and Canadians).

We believe that our study has important implications for Indigenous communities beyond Manitoba and Canada. Remoteness is often associated with poorer health outcomes. While our study shows that this may be the case for some health conditions, our results show that generalizations are not appropriate. Research that supports a more nuanced understanding of remoteness as a health protective factor and as a factor adding complexity to access to needed services is necessary.

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