





Trends in Inuit health services utilisation in Manitoba: findings from the *Qanuinnigitsiarutiksait* study

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ABSTRACT

There is a notable lack of research related to trends in Inuit accessing health services throughout the land known as Canada. Given Nunavut's reliance on specialised services provided in the Northwest Territories, Alberta, Manitoba, and Ontario, this gap is particularly problematic, making it more difficult for Nunangat to proactively plan new programs for emerging needs, and for provinces to respond to those needs. The *Qanuinnigitsiarutiksait* study aimed to address this gap by developing detailed profiles of Inuit accessing health services in Manitoba. We used administrative data routinely collected by Manitoba agencies, to support the development of Inuit-centric services. It was conducted in partnership with the Manitoba Inuit Association, and Inuit Elders from Nunavut Canada and Manitoba. We focused on two interrelated cohorts: Kivallirmiut (Inuit from the Kivalliq region of Nunavut) who come to Winnipeg to access specialised services; and Manitobamiut (Inuit already living in Manitoba). Findings show that health services are primarily accessed in Winnipeg. Half of health services accessed by Kivallirmiut are for in-patient care at facilities with the Winnipeg Regional Health Authority. The other half are for advanced out-patient care including specialist consults. For Kivallirmiut, hospitalisation for pregnancy and birth are the most prevalent reasons for hospitalisation, followed by diseases of the respiratory system. Noteworthy, rates of hospitalisation for conditions treatable in primary healthcare for Kivallirmiut are considerably lower than those for Manitobans living in the northern part of the province (where comparable constraints exist). For Inuit adults, rates of hospitalisation for these conditions are comparable to those of Manitobans living in small communities. Inuit living in Manitoba are most often hospitalised for mental health reasons, although other reasons are nearly as prevalent. Our results support the need for more Inuit-centric health programming in Winnipeg.

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Introduction

The Government of Nunavut Canada manages a very complex and fragmented healthcare system. Health services provided in Nunavut focus on primary healthcare. More complex services are accessed by citizens outside of Nunavut, primarily in the Northwest Territories, Ontario, Manitoba, Alberta and to a lesser extent, Quebec. Although a few Inuit organisations have emerged in large urban centres in some provinces to address the needs of Inuit accessing services in these locales, only in Ontario have Inuit-based organisations managed to get the attention of their provincial and

federal governments, and secure substantial funding to develop a network of Inuit-centric clinical and support services, located in Ottawa. The development of an Inuit organisation in Alberta is in its infancy.

The Manitoba Inuit Association (MIA) was created in 2008 to operationalise a vision of *enhancing the lives of Inuit in Manitoba by promoting Inuit values, community and culture while connecting to services that meet our evolving needs* [1]. MIA recognises its obligation as extending to Inuit living in Manitoba, whether they are residents of Manitoba (Manitobamiut), or residents of Nunavut, who are primarily resident of the Kivalliq

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region, accessing services in Manitoba (Kivallirmiut). To support this vision, Inuit associated with MIA approached researchers at the University of Manitoba in 2015 to enlist their assistance in creating profiles of health services utilisation and needs for Inuit accessing services in Manitoba. At the time, years of advocacy had not resulted in tangible federal or provincial investments. The objective of this request then was to enlist the assistance of the research community to document the struggles of Inuit accessing services in Manitoba, to support MIA's advocacy.

MIA's request resulted in a co-created and co-managed study entitled *Qanuinnngitsiarutiksait: Developing Population-Based Health and Well-Being Strategies for Inuit in Manitoba*. The word *Qanuinnngitsiarutiksait*, translated from Inuktitut, means *tools for the well-being/safety of Inuit/people*. The intent of this study was to document the experience and needs of Inuit accessing health and other services in Manitoba, and develop strategies to enhance these experiences and facilitate transitions to and from Nunavut. Specific objectives included 1) developing detailed profiles of Inuit accessing services including length of residence (permanent, short-term, or long-term relocation), types of services accessed, unmet needs, costs and challenges associated with relocating to and accessing services in Manitoba; and 2) propose possible remedies. Our ability to pursue interviews with Inuit was however interrupted by the COVID-19 pandemic, and will be the focus of future work. This article reports on trends in access to Manitoba health services for Kivallirmiut (Inuit from Nunavut, primarily the Kivalliq region) and for Manitobamiut (Inuit already living in Manitoba).

Background

As a result of history, demographics, recruitment and retention issues, and diseconomies of scale [2], health services provided in Nunavut focus on primary health-care provided by nurses working with an expanded scope of practice, and community health representatives [3]. Only larger regional centres have resident family physicians. Smaller communities benefit from family physician and specialist care provided by southern-based visiting professionals who come to the community a few days per month. Some care is provided virtually through a telehealth platform. Eight communities located in the Kivalliq region, the focus of this study, have benefited from a fifty-year relationship with

the University of Manitoba-based Ongomiizwin Health Services (formerly the J.A. Hildes Northern Medical Unit), which provides visiting family physician and specialist services, midwifery, occupational therapy care, physiology, and audiology [4].

Nunavut counts three regions: the Qitirmiut north-east of the Northwest Territories (NWT) with a population of 6,710; the Kivalliq, located north of Manitoba with a population of 11,472; and the Qikiqtaaluk, formerly known as Baffin Island with a population of 18,725 [5], 2015 figures. The Qikiqtani General Hospital is the only Nunavut-based hospital, located in Iqaluit, providing hospital care primarily to residents of the Qikiqtaaluk region [2,6]. Inuit from these regions requiring access to more complex care generally must travel out of territory. Because of pre-existing air travel corridors set by the Government of Canada when it managed health services (before Nunavut) [7], Inuit living in the Qitirmiut region access services predominantly in Yellowknife NWT and Edmonton Alberta; those from the Kivalliq region travel to Winnipeg, Manitoba; and those from the Qikiqtaaluk region travel primarily to Ottawa, Ontario. The MIA reported 16,000 medical trips in 2014–15 for Kivalliq residents alone [8]. In 2013–14,¹ in his 2019 budget address, Minister George Hickes, then minister of Finance for Nunavut, stated,

One of the most concerning issues in healthcare is the cost of flying patients out of the territory for medical treatment. Medical travel will cost more than \$90 million next year, more than one-fifth of all health-care spending [9].

Travel to care may be the result of an urgent need, requiring a medical evacuation or medevac as it is commonly known [2] or may be to attend a single or series of set appointments for diagnoses, treatments, follow-ups, or other referrals. In such cases, travel is undertaken on scheduled flights. In some cases, a relatively simple health problem theoretically treatable locally may result in a medevac because the health centre is short-staffed, there is no available bed to treat overnight, or drugs may be in short supply [2]. Inuit who travel to Winnipeg might be housed at the Kivalliq Inuit Centre [10], a residence exclusively designed for Nunavummiut (Inuit living in Nunavut). The centre is operated by the Government of Nunavut and staffed with Inuktitut speaking professionals from Nunavut tasked with coordinating care and discharge plans and hospital transfers for Kivallirmiut. Similar facilities exist

¹Thereafter, Health Canada stopped reporting on medical transportation costs for Nunavut, and instead began reporting aggregated figures for all territories.

in Churchill, Edmonton, Ottawa, Montreal and Yellowknife. The Kivalliq Inuit Centre is often at full capacity. In such cases, Inuit are lodged in local lower quality city hotels where safety issues have been documented [11].

Rankin Inlet is the regional centre for the Kivalliq region. Since 1993, a local birthing centre was established in the hamlet to bring back low-risk births to the region. It was set up to serve all 8 Kivalliq communities, including Arviat, Baker Lake, Chesterfield Inlet, Coral Harbour, Naujaat, Sanikiluaq and Whale Cove [12]. Staffing issues have at time prevented the centre from delivering services.

In some cases, when healthcare and service needs cannot be met in their home communities, Inuit relocate to urban centres [13]. In other cases, relocation is motivated by employment and educational opportunities, housing shortages, and other needs. Relocation can be permanent, long term, or short lived, with periodic returns to Nunavut. The north–south corridors discussed above often result in corridors for relocation. As a result, Edmonton, Winnipeg, and Ottawa have significant resident Inuit population, and see large numbers of Inuit visiting from Nunavut to access health and other services.

A considerable body of literature has documented health inequities experienced by Inuit because of colonisation and consequential policies that have repressed and undermined Inuit self-determination and sovereignty over health [14–16]. Potentially avoidable mortality (PAM) refers to mortality from conditions that are deemed preventable through health education, early intervention, and primary healthcare support. These services are available in Nunavut, although acute care pressures can at times side-track prevention services [2,17]. Rates of PAM have been slowly increasing in all jurisdictions over time. Rates in Nunavut are considerably higher than in Manitoba and Canada (3.08, versus 2.43 and 2.12 respectively), indicating that prevention efforts may be under-resourced [18,19]. Still it is important to note that PAM does not distinguish between ineffective or insufficient prevention efforts, and the lack of opportunities for patients to operationalise recommendations. For example, a recommendation to adopt a healthier diet may be impossible to operationalise when facing food insecurity [20–24].

The Inuit Tapiriit Kanatami (ITK) is the organisation politically representing Inuit in Canada. ITK reported that in 2016, 65,030 Inuit lived in Canada. Of these, 17,690 (37.4%) were reported to be living outside of their traditional territory [25]. The Inuit traditional territory is known as Nunangat, and includes four northern Canadian regions: the Inuvialuit Settlement Region (in

the northern portion of the Northwest Territories), Nunavut, Nunavik in northern Quebec and Nunatsiavut in Labrador (which is part of the province of Newfoundland and Labrador). Inuit have been demanding access to Inuit-centric or at least Inuit-informed services for those living outside of Nunangat and for Inuit travelling to urban centres to access care [13,26–30]. We have shown elsewhere that the vast majority of Inuit accessing services in Manitoba come to Winnipeg to receive these services [suppressed for anonymity].

Methods

In this study, we wanted to document the patterns of service utilisation for all Inuit accessing services in Manitoba, whether residents of Manitoba (Manitobamiut) or residents of the Kivalliq region (Kivallirmiut). This choice was informed by priorities set by MIA. Throughout this study, we engaged MIA and a Council of Nunavut and Manitoba Inuit *Isumataiit Sivuliuqtii* (Elders or knowledge keepers, co-authors, on all publications), to ensure that analyses and interpretations resonated with their experience, and that results would inform the development of strategies to address unmet needs. Our team was guided by a protocol, co-developed with the *Isumataiit Sivuliuqtii* [suppressed for anonymity], thereby ensuring that our work remained grounded in *Inuit Qaujimagatuqangit* ([IQ] Inuit ways of knowing) [31,32].

Data source and scope

To identify Inuit in health administrative datasets, we used two interrelated approaches we described in detail in a previous publication [33,34]. In summary, **for Inuit from the Kivalliq accessing services in Manitoba (Killarmiut)**, Manitoba Health identified all services delivered to Kivalliq Inuit, identified through their Nunavut Healthcare Number (NHCN) card. **For Inuit living in Manitoba (Manitobamiut)**, we used the criteria of *ever had a Nunavut Health Care Number* as recorded by Manitoba Health for those accessing services in Manitoba, to identify Inuit in Manitoba Health's data. In both cases, our cohorts may include a few non-Inuit (up to 9.8%) [35]. While this is not ideal, Elders advised that the non-Inuit population moved to Nunavut primarily for employment and is likely to leave when employment ends. In contrast, Inuit are known to shoulder a significantly higher burden of chronic diseases, and to experience higher mortality rates [36]. Consequently, we anticipate that the number

of consults and hospitalisations by non-Inuit would be considerably less than 9.8%.

Once cohorts were created, we linked these cohorts to administrative data housed in the Population Health Research Data Repository at Manitoba Centre for Health Policy (MCHP).² We were able to link these two cohorts to a long list of administrative datasets, including hospital separation abstracts; vital statistics; admission, discharge, and transfer, e-triage; hospital abstracts; Manitoba Provincial Client Registry; and medical services provided (physician, specialists, based on billings). Our data linkage spanned 1999 (earliest data available) to 2016. We used the Canadian fiscal year (April 1 to March 31) rather than the calendar year.

Ethics

The study received ethics approval from the University of Manitoba Health Research Ethics Board and data access approval from the Manitoba Health Information Privacy Committee. The MIA Board of Directors also approved the study.

Analysis

In this article, we report on analyses designed to provide an overview of Inuit health service utilisation in Manitoba. We provide a description of the cohorts, report on hospitalisation rates and reasons for hospitalisation, and also provide comparative data on hospitalisations. We were able to calculate rates for Kivallirmiut hospitalised in Manitoba, using Statistics Canada population figures for

our denominator to calculate rates of hospitalisation [37,38]. We were however not able to do the same for ambulatory care, since Nunavut provides access to family physicians, specialists, and primary care nurses in Nunavut. Thus, ambulatory care access in Manitoba is only a portion of the ambulatory care accessed by Kivallirmiut. We compare results for Kivallirmiut and Inuit living in Manitoba, where informative.

We were able to calculate age and sex-adjusted rates of hospitalisation for Kivallirmiut accessing services in Manitoba, and compare these rates to smaller communities in Manitoba, to communities located in the northern part of Manitoba, and to all of Manitoba. We used the population of Manitoba to calculate adjusted rates (age, sex). We also calculated rates of hospitalisation for ambulatory care sensitive conditions (ACSC), which are “diagnoses for which timely and effective out-patient [primary] care can help to reduce the risks of hospitalization by either preventing the onset of an illness or conditions, controlling an acute episodic illness or conditions, or managing a chronic disease or condition” [39], p. 163. Our definition of ACSC is provided in Appendix I. We identified the ten most prevalent conditions for which Manitoba Inuit and Kivallirmiut are hospitalised. Definitions are provided in Appendix II.

Results

Cohort descriptions

Kivallirmiut accessing services in Manitoba (Figure 1) shows that the vast majority of Kivallirmiut are accessing services in Winnipeg, as opposed to other sites in

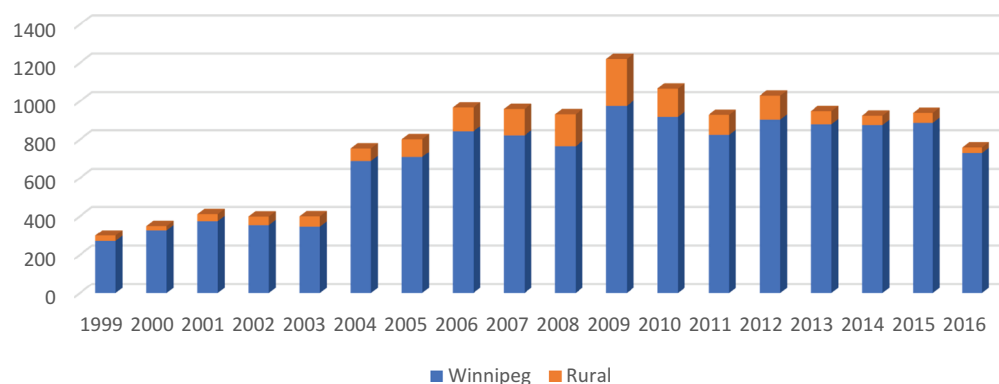


Figure 1. Number of Kivalliq patient hospitalisations, winnipeg vs Manitoba rural settings, 1999–16.

²MCHP is a centre of research excellence that conducts world class population-based research on health, and the social determinants of health. MCHP develops and maintains a comprehensive population-based data repository on behalf of the Province of Manitoba for use by the local, national and international research community.

Table 1. Manitobamiut cohort description: Inuit living in Manitoba.

	Number			Age women		Age men	
	Men	Women	Total	Average age	Standard dev	Average age	Standard dev
1999	166	187	353	28.8	15.5	29.5	15.9
2000	176	212	388	28.1	15.7	29.8	15.4
2001	202	226	428	28.3	16.1	30.4	16.0
2002	236	251	487	28.4	15.7	30.0	16.5
2003	259	262	521	29.4	15.9	30.4	16.8
2004	290	300	590	30.7	16.4	32.1	17.6
2005	284	317	601	31.7	16.4	33.8	17.7
2006	286	332	618	32.4	16.9	34.5	17.8
2007	304	348	652	33.4	17.2	34.9	18.3
2008	313	379	692	33.4	17.7	35.2	18.3
2009	311	392	703	33.5	17.9	36.5	18.6
2010	327	402	729	34.1	17.8	37.0	18.9
2011	336	405	741	34.8	17.8	37.5	18.8
2012	340	405	745	35.6	18.0	37.7	19.1
2013	361	422	783	35.4	18.2	38.2	19.2
2014	370	430	800	36.7	18.4	39.2	19.3
2015	381	433	814	37.2	18.5	39.9	19.5
2016	369	416	785	38.5	18.6	41.2	19.5

Manitoba. Between 2004 and 2012, a significant portion of services were accessed in the northern town of Churchill. This has now diminished considerably due to government cuts and health facility regulations. A majority of services accessed in Churchill are in-hospital tooth removal related to early childhood tooth decay through a paediatric dentistry training program overseen by the University of Manitoba.

Manitobamiut Our cohort of Manitobamiut is shown in Table 1. We aligned timelines to reflect more dependable data and sex/age breakdown (1999–2016). Our data shows 785 Inuit relocating to Manitoba between 1999 and 2016. This however underestimates the total number of Inuit in Manitoba, which is estimated closer to 1,500 [33].

Our cohort of Manitobamiut is older than Kivallirmiut population, where the median age is 22.3 years of age for women and 22.9 for men [37,38].

Table 2 suggests that the Manitobamiut population is relatively stable, with an average of 43 new arrival every year. It is noteworthy that since 2010, nearly 95% of Manitobamiut had been in the province for at least one year.

Figure 2 shows that most Manitobamiut settle in Winnipeg. As with Kivallirmiut, we note a shift away from healthcare facilities operated by the Northern Regional Health Authority, possibly related to a reduction of services offered in Churchill in the 2003–07 timespan. Overall, two thirds of Manitobamiut move to a location within the boundaries of the Winnipeg Regional Health Authority.

Table 2. Cohort description: percentage of Inuit moving to Manitoba (Manitobamiut).

	Number of Inuit living in Manitoba	Number of Inuit moving to Manitoba	Yearly % of Inuit new arrived to Manitoba
1999	353	24	6.8%
2000	388	37	9.5%
2001	428	44	10.3%
2002	487	65	13.3%
2003	521	51	9.8%
2004	590	59	10.0%
2005	601	48	8.0%
2006	618	48	7.8%
2007	652	49	7.5%
2008	692	65	9.4%
2009	703	46	6.5%
2010	729	32	4.4%
2011	741	39	5.3%
2012	745	30	4.0%
2013	783	50	6.4%
2014	800	38	4.8%
2015	814	43	5.3%
2016	785	6	0.8%

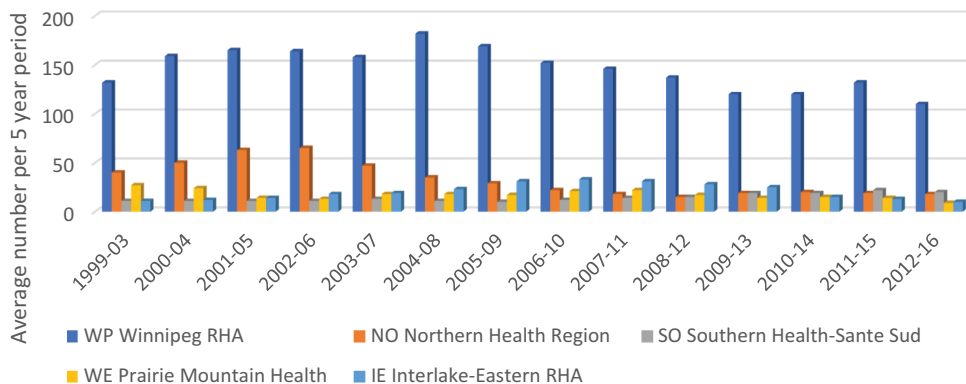


Figure 2. Kivallirmiut living in MB by regional health authority, yearly average (5 years roll-up).

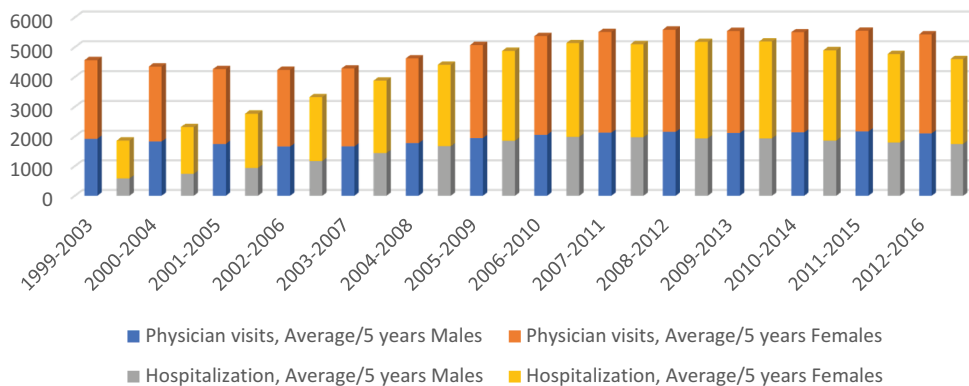


Figure 3. Average yearly number of physician visits and hospitalisation by sex for Kivallirmiut, per 5 year period, 1999–16.

Table 3. Proportion of total medical visit attributable to ambulatory care over time, Kivallirmiut.

	Males	Females
1999–2003	77%	67%
2000–2004	71%	62%
2001–2005	65%	58%
2002–2006	59%	55%
2003–2007	54%	52%
2004–2008	51%	51%
2005–2009	51%	51%
2006–2010	51%	51%
2007–2011	52%	52%
2008–2012	53%	51%
2009–2013	52%	51%
2010–2014	53%	53%
2011–2015	55%	53%
2012–2016	55%	54%

Health services utilisation for Kivallirmiut

Figure 3 shows the average number of yearly physician visits and hospitalisations by sex, for 5-year roll-up

periods. This figure shows a shift from more physician visits in 1999–2003, to a nearly even distribution of physician visits and hospitalisations in 2012–2016. When adding physician and hospital visits for the 2012–2016 period, our data shows 10,032 visits. This graph does not factor in visits for diagnostic purposes and for follow up with allied services (physiotherapy, for example).

Table 3 shows the proportion of medical visits for ambulatory care (out-patient care), over time. Our data shows that between 1999 and 2016, out-patient service utilisation declined for Kivallirmiut, suggesting that such services are being accessed in Nunavut.

Figures 4(a,b) show the rates of hospitalisation in Manitoba for Kivallirmiut children (less than 20 years of age) and adults (20 years of age and older), compared to Manitobans living in small Manitoba communities, in the Northern Regional Health Authority and for

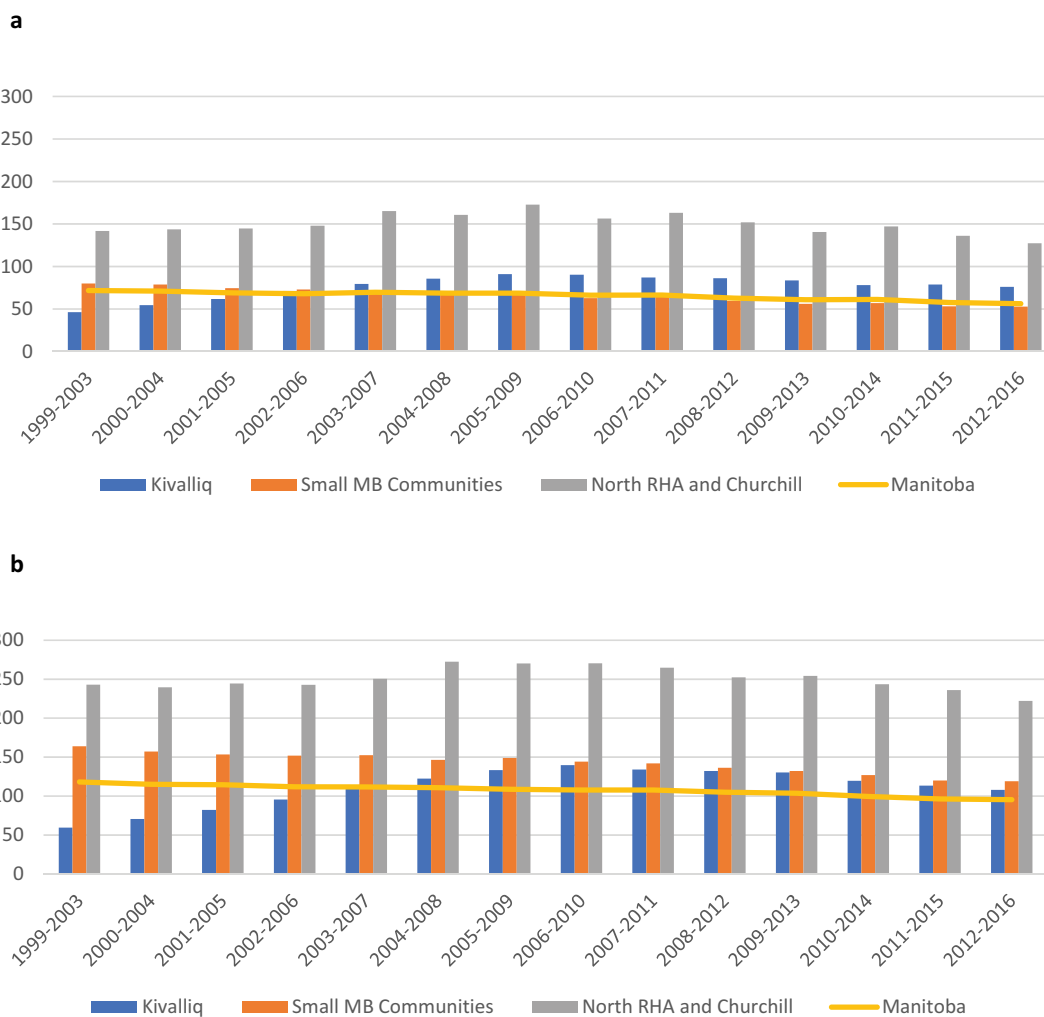


Figure 4. (a) Adjusted rates (sex, age) of all hospitalisation for children (<20 years) of the Kivalliq region, per 1000 (5 year roll-up). **(b)** Adjusted rates (sex, age) of all hospitalisation for adults (20 years and older) of the Kivalliq region, per 1000 (5 year roll-up).

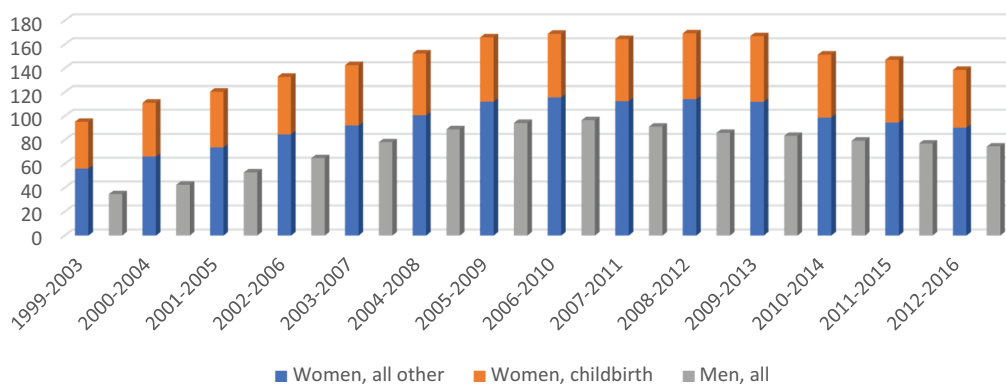


Figure 5. Adjusted rates of In-patient hospitalisations per 1000 by sex, Kivallirmiut (5 years roll-up).

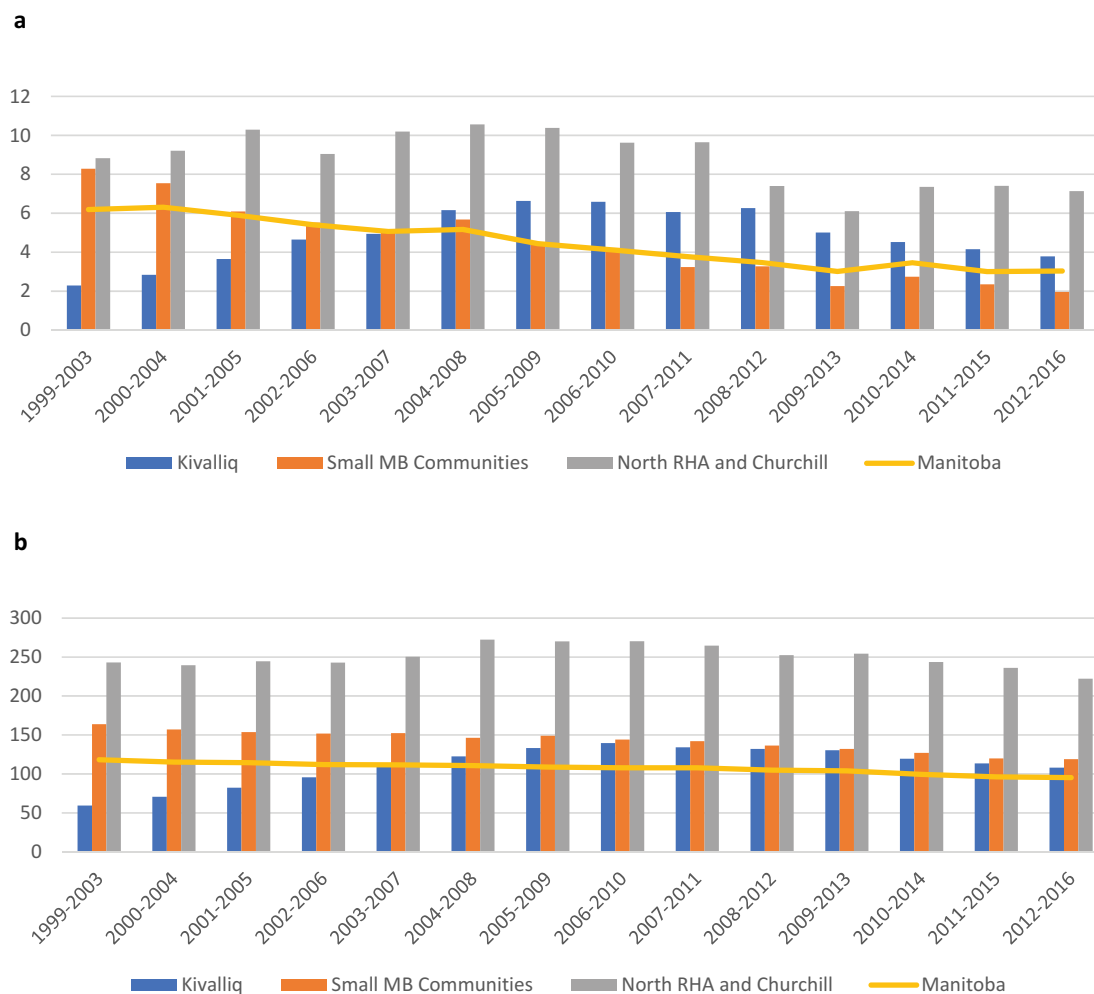


Figure 6. (a) Adjusted rates of ambulatory care sensitive conditions hospitalisation for Kivalliq children (<20 years), per 1000 (5 year roll-up). (b) Adjusted rates of ambulatory care sensitive conditions hospitalisation for Kivalliq adults (20 years and >), per 1000 (5 year roll-up).

all Manitoba. This comparison shows that the rates of hospitalisation for Kivallirmiut children and adults are comparable to that of Manitoba's small community residents and to all of Manitoba, and considerably lower than that of residents of the Northern Regional Health Authority which in our study also includes Churchill up until 2012, suggesting better access to such services in Nunavut. After 2012, Churchill Health Centre joined the Winnipeg Regional Health Authority for administrative efficiencies and other regulatory measures.

Figure 5 shows that Kivallirmiut women are hospitalised more frequently than men, even when hospitalisations for childbirth are considered.

We explored the top ten reasons why Manitobamiut, and Kivallirmiut are hospitalised in Manitoba. Both cohorts show considerable

differences. Manitobamiut are most often hospitalised for mental health reasons, although other reasons are nearly as prevalent. In contrast, for Kivallirmiut, hospitalisation for pregnancy and birth are the most prevalent reasons why hospitalisation occurs, followed by diseases of the respiratory system.

Finally, (Figures 6a,b) show the rates of hospitalisation for ambulatory care sensitive conditions (ACSC). Figure 6a shows that the rates of hospitalisation for ACSC for Kivalliq children are higher than those documented for small Manitoba communities, and for all Manitoba.

The results are slightly different for adults, where rates for Kivallirmiut are slightly lower than the rates for smaller MB communities. In all cases, the rates for the Northern Regional Health Authority and

Churchill remain considerably higher, suggesting better access to effective primary care in Nunavut.

Discussion

This study is a first attempt at documenting how and why Inuit access health services in Manitoba. The attempt breaks new methodological ground. We note some limitations. To begin, as mentioned before, our cohorts may include some non-Inuit: up to 9.8%, which is the population of non-Inuit living in the Kivalliq [35]. This limitation is simply due to the lack of an alternative for identifying Inuit in Manitoba Health dataset. We still believe that given the burden of illness shouldered by Inuit, the number of consults by non-Inuit will be considerably lower than 1 in 10, and see this as an acceptable compromise given the lack of alternatives. We report on additional challenges associated with each cohort separately.

For the **cohort of Kivallirmiut** accessing care in Manitoba, *first*, a small proportion of Inuit accessing services in Manitoba may be from other regions of Nunavut. Examples provided to us by experts include Inuit children being treated for early childhood decay at the health centre in Churchill. We are told that Inuit children from all of Nunavut access these specific services in Churchill. Another example includes Inuit accessing mental health services at the Selkirk Mental Health Centre. This centre provides mental health stabilisation and residential care to children in crisis, and host Inuit from Kivalliq and elsewhere in Nunavut. *Second*, Kivallirmiut requiring highly specialised care may be transferred to centres others than Winnipeg (e.g. Vancouver, Toronto). The number of cases is however estimated low, and unlikely to have a significant impact on the data reported here.

We also note some limitations to the **cohort of Manitobamiut**. *First*, we are aware of instances where Inuit families from the Kivalliq move to Winnipeg, return to Nunavut and come back eventually. Our count thus includes the same individual counted separately. *Second*, the method we used to identify Inuit was to include anyone living in Manitoba who previously had a Nunavut healthcare number. As a result, we are missing some Inuit families who were living in Manitoba before the creation of Nunavut. *Second*, our final cohort is small, and limited the number of analyses we could undertake. For example, we could not define a denominator for this cohort, which prevented us from calculating rates.

An overall limitation is that our analyses were confined to health administrative data. Although we had planned to engage Inuit in interviews to

document their lived experience of accessing care in Manitoba, this plan was interrupted by the COVID-19 pandemic. This work remains a part of future plans, and will be undertaken when safe to meet face-to-face, build relationships and engage in this potentially triggering work. We are mindful of the risk of re-traumatising participants, and will require an aftercare network to ensure continuous safety. We are also mindful that interviews may raise issues that are “fixable” (access to safe care, food insecurity) and that we will need a process to ensure that those issues are passed on to those who can advocate and act (with permission), to ensure that actionable issues are not relegated to a transcript for analysis, when immediate benefits for participating in the study could have been realised by participants. We acknowledge that our original plan would have yielded richer data than what we were able to include in this manuscript.

Despite these limitations, we believe that the methods we have developed provide a novel perspective on health service utilisation and needs. Our results show that Kivallirmiut primarily access services in Winnipeg: indeed, between 75% in 2009 to 96% in 2016 of all hospitalisations occurred in Winnipeg. Likewise, Inuit moving to Manitoba primarily relocate to Winnipeg (from 57% in 1999–2003 to 66% in 2012–16). As stated, MIA reported that in 2014–2015, approximately 16,000 health-related consults were made by Kivallirmiut in Manitoba [8]. Our data shows a yearly average of approximately 10,000 visits to clinics for physician visits and hospitalisations. Our data does not include other reasons for medical travel including diagnostic services and accessing allied services unavailable in Nunavut. Although MIA’s mandate is to serve all Inuit in Manitoba, whether residents or travelling to Manitoba to access to services, our results show a clear rationale for focusing a substantial part of MIA’s efforts in Winnipeg.

We investigated rates of hospitalisations for Kivalliq children and adults. Our results (Figures 4a, b) show the rates of Kivalliq children and adults’ hospitalisation for all causes is slightly higher when compared to that of residents of small Manitoba communities and of all Manitoba. Given the rates of potentially avoidable mortality previously discussed, where Nunavut residents show higher rates than all Manitoba and Canada, we wanted to look more closely at hospitalisations that are treatable in a primary healthcare setting (called ambulatory care sensitive conditions or ACSC) which is the level of care available in Kivalliq communities. Figures 6(a,b) show that

the rates of hospitalisations for ACSC for Kivallirmiut are slightly higher than those of small Manitoba communities and of all Manitoba. These results may be explained at least in part by the challenges associated with the recruitment and retention of health human resources in Nunavut, and by the challenges associated with staffing remote health facilities when workload can shift abruptly because of an accident or a flu outbreak, resulting in pressures on an existing committed albeit limited number of staff. Previous work published by our team has shown that the same and other pressures can result in medevacs [suppressed for anonymity].

Our results also show that hospitalisation for child-birth (Figure 5) remains an important driver of hospitalisation rates. The Government of Nunavut reported 289 births to Kivalliq residents in 2011 [5]. Our data shows an average of 232 births to Kivalliq women occurred in Manitoba during the same period. The discrepancy between these numbers might represent the number of births occurring in Nunavut communities [12]. For example, a news article published in 2014 reported approximately 50 births per year at the Rankin Inlet Birthing Centre [40], statistics from official sources could not be located. In addition, births do occur in community health centres across the region when women present are in active labour, and transportation is not possible because of weather conditions or other factors. We are continuing to investigate these issues.

Finally, our results document that the two cohorts have very different healthcare needs. For example, the most prevalent reason why Manitobamiut access services is mental health. We did not document the effectiveness of these services. In contrast, the most prevalent reason why Kivallirmiut access services is for conditions originating in the perinatal period, pregnancy, and birth. Discussions with the *Isumataiit Sivuliuqtii* and community partners however consistently raise the need for services to be more aware of Inuit culture, and more responsive to their needs. A concept of cultural safety, developed by Inuit for Inuit, is emerging [41] through very recent work. The *Isumataiit Sivuliuqtii*, as well as community partners, have reiterated the urgent need to implement health services that are *Piqusiivut Opiqniq* (which translates as *we believe in our culture* and epitomises the concept of culturally safe care from an Inuit perspective). This is certainly true of Manitoba, and likely extends to all southern-based sites responsible for healthcare provision to Inuit. This is an emergent field of Inuit scholarship, to which our research project is committed to making a strong contribution.

Conclusions

This study is making a unique contribution to understanding the relationship between healthcare provided in the Kivalliq region, and in Manitoba, to meet the healthcare needs of Inuit. A key finding is the volume of services provided in Manitoba. This alone justifies the existence of the Manitoba Inuit Association, an Inuit-centric urban organisation, to advocate for Inuit. It also underscores the importance of funding Manitoba-based programs and services that reflect or is at least mindful of Inuit culture and contexts. At the time of writing, a Memorandum of Understanding exists between Manitoba and Nunavut, addressing the need for coordination and cooperation [42]. The language of the agreement however is high level and addresses all sectors where the two jurisdictions might collaborate. Nunavummiut might be better served by a more detailed agreement, defining expectations of culturally safe care for Inuit accessing care in Manitoba.

Beyond health services, Manitobamiut or Kivallirmiut travelling to Manitoba to access care also require access to navigation and coordination of services to meet their specific needs. While the Kivalliq Inuit Centre provides such services to Kivallirmiut, members of our research team have occasionally been asked by Inuit patients for assistance in finding access to responsive care. Our collective experience in these cases has been that Inuit-centric services are sorely lacking in Manitoba overall, and in Winnipeg in particular. We have been able to leverage relationships to expand access to Inuit-centric primary health care and navigation services in Winnipeg [suppressed for anonymity]. What is now provided is crucial but only addressing a fraction of the needs. We are continuing our work to further document specific unmet needs, to advocate for change.

Data availability statement

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.

Disclosure statement

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Appendix I. Definitions of ambulatory care sensitive conditions

Category	Condition	ICD-9-Codes	
Chronic Conditions	Asthma	ICD-9-CM 493; ICD-10-CA J45	
	Angina	ICD-9-CM 411, 413; ICD-10-CA 120, 123.82, 124.0, 124.8, 124.9 Excluding cases with the following surgical procedures**: ICD-9 01.01–86.99; CCI 1.^,2.^,5.^ (i.e. any procedure from CCI section 1, 2, 5)	
	Heart Failure and pulmonary oedema	ICD-9-CM 428, 518.4; ICD-10-CA 150, J81, I11.0 Excluding cases with the following surgical procedures**: ICD-9 36.01, 36.02, 36.05, 36.1, 37.5, 37.7; CCI 1.IJ.50, 1.IJ.57.GQ, 1.HZ.85, 1.IJ.76, 1.HB.53; 1.HD.53, 1.HZ.53, 1.HB.55, 1.HD.55, 1.HZ.55, 1.HB.54, 1.HD.54	
	Diabetes with complications	ICD-9-CM 250; ICD-10-CA E10, E11, E13, E14	
	Hypertension	ICD-9-CM 401, 402; ICD-10-CA I10.0, I10.1, I11 Excluding cases with the following surgical procedures**: ICD-9 36.01, 36.02, 36.05, 36.1, 37.5, 37.7; CCI 1.IJ.50, 1.IJ.57.GQ, 1.HZ.85, 1.IJ.76, 1HB.53; 1.HD.53, 1.HZ.53, 1.HB.55, 1.HD.55, 1.HZ.55, 1.HB.54, 1.HD.54	
	COPD	ICD-9-CM 491, 492, 494, 496; ICD-10-CA J41, J42, J43, J44, J47	
	Pneumonia	Pneumonia (only when a secondary diagnosis of COPD is present): ICD-9-CM 480, 481, 482, 483, 484, 485, 486; ICD-10-CA J12, J13, J14, J15, J16, J18 *Exclude if secondary diagnosis of Sickle Cell Anaemia is present	
	Bronchitis	Acute Bronchitis (only when a secondary diagnosis of COPD is present): ICD-9-CM 466.0 ICD-10-CA J20	
	Vaccine Preventable Conditions	Diphtheria	ICD-9-CM 032; ICD-10-CA A36
		Hemophilus Influenza type B	ICD-9-CM 320.0; ICD-10-CA G00.0
Hepatitis A		ICD-9-CM 070.0, 070.1; ICD-10-CA B15	
Hepatitis B		ICD-9-CM 070.2, 070.3; ICD-10-CA B16	
Influenza		ICD-9-CM 487; ICD-10-CA J10, J11	
Measles		ICD-9-CM 055; ICD-10-CA B05	
Meningococcal disease (meningitis)		ICD-9-CM 036; ICD-10-CA A39	
Mumps		ICD-9-CM 072; ICD-10-CA B26	
Pertussis		ICD-9-CM 033; ICD-10-CA A37	
Pneumococcal		ICD-9-CM 038.2, 041.2, 320.1, 567.1, 711.0, 481; ICD-10-CA G00.1, A40.3, J13 Note: "Chronic conditions" are given the priority in the hierarchy for code 481 or J13 (see Pneumonia, only when a secondary diagnosis of COPD is present).	
Poliomyelitis		ICD-9-CM 045; ICD-10-CA A80	
Tuberculosis		ICD-9-CM 011–018; ICD-10-CA A15 – A19	
Rubella	ICD-9-CM 056; ICD-10-CA B06		
Tetanus	ICD-9-CM 037; ICD-10-CA A34, A35		
Acute Conditions	Dental Conditions	ICD-9-CM 521, 522, 523, 525, 528; ICD-10-CA K02.0, K02.1, K02.2, K02.3, K02.4, K02.8, K02.9, K03.0, K03.1, K03.2, K03.3, K03.4, K03.5, K03.6, K03.7, K03.8, K03.9, K04.0, K04.1, K04.2, K04.3, K04.4, K04.5, K04.6, K04.7, K04.8, K04.9, K05.0, K05.1, K05.2, K05.3, K05.4, K05.5, K05.6, K06.0, K06.1, K06.2, K06.8, K06.9, K08.0, K08.1, K08.2, K08.3, K08.80, K08.81, K08.82, K08.83, K08.87, K08.88, K08.9, K09.8, K09.9, K12.0, K12.1, K12.2, K13.0, K13.1, K13.2, K13.3, K13.4, K13.5, K13.6, K13.7	
	Cellulitis	ICD-9-CM 681, 682, 683, 686; ICD-10-CA, L03, L04, L08, L44.4, L88, L92.2, L98.0, L98.3 Excluding cases with the following surgical procedures except incision of skin and subcutaneous tissue where it is the only listed: ICD-9 01.01–86.99 (except 86.0–86.09) CCI 1.^,2.^,5.^ (i.e. any procedure from CCI section 1, 2, 5) (except 1.AXE.53.LA-QK, 1.IS.53.HN-LF, 1.IS.53.LA-LF, 1.JU.53.GP-LG, 1.KR.53.LA-LF, 1.OA.53.LA-QK, 1.SY.53.LA-QK, 1.YA.35.HA-W1, 1.YA.35.HA-X4, 1.YA.52.HA, 1.YA.52.LA, 1.YA.55.DA-TP, 1.YA.55.LA-TP, 1.YA.56.LA, 1.YB.52.HA, 1.YB.52.LA, 1.YB.55.DA-TP, 1.YB.55.LA-TP, 1.YB.56.LA, 1.YF.35.HA-W1, 1.YF.35.HA-X4, 1.YF.52.HA, 1.YF.55.DA-TP, 1.YF.55.LA-TP, 1.YF.56.LA, 1.YG.52.HA, 1.YG.52.LA, 1.YG.55.DA-TP, 1.YG.55.LA-TP, 1.YG.56.LA, 1.YR.52.HA, 1.YR.52.LA, 1.YR.56.LA, 1.YS.35.HA-W1, 1.YS.35.HA-X4, 1.YS.52.HA, 1.YS.52.LA, 1.YS.55.DA-TP, 1.YS.55.LA-TP, 1.YS.56.LA, 1.YT.35.HA-W1, 1.YT.35.HA-X4, 1.YT.52.HA, 1.YT.52.LA, 1.YT.55.DA-TP, 1.YT.55.LA-TP, 1.YT.56.LA, 1.YU.52.HA, 1.YU.52.LA, 1.YU.55.DA-TP, 1.YU.55.LA-TP, 1.YU.56.LA, 1.YV.35.HA-W1, 1.YV.35.HA-X4, 1.YV.52.HA, 1.YV.52.LA, 1.YV.55.DA-TP, 1.YV.55.LA-TP, 1.YV.56.LA, 1.YW.52.HA, 1.YW.52.LA, 1.YW.55.DA-TP, 1.YW.55.LA-TP, 1.YW.56.LA, 1.YX.52.HA, 1.YX.52.HA-AV, 1.YX.52.LA, 1.YX.56.LA, 1.YZ.35.HA-W1, 1.YZ.35.HA-X4, 1.YZ.52.HA, 1.YZ.52.LA, 1.YZ.55.DA-TP, 1.YZ.55.LA-TP, 1.YZ.56.LA	
	Pelvic Inflammatory Disease	ICD-9-CM 614, ICD-10-CA, N70, N73, N99.4 Exclude males or cases with a hysterectomy procedures: ICD-9 68.3–68.89, CCI 1.RM.87, 1.RM.89, 1.RM.91, 5.CA.89.CK, 5.CA.89.DA, 5.CA.89.GB, 5.CA.89.WJ, 5.CA.89.WK	
	Gastroenteritis & Dehydration	ICD-9-CM 558, 276.5; ICD-10-CA K52.2, K52.8, K52.9, E86	
	Severe Ear, Nose and Throat (ENT) infections	ICD-9-CM 382, 462, 463, 465, 472.1; ICD-10-CA H66, J02, J03, J06, J31.2, H67 Exclude otitis media cases with a myringotomy procedure: ICD-9 20.01; CCI 1.DF.53.JA-TS	

(Continued)

(Continued).

Category	Condition	ICD-9-Codes
Mental health	Mood disorders	ICD-9-CM 296.1–296.8, 300, 309 or 311; ICD-10-CA F31, F32, F33, F34.1, F38.0, F38.1, F41.2, F43.1, F43.2, F43.8, F53.0, F93.0 or with a diagnosis for an anxiety state, phobic disorders or obsessive-compulsive disorders: ICD-9-CM 300.0, 300.2, 300.3, 300.7; ICD-10-CA F40, F: ICD-9-CM 300; ICD-10-CA F32, F34.1, F40, F41, F42, F44, F45.0, F45.1, F45.2, F48, F68.0, or F99, F41.0, F41.1, F41.3, F41.8, F41.9, F42, F45.2
	Schizophrenia	ICD-9-CM 295 ICD-10-CA F20, F21, F23.2, F25

* "Secondary diagnosis" refers to a diagnosis other than most responsible

** Code may be recorded in any position. Procedures coded as cancelled, previous and "abandoned after onset" are excluded.

Appendix II. Most prevalent reasons for diagnosis: definitions

Conditions	ICD-9 Codes
Cancer	140–239
Circulatory System (includes hypertensive heart disease)	390–459
Conditions Originating in Perinatal Period, Pregnancy & Birth	630–679, 760–779
Digestive System (includes cirrhosis and liver diseases)	520–579
Disorders of Skin	680–709
Endocrine & Metabolic Diseases	240–279
Factors Influencing Health Status & Contact	V01–V89
Genitourinary System	580–629
Infectious and Parasitic Diseases	001–139
Injury & Poisoning (includes overdoses)	800–999
Mental Illnesses	290–319
Musculoskeletal System (include rheumatoid arthritis, osteoarthritis, osteoporosis)	710–739
Nervous System (includes chronic meningitis, Huntington's disease, multiple sclerosis, Bell's palsy)	320–389
Respiratory System (including influenza)	460–519
Symptoms, Signs & Ill-Defined Conditions	780–799