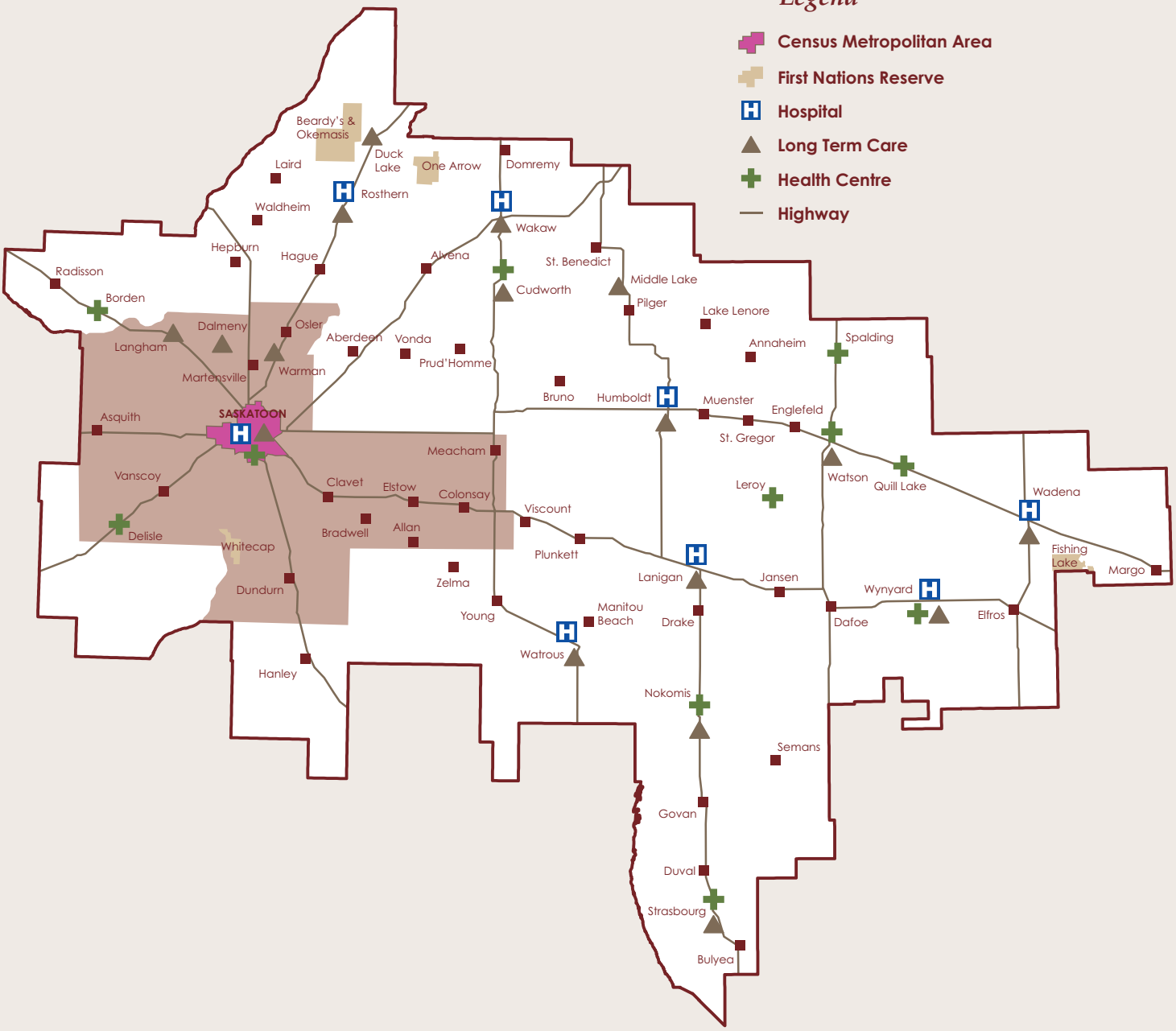
HEALTH STATUS 2008 REPORT

A Report of the Chief Medical Health Officer

Saskatoon Health Region

Saskatoon Health Region



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Saskatoon Health Region	*Outside Saskatoon Health Region*
Chronic Disease Management and Renal Services	City of Saskatoon, Environmental Services
Continuing Care and Seniors Health	Ducks Unlimited Canada
Corporate and Public Affairs	Health Quality Council
Facilities and Engineering Services	Ministry of Environment
Home Care, Client Patient Access Services, Podiatry and Palliative Care	Ministry of Health
Infection, Prevention and Control	Saskatchewan Cancer Agency
Integrated Community Services	Saskatoon City Police, COMPSTAT/Planning Unit
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Letter from the Chief Medical Health Officer

The 2008 Health Status Report tells a story about the overall health and well-being of Saskatoon Health Region residents. To strive for the Region's vision of Healthiest people, Healthiest communities, Exceptional service, a sound understanding of our health status and the many factors that influence health are important. Every four to five years, a detailed health status report is produced by the office of the Chief Medical Health Officer to provide a broader picture of health status. It is my hope that the information contained in this report will be useful to Health Region employees, physicians and decision makers as well as external partners, community members and agencies for purposes such as strategic planning, priority setting and policy, program and service development.

He who has health, has hope. And he who has hope, has everything. Proverb

What's Our Story?

Telling Saskatoon Health Region's health status story is not straightforward. Similar to many places across Canada, the majority of our residents enjoy good health. But this experience is not shared equally across all groups in our region for a variety of reasons, many of which are amenable to program and policy intervention.

In looking at the health of our region's population as a whole and the issues that influence health, there are many positive things to say. Using the most recent data available: Overall life expectancy is increasing. Rates of heart disease and cancer are decreasing. Infant mortality rates are declining. Household income is up. The percentage of low income families is down. Unemployment is at near record lows. We are well educated compared to the provincial average. A majority of us report excellent or very good quality of life. We enjoy good air quality and drinking water . . . and the list goes on. This is all good news and a clear indication that we appear to be moving in the right direction towards the Region's vision.

In light of this good news, we must celebrate the progress we've made in our communities over the past number of years. More collective attention has been paid to initiatives aimed at tackling poverty and addressing homelessness. A provincial and municipal smoking ban in public places has reduced exposure to second hand smoke. We are making progress in supporting the management of chronic diseases. An injection drug use strategy has been developed. We are advancing efforts to reduce our ecological footprint. And the list goes on.

But we must not limit our story to just one chapter as it is only part of our health status story. Diabetes mortality and hospitalization rates are on the rise. Injuries - which can be prevented - are the leading cause of premature death, slightly ahead of all cancers. Depression is the most common mood disorder cause for hospitalization. We have among the highest rates of sexually transmitted infections across the nation. Our coverage rates for immunization are lower than optimal. And this list also goes on.

Taking a closer look at our health status and the factors that influence health further reveals there is still much room for improvement in this story.[a] Urban residents generally enjoy better health than rural residents. Food costs are higher in rural areas than urban. Significant gaps in health equity between rich and poor permeate the region. Life expectancy is decreasing in our core neighbourhoods and these residents continue to have poorer health outcomes than those in the most affluent areas with infant mortality rates at double those of the region as a whole and higher low birth weight rates. Close to half of core neighbourhood residents live below the poverty line. Access to grocery stores in Saskatoon's core is lacking. HIV rates are up. Our smoking rates are increasing. And this list also goes on.

This story is not unique to our health region. Health inequity has been the subject of many recent national and international reports. The Canadian Population Health Initiative's *Reducing Gaps in Health* and Canada's Chief Public Health Officer Dr. David Butler Jones *Report on the State of Public Health in Canada* have helped illuminate the extent of health inequities in Canada and some of their main contributors.

[a] *Note: a rural health status report has also been developed that highlights in more detail rural issues. Readers are encouraged to contact the Public Health Observatory, Public Health Services for more information.*

At the local level, Saskatoon Health Region's Public Health Observatory staff have studied the rates of illness, hospitalization, use of services, health behaviours and health outcomes between those in low income areas compared to others in our community and have found large differences. This work has helped to establish programs directed at those most in need and has given us the ability to work with other agencies to offer solutions to these deep rooted problems. This report builds on this existing body of work to continue to guide our collective efforts in reducing these gaps in health in our communities.

What Can Be Done?

While it is true that much progress has been made[b] as evidenced by improvements in overall health status in many areas, more can be done to improve health and reduce gaps in health inequity. Chapter 8 of this report contains a number of recommendations that were developed using feedback from a number of departments and staff across Saskatoon Health Region and our partner agencies. At a high level, they call for:

- Planning pro-actively for a larger, changing and aging population
- Focusing on improving the social determinants of health and reducing the gaps in health inequities through priority actions
- Creating the social and physical environments to optimize health and healthy lifestyles
- Enhancing efforts in health protection and illness and injury prevention in key risk areas
- Taking action to ensure a healthy, sustainable environment

These are clearly not issues that Saskatoon Health Region can address alone. It will be important to ensure continued partnerships across sectors and within communities in order to succeed. Courage and commitment when it comes to difficult funding choices are needed. The good news is that this region has a rich history of collaboration for the betterment of our society. After the initial expressions of shock and outrage, news of the extent of health disparities in our region has been greeted with a strong desire across sectors to adopt solutions to these complex problems and reduce the gaps in health status experienced by those most in need. This experience is being echoed across the province, the nation and the globe. I am confident that the residents of Saskatoon Health Region will support the work of the various sectors involved in improving the factors that determine our health and reducing the gaps in health status for all.

Dr. Cordell Neudorf

Chief Medical Officer of Health,
Saskatoon Health Region

[b] *For more details on actions and progress visit http://www.saskatoonhealthregion.ca*

CHAPTER 1

Population of Saskatoon Health Region

Saskatoon seniors exercise several times each week in this Forever . . . in motion program held in the community.

HIGHLIGHTS

Population of Saskatoon Health Region

The Population is Growing

> In 2008, the population within Saskatoon Health Region's (SHR) boundaries was 298,371, up from 275,492 in 1995. Using medium growth assumptions, the population is projected to increase to more than 335,000 by 2028.

> More than 73% of SHR's population is located in the city of Saskatoon. The percentage of residents living in areas outside Saskatoon (rural SHR) has dropped slightly since 1995.

The Population is Aging

> By 2028, it is estimated that the number of people age 65 to 74 years will increase by almost 20,000 (105%) and those 75 years and over will increase by almost 8,000 (39%).

Rural Populations are Older

> Rural SHR has a relatively high aged dependency ratio (those aged 65 years and over divided by those 15 to 64 years) at 22.7%, signalling that rural populations are more dependent on working age adults. This is higher than Saskatoon at 17.9%.

Registered Indian Status (RIS)[a] Populations are Younger

> SHR RIS populations are much younger than the provincial and national averages, as evidenced by their child dependency ratios (those aged less than 15 years divided by those 15 to 64 years) of 54.1%, twice the Saskatchewan (28.2%) and Canadian ratios (24.2%).

Some of Us are Expected to Live Longer

> Between 1997 and 2004 life expectancy in SHR increased from 78.8 to 79.8 years, but the gap in health status continues to widen as those residents in the core neighbourhoods[b] have seen a decrease in life expectancy to 74.4 years in 2004, from 74.7 years in 1997.

Saskatoon Health Region encompasses communities within 33 whole and 14 partial rural municipalities along with four rural First Nations reserves. It is important to understand our population demographics as age, sex and ethnicity all have an impact on health. Demographic information provides insights into future planning needs for health care providers. This chapter examines our demographics, with a look to future implications.

Population Size and Structure

Saskatoon Health Region (SHR) has a population of 298,371- almost 29% of the provincial population.[1] Between 1995 and 2008 the SHR population grew by 8.3% (n=22,879), while the overall Saskatchewan population had increased only 1.5% (n=15,166). Proportionately, SHR's population has grown faster than every other health region in the province, with the exceptions of Mamawetan Churchill River and Keewatin Yatthé in the north.

[a] *See Technical Appendix for a definition of Registered Indian Status.*
[b] *See Technical Appendix for a definition of "core neighbourhoods".*

A Closer Sub-Regional Look

Saskatoon Health Region is increasingly urban, with more than 73% (218,573) of the population living in the city of Saskatoon. That number increases to 83.5% (249,010) when including the Saskatoon Census Metropolitan Area (CMA) *(see box)*. This is much like Canada where over 84% of the population lives in urban settings.[2]

Population growth in SHR has occurred in urban areas (12.0% in Saskatoon CMA) while rural populations have declined by 7.0% from 1995 to 2008.

Table 1.1 shows that the population living outside Saskatoon (from here on referred to as rural SHR) tends to be older, with 14.9% being 65 years of age or older compared to 12.5% in the city. By contrast, residents of the core neighbourhoods *(see box)* tend to be younger than residents outside the core neighbourhoods (from here on referred to as non-core neighbourhoods).

The Registered Indian Status (RIS)[b] population has a very different age structure from the overall population, with 55.8% of the RIS population less than 25 years of age compared to 31.7% for non-RIS populations. The largest proportion of the RIS population (34.5%) is zero to 14 years. About 26% of core neighbourhood residents are RIS, compared to 6.1% for SHR.

Geographic Areas Used in This Report

Saskatoon: Within the city of Saskatoon boundaries.

Saskatoon CMA: The city of Saskatoon boundaries, plus all communities within the boundaries of the rural municipalities of Corman Park, Blucher, Colonsay, Vanscoy, Dundurn.

Rural SHR: All communities within Saskatoon Health Region boundaries, not including the city of Saskatoon.

Core Neighbourhoods: King George, Riversdale, Pleasant Hill, Westmount, Meadowgreen, Confederation Suburban Centre.

Non-core Neighbourhoods: All Saskatoon neighbourhoods outside the core neighbourhoods.

Using data from the Census of Canada, we get a slightly more comprehensive picture of Aboriginal status within SHR. More than 25,000 people or just over 9.3% of SHR's population were of Aboriginal identity[b], compared to 6.1% using RIS. As well, slightly more than 33% of core neighbourhood residents were of Aboriginal identity.

Table 1.1: Population Structure, Saskatoon Health Region, 2008

Age Group	*0–14*	*15–24*	*25–44*	*45–64*	*65–74*	*75+*	*Total*	*% of Region's Population*
SHR Total	18.1%	15.0%	27.8%	25.9%	6.3%	6.8%	298,371	100%
City of Saskatoon	17.7%	15.4%	28.9%	25.5%	6.0%	6.5%	218,573	73.3%
Rural SHR	19.2%	14.2%	24.9%	26.7%	7.3%	7.6%	79,798	26.7%
Saskatoon CMA	18.3%	15.2%	29.0%	25.5%	5.9%	6.1%	249,010	83.5%
Core Neighbourhoods	21.5%	16.2%	31.2%	23.0%	4.5%	3.7%	16,861	5.7%
Non-Core Neighbourhoods	17.4%	15.3%	28.7%	25.7%	6.1%	6.7%	201,712	67.6%
Registered Indian Status	34.5%	21.3%	30.5%	11.9%	1.3%	0.5%	18,274	6.1%
Non Registered Indian Status	17.1%	14.6%	27.6%	26.8%	6.7%	7.2%	280,097	93.9%

Source: Saskatchewan Ministry of Health Covered Population.

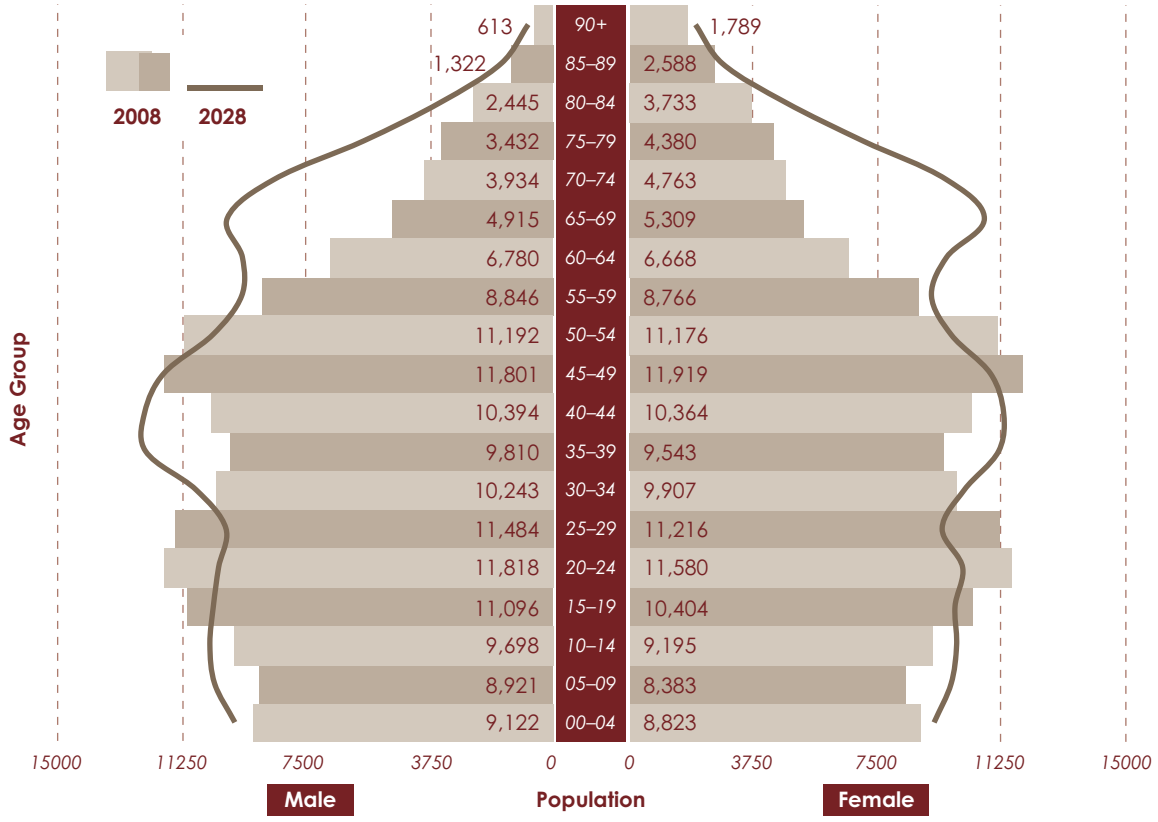
[b] *See Technical Appendix for definition of Registered Indian Status and Aboriginal Identity.*

Projections for the Future[c]

According to population projections, SHR is expected to increase to 335,000 by 2028. Other projection models have projected an increase of up to 352,000 by 2026 based on different economic growth and migration projections.[3]

Figure 1.1 shows the largest age groups as those aged 45 to 49 years (peak of the baby boomers) and 20 to 24 years (children of the baby boomers). As the population continues to age, by 2028 these groups will become the 65 to 69 year olds and 35 to 39 year olds.

Figure 1.1: Population by Age Group and Sex, Saskatoon Health Region, 2008-2028

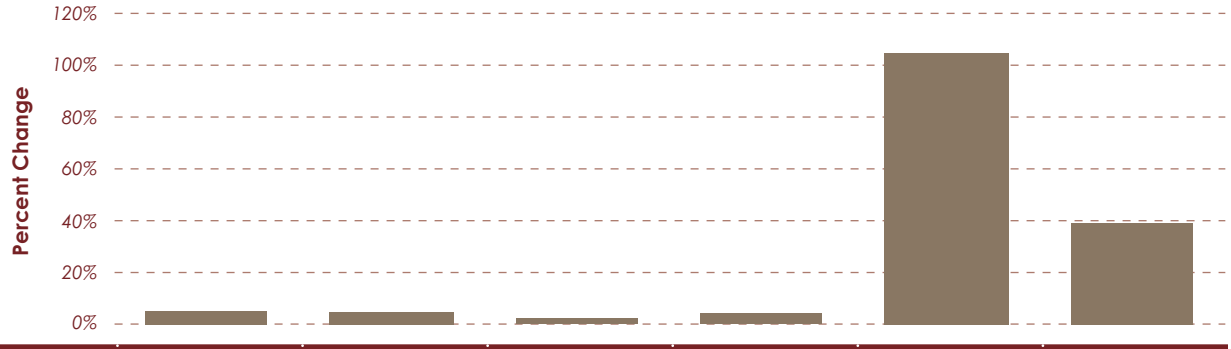


Source: Saskatchewan Ministry of Health Covered Population, Public Health Services, 2008.

To further illustrate the aging population, Figure 1.2 shows that the population for those 65 to 74 years will see an estimated 105% increase in their populations (almost 20,000 people), and those 75 and over will increase 39% (almost 8,000 people) by 2028.

[c] ***Population projections are estimates only*** *- In 2005, projections for Saskatchewan showed a decrease in population from 2005 to 2031 in four out of six scenarios.[4] However, more recently, Saskatchewan has seen real population increases. Of all the provinces and territories, Saskatchewan experienced the largest reversal of migratory flows in the period from 2005 to 2007. Over 9,700 more persons left Saskatchewan than entered in 2005 but by 2007 the province recorded a net gain of about 10,200 persons from elsewhere in Canada, perhaps the result of a strengthening local economy bolstered by an emerging oil industry, a strong commodities sector like potash, as well as people returning from elsewhere.[5]*

Figure 1.2: Estimated Population Change by Age Group, Saskatoon Health Region, 2008-2028



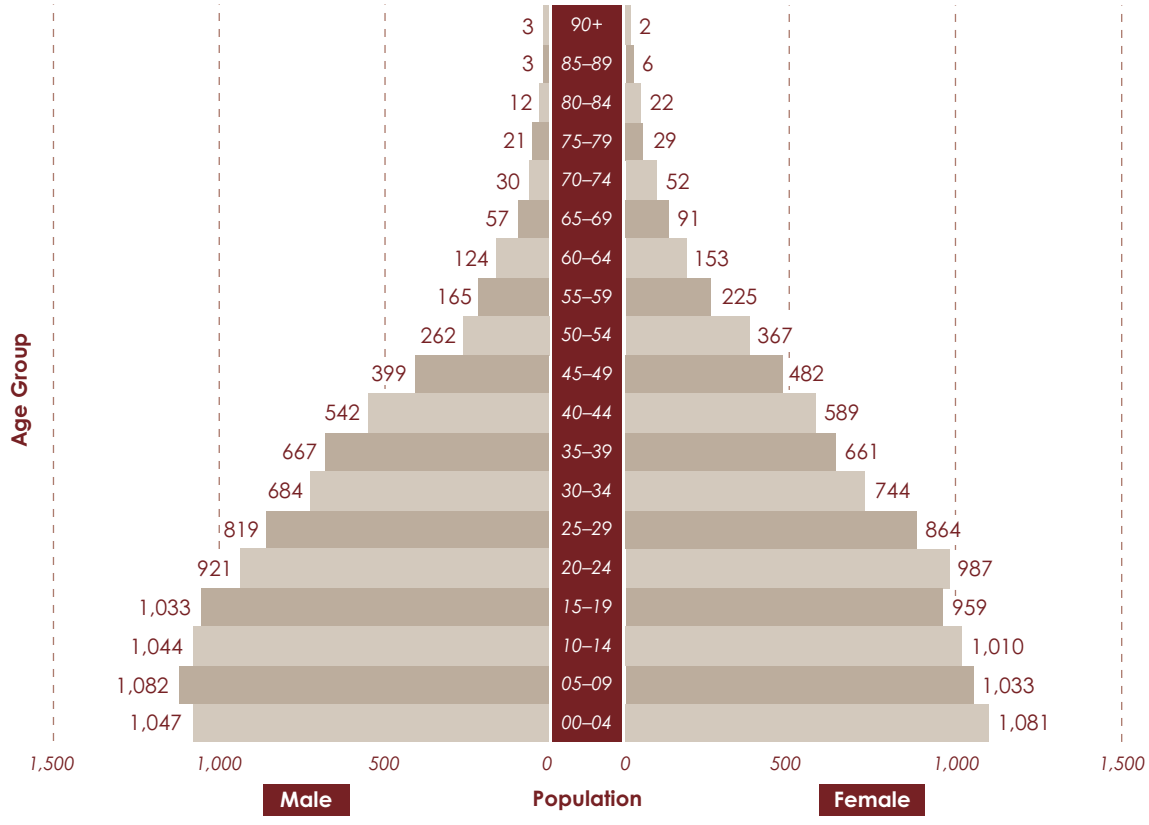
Age Group	0 to 4	5 to 19	20 to 44	45 to 64	65 to 74	75+
Percent Change	5.4% (964)	5.0% (2,878)	1.5% (1,627)	4.4% (3,393)	104.9% (19,851)	39.3% (7,987)

Source: Public Health Services, Saskatoon Health Region, 2008.

Registered Indian Status Population

Figure 1.3 presents the Registered Indian Status (RIS) population by age and sex. The RIS population is much younger than for the SHR general population. The shape of the pyramid is "squaring off" at the base, indicating stabilizing birth rates and decreased death rates in younger age groups.

Figure 1.3: Population by Age Group, Sex and RIS, Saskatoon Health Region, 2008



Source: Saskatchewan Ministry of Health, 2008.

RIS population projections are not available for SHR, though in Saskatchewan, Aboriginals aged 20 to 29 years are expected to make up 30% of the Aboriginal population in 2017, up from 17% in 2001.[6]

It is important to note that the RIS population is a 30 to 40% underestimate of the total Aboriginal population in Saskatchewan as it does not include non-status Aboriginal, Métis, or Inuit populations.

A Closer Sub-Regional Look

Roughly 81% of the Region's RIS population live in Saskatoon (14,718), with the remainder (3,556) living in rural SHR. Eighty-five percent of the rural RIS population live on one of the four First Nations reserves in the Region (Beardy's and Okemasis, Fishing Lake, One Arrow and Whitecap).

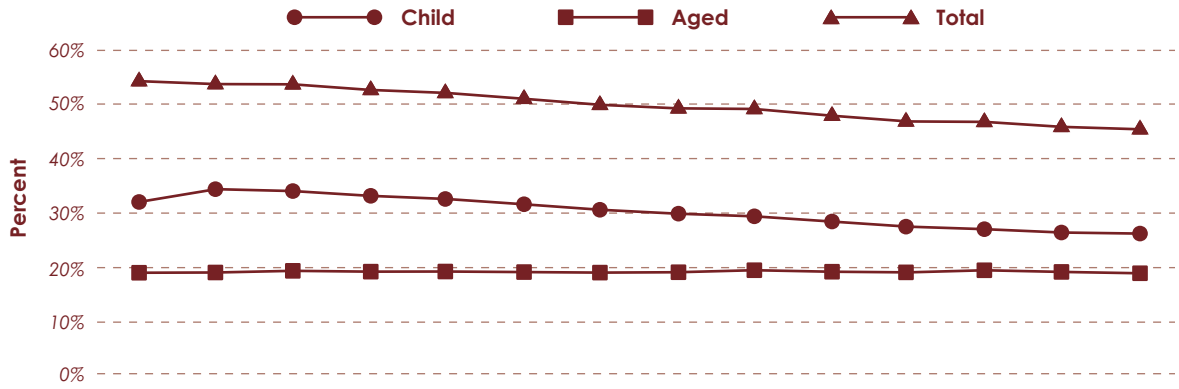
Dependency Ratio

This ratio is used to indicate the capacity of the working age population to support the more vulnerable populations of less than 15 years, and those 65 years of age and older, most of whom are not in the workforce. Dependency ratios can be expressed as a child ratio or as an aged ratio, with the denominator being the number of adults 15 to 64 years. Areas with high dependency ratios tend to be economically stressed as there are more people dependent relative to those people earning a wage.[7]

Regional Trend

Figure 1.4 shows that the total dependency ratio in SHR has gone down since 1995, due mostly to a decrease in the number of children. The aged dependency ratio has been holding steady, and will likely increase in the future due to our aging population.

Figure 1.4: Dependency Ratios, Saskatoon Health Region, 1995-2008



	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Child Ratio %	31.5	34.6	34.2	33.3	32.8	31.8	30.8	30.1	29.6	28.6	27.7	27.2	26.6	26.4
Aged Ratio %	19.2	19.3	19.6	19.4	19.4	19.3	19.2	19.3	19.7	19.4	19.3	19.7	19.4	19.1
Total Ratio %	54.4	53.8	53.8	52.8	52.2	51.1	50.0	49.4	49.3	48.0	47.0	46.9	46.0	45.5

Source: Saskatchewan Ministry of Health, Covered Population.

Appendix 1 displays dependency ratios for different areas in SHR as well as for Saskatchewan and Canada. The 2008 SHR total ratio of 45.5% was less than the provincial average of 49.9%, however slightly higher than the national average of 43.9%.

A Closer Sub-Regional Look

Dependency ratios for those living in rural SHR are much higher at 51.9% compared to 43.3% for Saskatoon (Appendix 1). This is especially true for the aged ratio which is 22.7% in rural compared to 17.9% in Saskatoon. RIS populations have the highest total ratios at 56.9% compared to 44.9% for the rest of the SHR population. Child ratios for RIS populations in SHR (54.1%) are about twice the provincial (28.2%) and national averages (24.1%). [2]

So What's the Bottom Line?

Our Aging Population: With health conditions more common in older age, this may have an impact on demand for health services, including hospitalization, long term care, and community based supports. This is projected to be partially offset by an emerging seniors population that is staying healthier longer than the previous generation (a concept called 'compression of morbidity').

Our RIS Population: The young demographic of the RIS population is important as they will make up a larger part of the work force in the Region into the future.

Dependency Ratios: Economic stresses may affect rural and RIS populations more than other subgroups given their current higher aged and child dependency ratios respectively. Economic stresses may be less of a concern for RIS populations in the future as their children begin to enter into the workforce. Conversely, the impact of an older rural population could increase the demand for a younger workforce to provide services to seniors in rural communities.

Life Expectancy

Life expectancy is one of the most common indicators used to measure the health of a population. It is an approximation of the number of years a newborn or person age 65 can expect to live based on today's mortality rates. However, if an individual had been a long time smoker, or had a family history of certain diseases, these factors could contribute to a shorter life for the individual.[8]

Life expectancy is dependent on many determinants beyond the performance of the health system and the appropriateness of health services, including income and education levels. It is an indicator of the quantity rather than quality of life.

Table 1.2 shows life expectancy values for 2001, the latest year for which provincial and national comparisons are available. SHR life expectancy in 2001 for both sexes (79.5 years) was slightly higher than the province of Saskatchewan (79.0 years), and the same as Canada. Females in SHR could expect to live on average 5.6 years more than males (82.3 years compared to 76.7 years).

A 65 year old resident of SHR could expect to live another 19.1 years, about the same as Saskatchewan (19.0) and Canada (18.8). Again, females are expected to live more than four years longer than males in SHR once they are 65 (21.1 compared to 16.9 years).[9]

Table 1.2: Life Expectancy at Birth and Age 65, Saskatoon Health Region, 2001

Life Expectancy		Male	Female	Both Sexes
At Birth	SHR	76.7	82.3	79.5
	Saskatchewan	76.2	81.8	79.0
	Canada	77.0	82.0	79.5
At Age 65	SHR	16.9	21.1	19.1
	Saskatchewan	16.9	20.9	19.0
	Canada	17.0	20.5	18.8

Source: Statistics Canada, 2001.

A Closer Sub-Regional Look

Table 1.3 shows that residents of core neighbourhoods in Saskatoon had lower life expectancies than for SHR as a whole. In fact, the gap in life expectancy between residents of the core neighbourhoods and SHR increased from 4.1 years in 1997 to 5.4 years in 2004. Whereas SHR life expectancies have increased between these years, core neighbourhood residents' life expectancies have decreased and are statistically different from the SHR average. Residents living in rural SHR had slightly elevated levels of life expectancy compared to the SHR total (80.7 years compared to 79.8 years in 2004), though these are not statistically significant differences.

I definitely see a correlation between the amount of money a person makes and life expectancy. I know personally that when I stress about not having enough money, my health and nutrition are not concerns for me, regardless if there were free programs available.

Public Health Services staff member, SHR.

Table 1.3: Life Expectancy at Birth, Saskatoon Health Region, 1997-2004

	1997	1998	1999	2000	2001	2002	2003	2004
SHR	78.8	79.0	79.3	79.3	79.4	79.8	79.7	79.8
Core Neighbourhoods	74.7	75.4	76.4	75.0	75.0	75.0	74.1	74.4

Source: Saskatchewan Ministry of Health, Vital Statistics.

So What's the Bottom Line?

Life Expectancy: Lower life expectancy in SHR's core neighbourhoods could be a result of lower socio-economic status (SES). These SES issues are explored in more detail in the Social Environment chapter of this report. As well, a higher proportion of core neighbourhood residents are RIS compared to the SHR average, and Aboriginal life expectancy has been shown to be lower than non-Aboriginals in Canada[10], mostly due to lower SES among Aboriginals compared to the rest of Canada.

Immigration

In 2006, only 0.7% of all recent immigrants to Canada resided in Saskatchewan. This compares with 2.8% in Manitoba, 9.3% in Alberta, and 16.0% in British Columbia. The Saskatchewan share of recent immigrants is virtually unchanged from 2001.[10]

Regional Trend

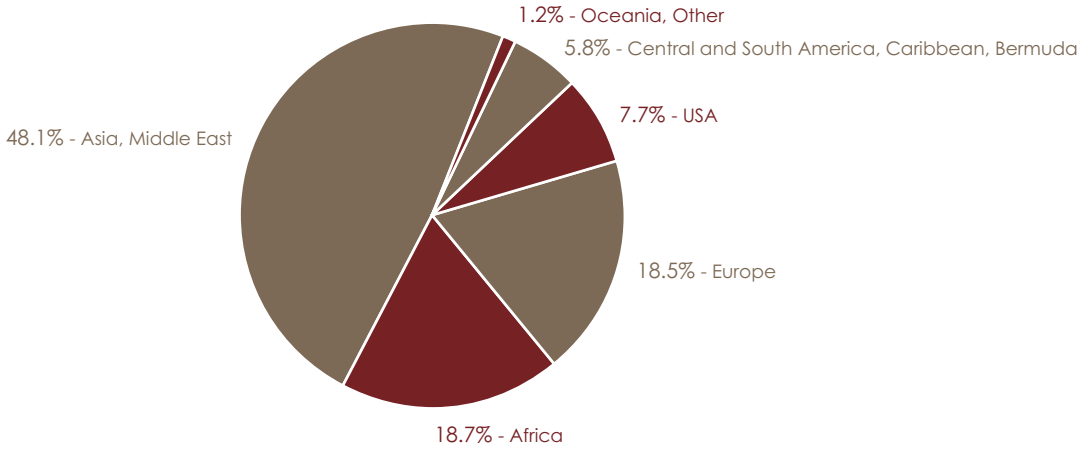
For SHR, 3,440 people were listed as recent immigrants (came to Canada within the last five years) in 2006, up slightly from 3,305 in 2001. Almost all recent immigrants (92%) settled in Saskatoon, with only 8% living in rural SHR. This is consistent with national findings showing most recent immigrants tend to settle in large urban areas.

Figure 1.5 shows that for SHR, about 48% of recent immigrants came from Asia and the Middle East, followed by Africa (18.7%) and Europe (18.5%).

Immigration in Canada

- Recent immigrants, (i.e., having come to Canada within the past five years) made up 3.6% of the Canadian population in 2006.
- A higher proportion of recent immigrants were in the younger age groups (25 to 54 years) compared to the Canadian born population.
- In Canada, slightly more than half of all recent immigrants came from Asia.[11]
- About nine in ten recent immigrants report they can converse in English or French. However, translation services and health information in their native languages are still needed for this group.

Figure 1.5: Region of Birth of Recent Immigrants to Canada, Living in Saskatoon Health Region, 2006 (n=3,440)



Source: Statistics Canada, Census 2006.

A Closer Sub-Regional Look

The Saskatoon Census Metropolitan Area (CMA) was home to a lower proportionate share of recent immigrants than its share of the Canadian population. So, while the population of the Saskatoon CMA makes up 0.7% of the Canadian population, it took in 0.3% of recent immigrants in 2006 and in 2001.[10]

One Year Mobility

One year mobility reflects the number of people, greater than age one that lived in a different municipality in Canada one year earlier. Mobility in a population is an important indicator as individuals that move may not have access to a regular primary care provider, which could result in poor health outcomes, particularly for those with chronic conditions.[12] Moving can also have negative psychological effects, especially for children, who are likely to need more time to prepare for the move ahead of time and to adjust to new social contacts after the move.[13] In SHR, one year mobility rates (5.6%) are on par with Canada (5.7%) and slightly lower than Saskatchewan totals (6.2%).

A Closer Sub-Regional Look

Mobility trends are available only back to 1996 due to changes in Census data. One year mobility rates have steadily fallen for residents of Saskatoon from 5.8% in 1996 to 4.9% in 2006. Residents of the city's core neighbourhoods were slightly more mobile (6.0% in 2006).

Mobility is greater for SHR rural residents (7.0%) and part of this may be a reflection of people moving off of farms into a town or village in the same area. A certain amount could also represent movement of Aboriginal populations off reserve to Saskatoon.

A somewhat different story emerges when examining the percentage of people that have moved in the past year, but within the same municipality. For Saskatoon in 2006, this was 13.3%, 21.6% for core neighbourhood residents, and 3.5% for residents in rural SHR.

So What's the Bottom Line?

Immigration: Almost all new immigrants to the Region settle in Saskatoon, with most of these immigrants of Asian descent.

Mobility: One year mobility rates are greater for rural SHR residents. Movement from rural to urban centres adds pressures to health care systems which may not have the capacity to absorb additional clients. Core neighbourhood residents also have higher mobility, especially for those moving within Saskatoon. This challenges service providers to deal effectively with a more transient population and could affect continuity of care.

References for Chapter 1

1 *Saskatchewan Ministry of Health. Covered population, 2008 [online]. 2008 [cited 2008 Dec 11]. Available from: URL: http://www.health.gov.sk.ca/covered-population2008/CovPopBook2008.pdf*

2 *Statistics Canada. Population living within a CMA, a CA or a strong CMA and CA influenced zone (MIZ), proportion of total population, Canada, provinces, territories, health regions and peer groups, 2001. Health Indicators [serial on the internet], 2003 Nov (Cat. No. 82-221-XIE) [cited 2008 Jan 24]; 2003(2): [about 5p.]. Available from: URL: www.statcan.ca/english/freepub/82-221-XIE/2007002/tblmaps/dt_maps/co4smx-en.pdf*

3 *Crosby Hanna and Associates. The City of Saskatoon and the Saskatoon Health Region population projections (2006-2026). Saskatoon: City of Saskatoon; 2008.*

4 *Belanger A, Martel L, Caron-Malenfant E. Population projections for Canada, provinces and territories, 2005-2031 [online]. 2005 [2008 Oct 7]. Available from: URL: www.statcan.ca/english/freepub/91-250-XIE/0010591-520-XIE.pdf*

5 *Statistics Canada. Report on the demographic situation in Canada [online]. 2008 [cited 2008 Sept 16]. Available from: URL: http://www.statcan.ca/english/freepub/91-209-XIE/91-209-XIE2004000.pdf*

6 *Statistics Canada. Projections of the Aboriginal populations Canada, provinces and territories: 2001-2017 [online]. 2005 [cited 2009 Feb 13]. Available from: URL: http://www.statcan.gc.ca/pub/91-547-x/91-547-x2005001-eng.pdf*

7 *Association of Public Health Epidemiologists of Ontario. Dependency ratios [online]. 2006 [cited 2008 Oct 16]. Available from: URL: http://www.apheo.ca/index.php?pid=63&PHPSESSID=b5234a90b58fa2e6bc9b81f22503bc26*

8 *Health Quality Council. Core health status indicators for regional health authorities. Life expectancy at birth and age 65: Technical information [online]. 2007 [cited 2008 Aug 19]. Available from: URL: https://www.hqc.sk.ca/portal.jsp?hZqD22Il8MiRTgIkAxAKpjBlzBf0QfLQkUwK4QBZaJu4RF/epeQtIFVvI5thiwzu*

9 *Statistics Canada. Life expectancy - abridged life table, at birth and confidence interval, by sex, three-year average, Canada, provinces, territories, health regions and peer groups, 2001[online]. 2001 [cited 2008 Aug 19]. Available from: URL: http://www.statcan.ca/english/freepub/82-221-XIE/2005002/tables/html/1431_01.htm*

10 *Statistics Canada. Aboriginal Peoples in Canada in 2006: Inuit, Métis and First Nations, 2006 Census. Aboriginal Peoples, 2006 Census. Census year 2006. Ottawa: Minister of Industry; 2008.*

11 *Chui T, Tran K, Maheux H. Immigration in Canada: A portrait of the foreign-born population, 2006 census [online]. 2007 [cited 2008 Sept 23]. Available from: URL: http://www12.statcan.ca/english/census06/analysis/immcit/pdf/97-557-XIE2006001.pdf*

12 *Health Quality Council. Core health status indicators for regional health authorities. One year mobility: Technical information [online]. 2007 [cited 2008 Aug 19]. Available from: URL: https://www.hqc.sk.ca/portal.jsp?hZqD22Il8MiRTgIkAxAKpjBlzBf0QfLQkUwK4QBZaJuFRloePiJNMVVvI5thiwzu*

13 *Magdol L. Is moving gendered? The effects of residential mobility on the psychological well-being of men and women. Sex Roles: A Journal of Research, 2002;47(11-12):553-560.*

CHAPTER 2

Reproductive and Infant Health

Infant immunization clinics, like the one at WP Bate School, help protect families from illness and disease.

HIGHLIGHTS

Reproductive and Infant Health

Birth Rates in the Region are Starting to Increase

- Birth rates had decreased in SHR since 1995, but more recent hospital-based data show increases.
- Registered Indian Status crude birth rates are almost three times higher than the SHR average.

Teenage Pregnancies Remain a Concern

- Teen pregnancy rates have been generally decreasing, though they have been relatively stable since 2002.
- Residents in core neighbourhood and Registered Indian Status[a] populations have much higher teen pregnancy rates than the SHR average.

Pregnancy Outcomes Worse for Core Neighbourhoods

- Core neighbourhood residents have a higher prevalence of low birth weight and infant mortality than the SHR average.

Breastfeeding Initiation Rates High, While Continuation Rates up to Six Months Sharply Decrease

- In 2005, 92% of SHR mothers stated that they initially breastfed their baby, slightly above provincial (89%) and national (87%) averages.
- It is estimated that only 22% of Saskatchewan mothers were exclusively breastfeeding up to six months compared to 26% for Canada.

A healthy first year of life is essential to ensure good health in later childhood and adulthood.[1] This chapter includes information on low birth weight babies, infant deaths and breastfeeding rates. Birth rates are also included, as they influence the population size of the community. Birth events - especially those with complications - also consume large portions of health-care services.

Births

Birth outcome data helps plan future health and social services. Certain risk conditions during gestation or early life predispose some children to unique lifelong challenges. These have an impact not only on their health and well-being, but on their capacity to live as independent, contributing citizens.

Regional Trend

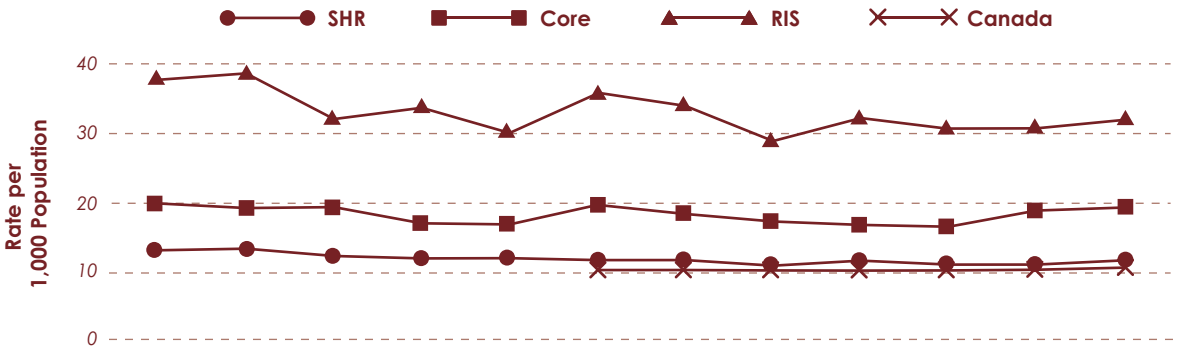
In 2006 there were 3,413 live births for Saskatoon Health Region (SHR) residents. The crude birth rate is the number of live births divided by the entire population, expressed per 1,000 residents. Figure 2.1 shows a slightly decreased crude birth rate trend for SHR residents; 13.4 per 1,000 in 1995 and 11.9 per 1,000 in 2006. SHR rates are nearly the same as the provincial rates (12.3 per 1,000 in 2006, data not shown), and slightly higher than Canadian rates of 10.9 per 1,000 in 2006. More recently, hospital-based data for the number of births to SHR residents showed a 9% increase to 3,611 in 2007.

[a] *See Technical Appendix for a definition of "core neighbourhoods" and "Registered Indian Status".*

A Closer Sub-Regional Look

Residents in the core neighbourhoods have seen higher and fairly steady crude birth rates around 19 per 1,000 population. While Registered Indian Status (RIS) populations in SHR have seen decreases in birth rates, it is interesting to note the rates are almost triple those of the SHR average. Rural SHR residents had lower rates than SHR in 2006 at 11.1 per 1,000.

Figure 2.1: Crude Birth Rates, Saskatoon Health Region and Canada, 1995-2006



	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
SHR	13.4	13.6	12.6	12.2	12.3	12.0	12.0	11.2	11.9	11.3	11.3	11.9
Core Neighbourhoods	19.8	19.4	19.6	17.3	17.1	19.9	18.6	17.5	17.0	16.8	19.1	19.3
RIS	38.0	38.8	32.2	33.8	30.2	35.6	34.1	29.1	32.4	30.8	30.9	32.1
Canada	n/a	n/a	n/a	n/a	n/a	10.7	10.7	10.5	10.6	10.5	10.6	10.9

Source: Saskatchewan Ministry of Health, Vital Statistics. Canada from CANSIM Table 102-4505. Live births, crude birth rate, age-specific and total fertility rates, Canada, provinces and territories, annual.

Total Fertility Rate

The total fertility rate is an estimate of the average number of children that women will have during the years they are aged 15 to 49, based on current age-specific birth rates[b]. For most developed countries, replacement level fertility rates are 2.1 children per woman.[2]

Regional Trend

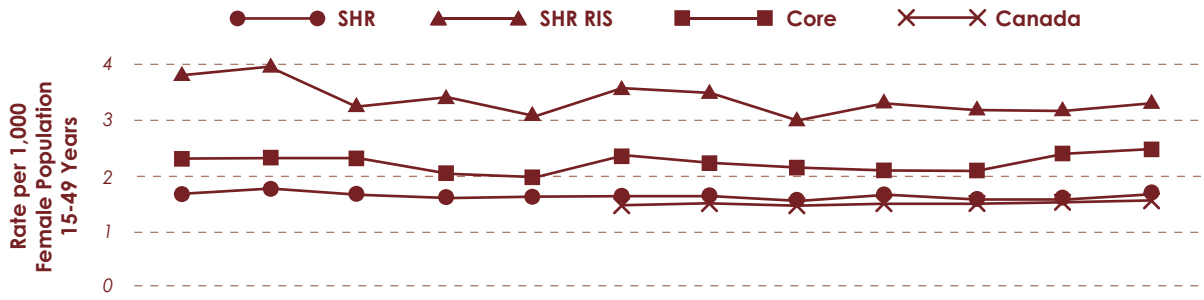
Figure 2.2 shows the trend in fertility rates across SHR. The rate has been stable over time, (1.7 in 1995 and 2006), and is slightly higher than the national average of 1.5 seen from 2000 to 2005.

A Closer Sub-Regional Look

Registered Indian Status women have the highest total fertility rate in SHR, though it has gone down in recent years from 3.8 in 1995 to 3.3 in 2006. Core neighbourhood residents in Saskatoon (2.5 in 2006) have a higher rate than Saskatoon and SHR. Rural areas are slightly higher than the SHR average at 1.9 in 2006 which is partly due to higher fertility rates on First Nations reserves.

[b] *Total Fertility Rate = [Sum of (age-specific fertility rates (per 1,000) for each age group) * k] * 1,000. Where k = the number of years in each age group. K=5 for the age group 15 to 19 years. Where the fertility rate = Mean annual number of live births to women in age group/ Total number of women in age group, area, and period *100.*

Figure 2.2: Total Fertility Rate, Saskatoon Health Region and Canada 1995-2006



	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
SHR	1.7	1.8	1.7	1.6	1.7	1.7	1.7	1.6	1.7	1.6	1.6	1.7
RIS	3.8	3.9	3.2	3.4	3.1	3.6	3.5	3	3.3	3.2	3.2	3.3
Core Neighbourhoods	2.4	2.4	2.3	2.1	2	2.4	2.2	2.2	2.1	2.1	2.4	2.5
Canada	n/a	n/a	n/a	n/a	n/a	1.5	1.5	1.5	1.5	1.5	1.5	1.6

Source: Saskatchewan Ministry of Health, Vital Statistics. Canada from CANSIM Table 102-4505. Live births, crude birth rate, age-specific and total fertility rates, Canada, provinces and territories, annual.

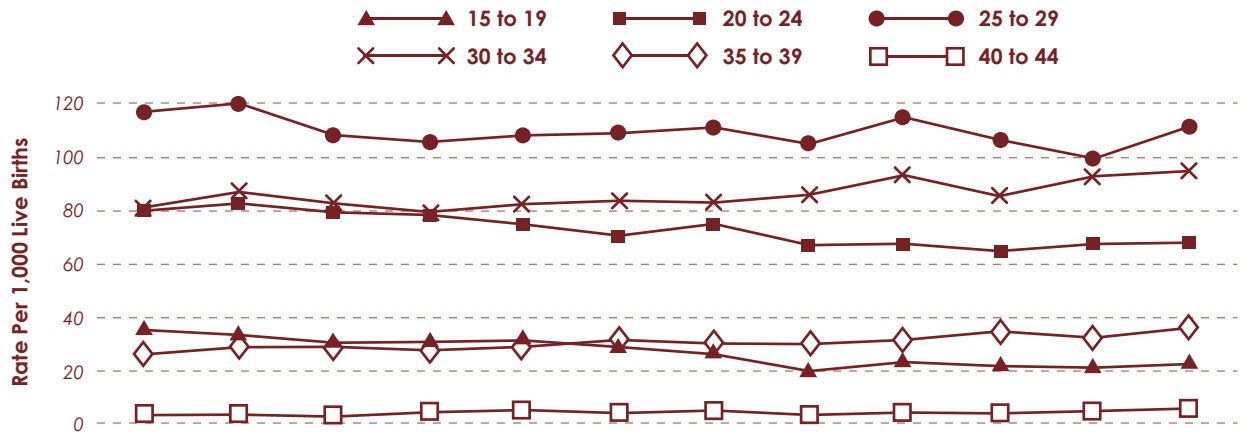
Age-Specific Fertility Rates

An age-specific fertility rate is the ratio of the number of live births to women in a given age group relative to the number of women in that age group.

Regional Trend

Generally, age-specific fertility rates have increased over time in SHR for women older than age 30. Figure 2.3 shows that for females 30 to 44 years, fertility rates per 1,000 have increased in all years from 1995 to 2006. Decreased fertility rates are seen for those less than 30 years. The 25 to 29 year age group has the highest fertility rates.

Figure 2.3: Age-Specific Fertility Rates, Saskatoon Health Region, 1995-2006



	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
15 to 19	35.7	33.8	30.9	31.2	31.8	29.3	26.6	20.4	23.7	22.2	21.6	23.0
20 to 24	80.0	82.7	79.4	78.4	74.9	70.7	75.1	67.2	67.7	65.0	67.6	68.1
25 to 29	116.8	119.9	108.1	105.6	108.0	108.8	111.0	104.8	114.8	106.4	99.4	111.3
30 to 34	81.2	87.0	82.7	79.5	82.5	83.7	83.0	85.9	93.2	85.4	92.8	94.8
35 to 39	26.6	29.3	29.4	28.1	29.4	31.9	30.6	30.4	32.0	35.1	32.7	36.5
40 to 44	4.0	4.2	3.4	5.0	5.9	4.7	5.7	4.1	5.0	4.6	5.5	6.4

Source: Saskatchewan Ministry of Health, Vital Statistics.

Teen Pregnancy

The teen pregnancy rate is defined as the number of pregnancies to females 15 to 19 years of age per 1,000 female teens age 15 to 19. Pregnancies include not only live births, but also stillbirths, miscarriages (i.e. the loss of products of conception from natural causes before 20 weeks gestation) and induced abortions (i.e. the medical termination of pregnancy). Teen mothers are more likely to deliver low birth weight babies, have pre-term births and have lower rates of prenatal care than mothers in older age groups.[3]

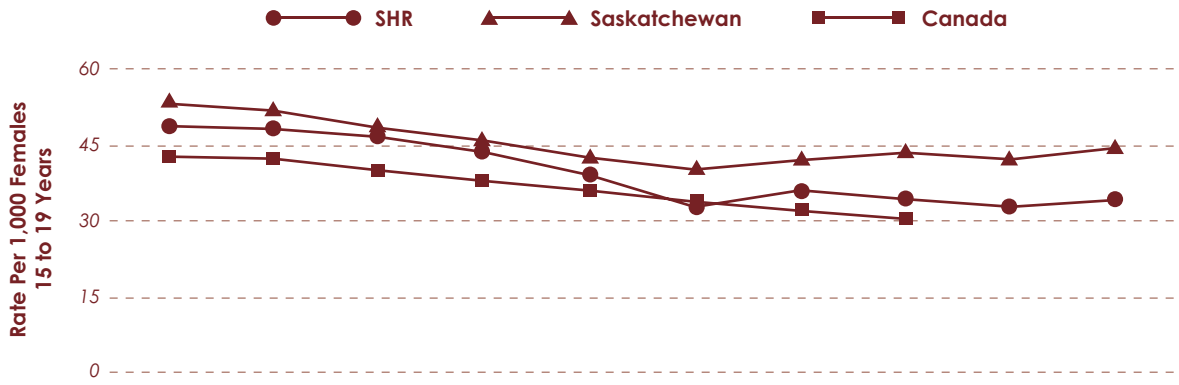
Regional Trend

Figure 2.4 shows teen pregnancy rates from 1997 to 2006 for SHR, Saskatchewan and Canada. SHR has seen a gradual decline, with a rate of 48.8 in 1997, dropping to its lowest level of 32.9 in 2002. A similar downward trend is seen for the province of Saskatchewan.[4] Both the province and Saskatoon Health Region have seen a levelling off or even an increase in teenage pregnancy rates since 2002. While SHR's teen pregnancy rate is lower than the provincial average and has been for some time, it has generally been higher than the Canadian rates.

Due to other barriers such as lack of transportation, limited parental awareness etc., children born to young mothers often do not receive services from Public Health that will help them be successful, contributing members of society (e.g. Speech Language Pathology and Early Childhood Psychology services).

Public Health Services staff member, SHR.

Figure 2.4: Teen Pregnancy Rates, Saskatoon Health Region, Saskatchewan, Canada, 1997-2006



	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
SHR	48.8	48.3	46.7	43.7	39.2	32.9	36.2	34.4	32.9	34.2
Saskatchewan	53.3	51.9	48.5	46.0	42.6	40.2	42.1	43.6	42.3	44.5
Canada	42.8	42.4	40.1	38.0	36.1	33.9	32.1	30.5	n/a	n/a

Source: Saskatchewan Ministry of Health, Vital Statistics.

A Closer Sub-Regional Look

Comparing teen pregnancy rates in Appendix 1 shows that Saskatoon rates are nearly double those in rural SHR (37.1 compared to 20.1). RIS populations have a teen pregnancy rate more than six times higher than for non-RIS population (144.4 compared to 22.0), which is statistically significant. Rates in the core neighbourhoods are more than four times higher than those in the non-core neighbourhoods (122.9 compared to 29.6), which is again statistically significant.

So What's the Bottom Line?

Births: After many years of decrease, we are starting to see some signs of an increase in birth rates in SHR. RIS populations continue to have the highest birth rates of any sub-population in SHR.

Age Specific Fertility Rates: Increases in fertility rates are most common in mothers 30 years of age and older. This may have implications for infant health as some studies show that the risks of pre-term birth, low birth weight and multiple births all increase as mother's age increases. However, other evidence suggests that older women following healthy behaviours and receiving good obstetric care are not at increased risk for some of these complications.[3]

Teen Pregnancy: After years of decline, teen pregnancy rates have levelled off and at the provincial level have started to increase. Teen pregnancy rates are highest for RIS populations followed by core neighbourhood teens. Teen pregnancies place challenges on teens that may have a harder time getting an education and work, and many teen mothers find themselves parenting alone, at increased risk of living in poverty.[5] Single parent family structure and poverty is discussed in the Social Environment chapter.

Low Birth Weight

Low birth weight is defined as any live birth weighing less than 2,500 grams (about 5.5 pounds). It is a widely used measure of health status and is considered by the World Health Organization to be an essential indicator to monitor progress towards overall health. Low birth weight infants are at increased risk for a number of health and developmental problems and it is one of the strongest predictors of infant mortality.[6, 7] Babies are at higher risk of low birth weight if they come from a multiple gestation, if the mother smokes, abuses alcohol or drugs, has poor nutritional habits, comes from low socio-economic status, and does not receive proper prenatal care.[8, 9] Most cases of low birth weight are related to premature birth.

Regional Trend

The SHR percentage of low birth weight from 2004 to 2006 was 5.8%, similar to Saskatchewan at 5.6% (see Appendix 1) and the Region has seen a slight increase in low birth weight since 2000 from 4.8% to 5.3% in 2006 (see Figure 2.5). The Saskatchewan low birth weight percentage may be slowly increasing since 2003.

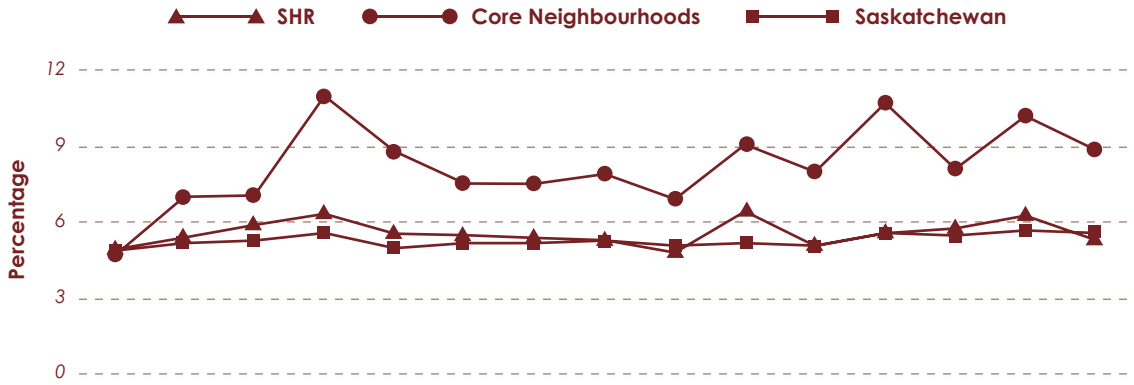
Low birth weight babies can be very stressful . . . mom's having to pump milk, ups and downs of the baby's health, etc. These families also miss out on some of the supports available to 'normal' parents.

Public Health Services staff member, SHR.

A Closer Sub-Regional Look

Core neighbourhood residents have also seen a trend in increased low birth weight since 2000 which has been well above the regional percentage since 1992 (see Figure 2.5). Conversely, rural SHR residents have had consistently lower percentages of low birth weight babies than SHR since 1992 though these differences are not statistically significant. (Data not shown).

Figure 2.5: Low Birth Weight Percentage, Saskatoon Health Region and Saskatchewan, 1992-2006



	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
SHR	4.9	5.4	5.9	6.4	5.6	5.5	5.4	5.3	4.8	6.5	5.1	5.6	5.8	6.3	5.3
Core Neighbourhoods	4.7	7.0	7.1	11.0	8.8	7.6	7.5	7.9	6.9	9.1	8.0	10.7	8.1	10.2	8.9
Saskatchewan	4.9	5.2	5.3	5.6	5.0	5.2	5.2	5.3	5.1	5.2	5.1	5.6	5.5	5.7	5.6

Source: Saskatchewan Ministry of Health, Vital Statistics.

High Birth Weight

High birth weight babies (those born greater than 4,000 grams or about 8 pounds 13 ounces) are a concern because there is greater risk of pregnancy complications, gestational diabetes, and the potential of these babies becoming obese or developing diabetes later in life.[10]

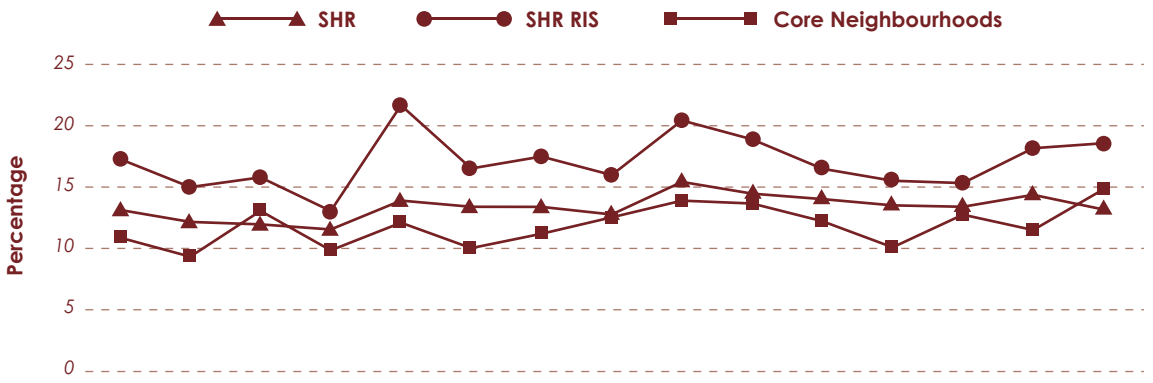
Regional Trend

For SHR residents, the trend has flattened somewhat since 2000 (see Figure 2.6) and has remained relatively stable over time. Appendix 1 lists high birth weight percentages between 2004 and 2006, where SHR rates (13.6%) are lower than Saskatchewan at 15.8% but higher than the national average of 11.9%.

A Closer Sub-Regional Look

Interestingly, residents of core neighbourhoods had lower percentages of high birth weight babies than the SHR average in most years. Conversely, RIS populations had the highest percentage of high birth weight babies with 17.4% between 2004 and 2006. This may be because they have a higher prevalence of diabetes, and diabetes is a risk factor for high birth weight. See the Mortality and Morbidity chapter for more information about diabetes.

Figure 2.6: High Birth Weight Percentage, Saskatoon Health Region, 1992-2006



	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
SHR	13.1	12.1	11.9	11.5	13.9	13.4	13.4	12.7	15.4	14.4	14.0	13.5	13.4	14.4	13.1
SHR RIS	17.3	15.0	15.8	13.0	21.7	16.5	17.5	16.0	20.5	18.9	16.5	15.5	15.3	18.2	18.6
Core Neighbourhoods	10.8	9.3	13.0	9.8	12.1	10.0	11.1	12.5	13.9	13.6	12.2	10.0	12.7	11.5	14.8

Source: Saskatchewan Ministry of Health, Vital Statistics.

So What's the Bottom Line?

Low Birth Weight: SHR residents have similar low birth weight percentages compared to provincial averages, though there seems to be a slight increasing trend. Because of increased rates in the core neighbourhoods, accessibility to key services such as prenatal programs and nutritious foods are of key importance.

High Birth Weight: While RIS populations have higher percentages of high birth weight babies, residents of core neighbourhoods have lower percentages compared to SHR averages.

Infant Mortality

As one of the most widely used indicators in public health, infant mortality rates can reflect the health status of a population and are a measure of health care services including the effectiveness of preventive care and maternal and child care. It is also used as a measure of broader social factors such as maternal education, smoking and relative deprivation.[11] It is defined as the number of deaths to infants less than one year of age per 1,000 live births.

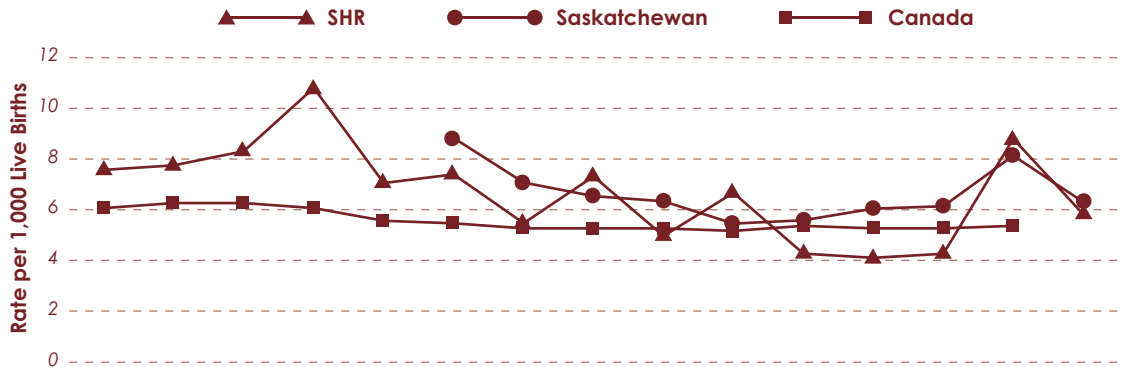
Regional Trend

SHR, Saskatchewan, and Canada infant mortality rates are shown in Figure 2.7. The infant mortality rate in Canada has generally decreased over time, registering at 5.4 deaths per 1,000 live births in 2005. SHR's rate has generally been lower than Saskatchewan, and both Saskatchewan and SHR infant mortality rates have decreased over time, except for a spike in 2005. This increase was subject to a formal review process where it was found that no single cause or factor was responsible for the increase. However, prematurity and low birth weight were associated with the majority of the infant deaths.

A Closer Sub-Regional Look

Appendix 1 displays the infant mortality rates for the three years from 2004 to 2006 combined. Residents of core neighbourhoods in Saskatoon had more than twice the infant mortality rate (14.3 per 1,000 live births) than for SHR residents (6.3 per 1,000 live births), though these differences are not statistically significant. This could be a reflection of higher teen pregnancy rates in the core neighbourhoods which are a known risk factor for infant mortality. Initial analysis into the causes of these infant deaths showed a higher percentage of core neighbourhoods deaths resulting from Sudden Infant Death Syndrome (SIDS) than in SHR overall.

Figure 2.7: Infant Mortality Rate, Saskatoon Health Region, Saskatchewan, Canada, 1992-2006



	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
SHR	7.6	7.8	8.3	10.8	7.1	7.4	5.5	7.4	5.0	6.7	4.3	4.1	4.3	8.8	5.9
Saskatchewan	n/a	n/a	n/a	n/a	n/a	8.9	7.1	6.6	6.4	5.5	5.6	6.1	6.2	8.2	6.3
Canada	6.1	6.3	6.3	6.1	5.6	5.5	5.3	5.3	5.3	5.2	5.4	5.3	5.3	5.4	n/a

Source: Saskatchewan Ministry of Health, Vital Statistics.

So What's the Bottom Line?

Infant Mortality: SHR rates have generally been above national but below provincial averages. The relatively higher proportion of SIDS related infant deaths in Saskatoon's core neighbourhood residents signals a need for more directed attention towards this issue.

Breastfeeding

Breastfeeding is well documented as the best way to ensure infants get adequate nutrition, immunological benefits and emotional nurturing.[12] There is international consensus on the benefits of breastfeeding including its contribution to reduce:

- pre-term infant mortality;
- gastro-intestinal, respiratory, urinary tract, middle-ear infections, and atopic illness;
- childhood illnesses like juvenile onset insulin dependant diabetes mellitus and obesity; and;
- maternal breast cancer incidence, ovarian cancer, and hip fractures.

It has also been shown to contribute to increased cognitive development in children.[13]

Regional Trend

Similar to previous years, in 2005, 92% of SHR mothers stated they breastfed their most recent baby, slightly higher than the 89% in Saskatchewan and 87% for Canada, though these differences are not statistically significant (see Table 2.1).

Table 2.1: Prevalence of Breastfeeding, Saskatoon Health Region, Saskatchewan, and Canada, 2001-2005

	Saskatoon Health Region	*Saskatchewan*	*Canada*
2001	92.1%	86.6%	81.5%
2003	87.7%	87.2%	84.8%
2005	92.1%	88.8%	87.1%

Source: Statistics Canada, Canadian Community Health Survey Public Use Microdata Files 2000/01, 2003 and 2005. Answered yes to question: For your last baby, did you breastfeed or try to breastfeed your baby, even if only for a short time?

The World Health Organization recommends exclusive breastfeeding (i.e. breast milk only, no other food or water) for the first six months of life.[14] About 22% of Saskatchewan mothers exclusively breastfed their babies up to six months (between 20 to <28 weeks) compared to 26% of Canadian mothers.

So What's the Bottom Line?

Breastfeeding: SHR breastfeeding rates are on par with provincial and national averages, though six month exclusive breastfeeding rates are relatively low. This may detract from the full benefits of breastfeeding exclusively for the first six months.

References for Chapter 2

1 *Stratton J, McKeown D, Wong KP, & Funnell K. Child health report 2002 [online], 2002. [cited 2008 August 19]. Available from: URL www.peelregion.ca/health/health-status-report/pages-child/complete.htm*

2 *Statistics Canada. Births, 2006 [online]. 2008 [cited 2009 Jan 20]. Available from: URL: http://www.statcan.gc.ca/pub/84f0210x/84f0210x2006000-eng.pdf*

3 *Health Canada. Canadian perinatal health report 2003. Ottawa: Minister of Public Works and Government Services Canada; 2003.*

4 *Saskatchewan Ministry of Health. Health service utilization reports. Teen pregnancies by RHA [online]. 2007 [cited 2008 Aug 19]. Available from: URL: https://sharepoint.shin.sk.ca/SaskHealth_Svc_Util_Reports/Shared%20Documents/2005-06/Data/Vital%20Stats/V03%20INFANT%20MORTALITY%20RATES.XLS*

5 *Canadian Institute of Child Health, Young/Single Parent Support Network of Ottawa Carleton, Timmins Native Friendship Centre. Pro-action, postponement, and preparation/support: A framework for action to reduce the rate of teen pregnancy in Canada. Ottawa: Health Canada; 2000. Available from: URL: http://www.phac-aspc.gc.ca/dca-dea/publications/pdf/reduce_teen_pregnancy_section_1_e.pdf*

6 *Strobino D, OCampo P, Schoendorf K. A strategic framework for infant mortality reduction: Implications for ``Healthy Start.`` Milbank Q 1995; 73(4):507-533.*

7 *McCormick MC. The contribution of low birth weight to infant mortality and childhood morbidity. N Engl J Med 1985;312(2):82-89.*

8 *Saskatchewan Ministry of Health. Health service outcome indicators – Mothers and infants. Regina: Saskatchewan Ministry of Health; 2007. Available from: URL: www.health.gov.sk.ca/content/indicators_mothers_infants.pdf*

9 *Wardlaw T, Blanc A, Zupan J, & Ahman E. Low birthweight: Country, regional and global estimates. Geneva: World Health Organization & UNICEF [online]. 2004 [cited 2008 Nov 14]. Available from :URL: http://www.who.int/reproductive-health/publications/low_birthweight/low_birthweight_estimates.pdf*

10 *Saskatchewan Ministry of Health. Global health indicators for Saskatchewan regional health authorities. Regina: Saskatchewan Ministry of Health; 2006.*

11 *Health Quality Council. Core health status indicators for regional health authorities. Infant mortality rate: Technical information [online]. 2008 [cited 2008 Aug 19]. Available from: URL: https://www.hqc.sk.ca/portal.jsp?hZqD22ll8MiRTglkAxAKpjBlzBf0QfLQkUwK4QBZaJuZPAl0n65QBFVvl5thiwzu*

12 *Public Health Agency of Canada. Breastfeeding and infant nutrition [online]. 2008 [cited 2008 Aug 14] Available from: URL: http://www.phac-aspc.gc.ca/dca-dea/prenatal/nutrition-eng.php*

13 *Britton C, McCormick FM, Renfrew MJ, Wade A, King SE. Support for breastfeeding mothers. Cochrane Database of Systematic Reviews 2007, Issue 1. Art. No.: CD001141.DO1: 1002/14651858.CD001141.pub3*

14 *World Health Organization. Up to what age can a baby stay well nourished by just being breastfed? [online]. 2008. [cited 2009 Jan 9] Available from: URL: http://www.who.int/features/qa/21/en/index.html*

CHAPTER 3

Major Causes of Mortality and Morbidity

A Fitness Food Fun participant checks her insulin before a diabetes-specific exercise program at White Buffalo Youth Lodge.

HIGHLIGHTS

Major Causes of Mortality and Morbidity

Leading Causes of Death and Hospitalization in Saskatoon Health Region (SHR)

- Leading causes of death are circulatory diseases (34%), cancers (24%), respiratory diseases (8%), and injuries (6%).
- Leading causes of hospitalization (other than pregnancy-related) are due to problems with the circulatory system (12%), digestive system (10%), and respiratory system (8%).

Premature Mortality a Concern in Core Neighbourhoods

- Premature mortality is much higher for core neighbourhood residents[a] of Saskatoon compared to SHR overall.

Mental Health Indicators Suggest Depression a Concern

- Mood affective disorders, primarily associated with depression, are the most common cause of mental disorder hospitalization in SHR.

Injuries Related to Suicide, Falls and Transportation are Most Common

- Main causes of injury mortality and hospitalization continue to be suicide, falls and transportation-related.
- Injuries are now the leading cause of premature death in SHR, slightly ahead of all cancers.
- Transportation mortality rates for rural residents are twice as high as compared to urban residents.

The Impact of Diabetes Continues to Grow

- Diabetes is the only disease examined in this chapter where both mortality and hospitalization rates increased between 2001/02 and 2006/07.

In this chapter we consider major causes of ill health for residents of Saskatoon Health Region (SHR), how we compare with other regions and how different sections of the population bear different burdens of disease. This is important because it can help inform priority decisions about clinical programs, whether for prevention, treatment or rehabilitation, to improve overall health of the residents of SHR. Note that where a rural breakdown is not shown, a separate rural health status report has been developed that highlights rural issues in more detail. Readers are encouraged to contact Saskatoon Health Region, Public Health Services for more details.

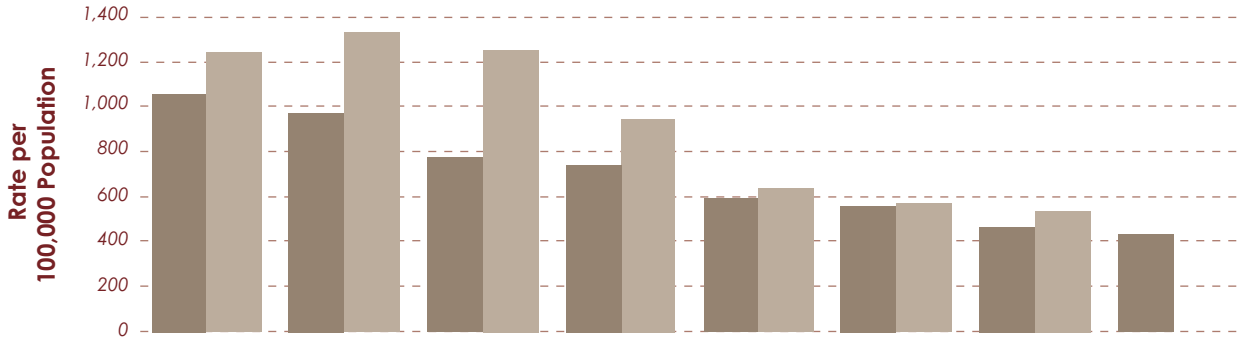
Leading Causes of Hospitalization

In the fiscal year ending March 31, 2007, there were more than 30,000 hospital discharges for SHR residents. The leading causes of hospitalization are shown in Figure 3.1. The most common causes of hospital discharges in SHR are due to circulatory, digestive, respiratory, and injury conditions. Rates for Saskatchewan residents are significantly higher than for SHR for all causes shown in this chapter, except for cancers. Pregnancy-related conditions such as deliveries are the most common type of hospital discharge but are excluded for the purposes of this analysis.

[a] *Please see definition of core neighbourhood in the Technical Appendix*

The most common types of diseases within the main chapter headings are shown in Table 3.1. For circulatory disease, aside from other heart disease, coronary heart disease and stroke are most common. Gallbladder related conditions are the most common type of digestive disease. Chronic obstructive pulmonary disease and allied conditions, along with influenza and pneumonia are the most common types of respiratory conditions.

Figure 3.1: Age Standardized Hospital Separation Rate by Chapter Cause, Saskatoon Health Region and Saskatchewan, 2004/05-2006/07 Combined



	Circulatory	Digestive	Respiratory	Injury	Genitourinary	Cancers	Musculoskeletal	Mental disorders
SHR	1,070.4	985.3	785.8	751.0	601.5	567.5	476.0	442.0
Saskatchewan	1,255.4	1,344.2	1266.1	956.5	646.9	579.3	545.2	n/a

Source: Saskatchewan Ministry of Health. Note: Hospitalizations for mental disorders not available. See Technical Appendix for International Classification of Disease chapter classifications and codes.

Table 3.1: Most Common Hospital Separations by Sub-Chapter, Saskatoon Health Region, 2004/05-2006/07 Combined

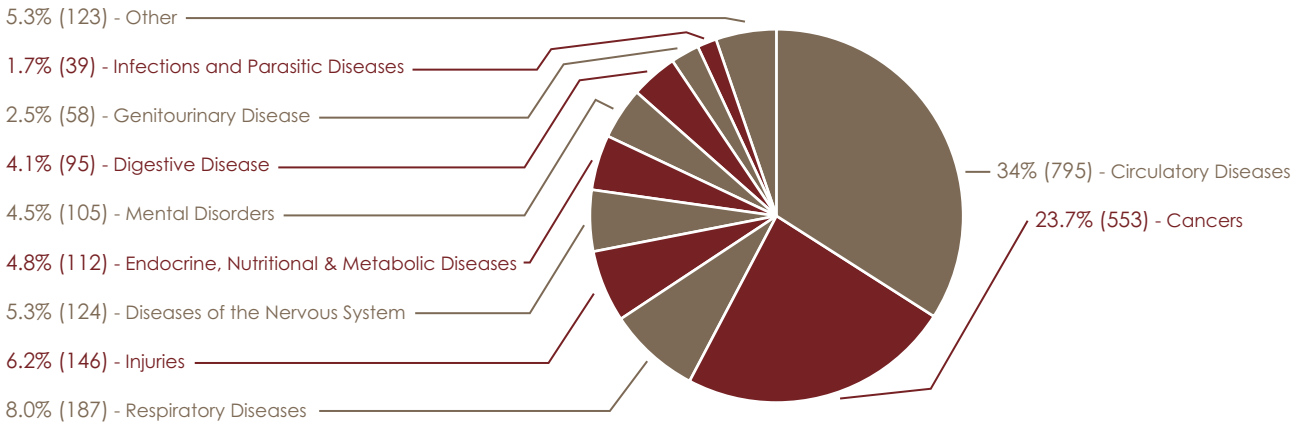
ICD-10 Codes	Name	% of Chapter Cause	Number of Hospital Separations
Circulatory Disease			
I30-I52	Other Forms of Heart Disease	38.5%	3,743
I20-I25	Coronary Heart Disease	28.5%	2,777
I60-I69	Stroke	13.4%	1,307
Digestive Disease			
K80-K87	Disorders of Gallbladder, Biliary Tract, Pancreas	22.0%	1,982
K55-K63	Other Diseases of Intestines	20.4%	1,840
K50-K52	Noninfective Enteritis and Colitis	12.9%	1,166
Respiratory Disease			
J40-J47	COPD and Allied Conditions	32.1%	2,330
J10-J18	Influenza and Pneumonia	30.5%	2,215
J30-J39	Other Diseases of Upper Respiratory Tract	14.2%	1,029

Source: Saskatchewan Ministry of Health.

Leading Causes of Death

In 2006, more than 2,300 SHR residents died, approximately 1% of the SHR population. Figure 3.2 displays the major causes of death, the most common of which are circulatory diseases (34.0% of all deaths), followed by cancers (23.7%), respiratory disease (8.0%) and injuries (6.2%).

Figure 3.2: Number of Deaths by Cause, Saskatoon Health Region, 2006

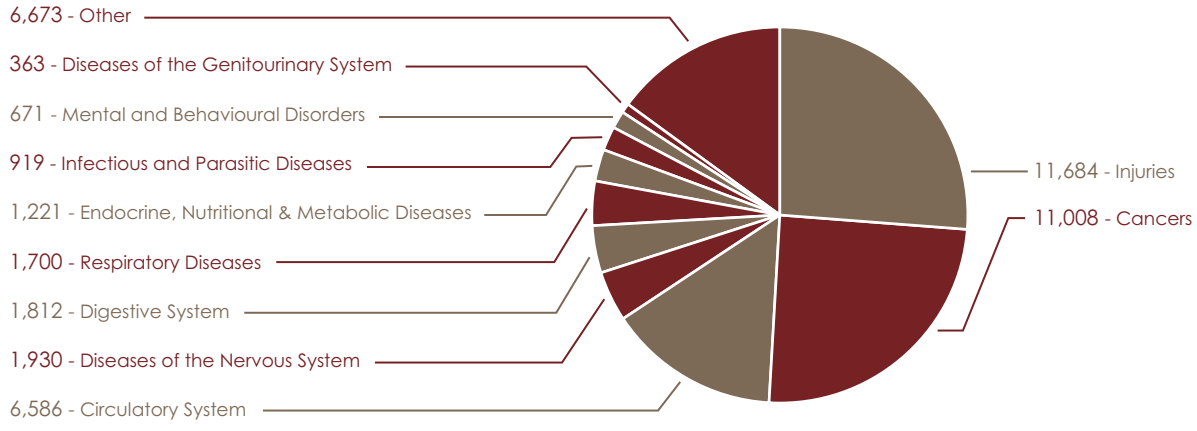


Source: Saskatchewan Ministry of Health, Vital Statistics.

Main Causes of Premature Mortality

It is useful to consider deaths before the age of 75 years, also referred to as premature mortality. Potential years of life lost (PYLL) is a measure of premature mortality and represents the number of years before the age of 75 years that people die.[1] While cancer (11,008 PYLL) and circulatory diseases (6,586 PYLL) remain important premature mortality contributors, injuries (11,684 PYLL) are the leading cause of potential years of life lost in SHR (see Figure 3.3). See Technical Appendix for details of each cause.

Figure 3.3: Potential Years Life Lost (PYLL) by Cause, Saskatoon Health Region, 2004-2006

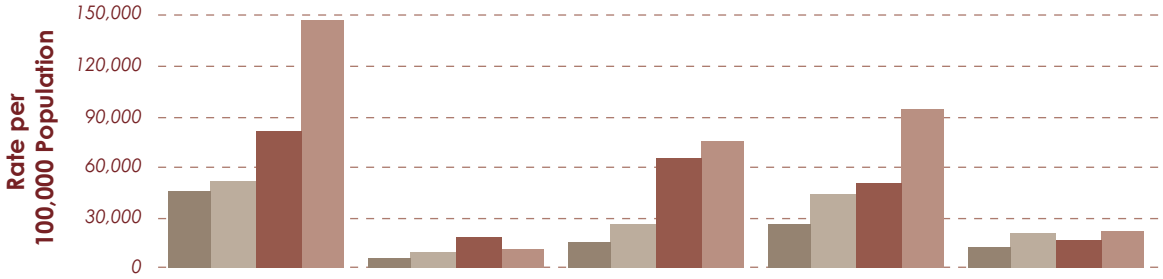


Source: Saskatchewan Ministry of Health, Vital Statistics.

A Closer Sub-Regional Look

Potential Years of Life Lost (PYLL) per 100,000 population for core neighbourhood residents compared to SHR residents are shown in Figure 3.4. Residents of the core neighbourhoods have higher PYLL rates in all age groups, especially those in the 'less than one year' and 20 to 44 year age groups for males and females.

Figure 3.4: All Cause PYLL Rate by Sex and Age Group, Saskatoon Health Region, 2004-2006 Combined



	<1	1-19	20-44	45-64	65-74
Female SHR	46,031	6,281	15,752	26,057	12,421
Male SHR	51,800	9,814	26,197	44,097	20,948
Female Core Neighbourhoods	81,155	18,672	65,547	50,713	16,540
Male Core Neighbourhoods	147,160	11,202	75,456	94,430	22,402

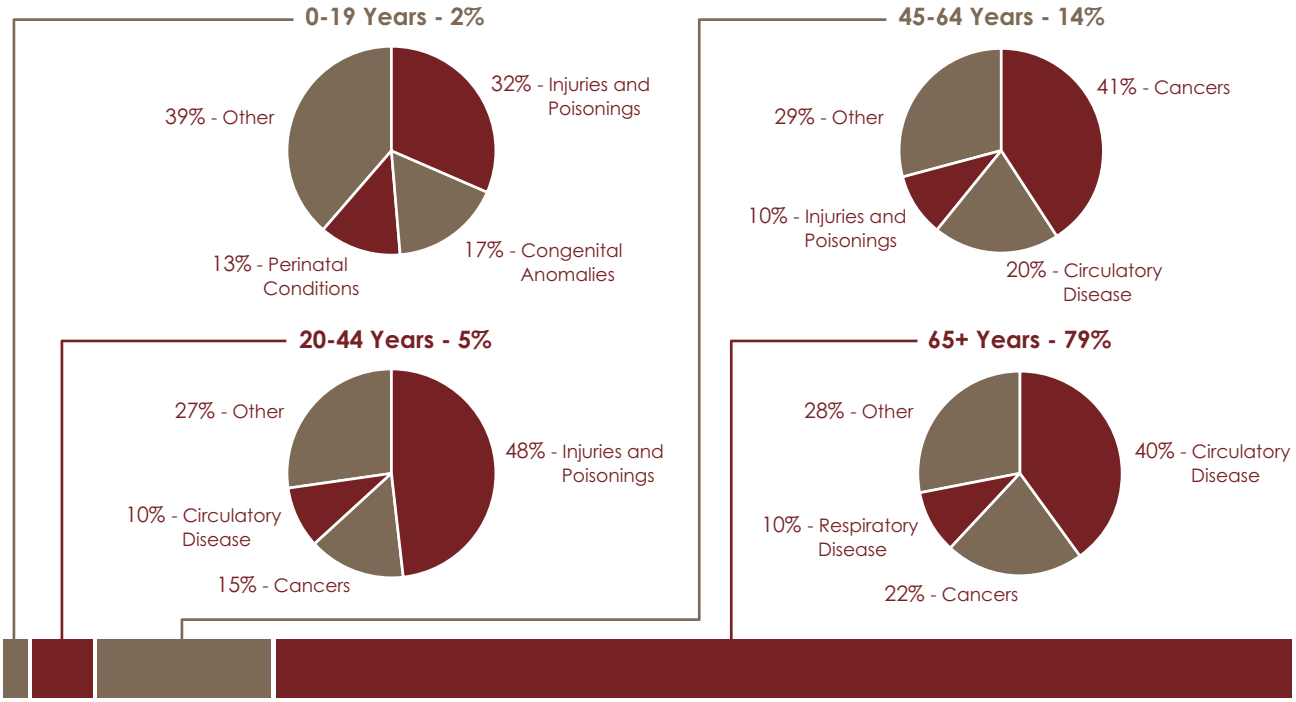
Source: Saskatchewan Ministry of Health, Vital Statistics.

How Does Death Vary by Age?

Figure 3.5 shows mortality by age group for SHR residents with 79% dying at 65 years and over. The main cause of death for this age group is circulatory disease, (mostly heart disease and stroke), followed by cancers and respiratory disease. For 45 to 64 year olds, the main cause of death is cancers, followed by circulatory disease and injuries. For 20 to 44 year olds, injuries are the main cause of death, though this age group makes up just 5% of all deaths in SHR residents. Cancers and circulatory disease are the other main causes. Finally, for those 0 to 19 years, injuries are the most common cause of death, followed by congenital anomalies and perinatal conditions.[b]

[b] *Congenital anomalies includes both structural deformities and biochemical abnormalities. Perinatal conditions include conditions that have their own origin around the time of birth (usually between 20 weeks gestation and 7 days after birth).*

Figure 3.5: Mortality by Select Cause and Age Group, Saskatoon Health Region, 2004-2006 Combined



Source: Saskatchewan Ministry of Health, Vital Statistics.

So What's the Bottom Line?

Hospitalizations: Circulatory, digestive system, and respiratory diseases are the most common causes of hospitalization for SHR residents.

Premature Mortality: Injuries are now the most common cause of potential years of life lost. More detail is needed on causes of injury mortality in younger ages to better inform programming. Core neighbourhood residents experience premature mortality rates that are higher than the SHR average for all age groups.

Mortality: Circulatory diseases, cancers and respiratory diseases are the most common cause of mortality in SHR. As our population continues to age, programs and services for those with chronic conditions will be crucial.

Important Specific Causes of Death and Disability

This section highlights specific conditions which are major causes of death and disability in our region. Readers are encouraged to refer to Appendix 2 and 3 for more detail.

Coronary Heart Disease

Coronary heart disease is caused by a narrowing of the arteries of the heart and stiffening of their walls due to hard fatty deposits. Further and sometimes sudden narrowing of the arteries may occur when blood clots around these deposits. Once the narrowing of the artery reaches a certain point the heart muscle becomes short of blood. This may lead to angina (chest pain), acute myocardial infarction (heart attack), arrhythmia (disturbed heart rhythm) and heart failure.

Economic Burden of Heart Disease

> Heart disease and stroke cost the Canadian economy more than any other disease conditions at more than $18 billion dollars in physician, drug, hospital and lost productivity costs.[4]

Tobacco use, physical inactivity, poor diet and obesity are the main risk factors for heart disease, along with socio-economic factors like low income.[2,3] These issues are examined in more detail in Chapter 5 (Social Environment) and Chapter 7 (Health Behaviours).

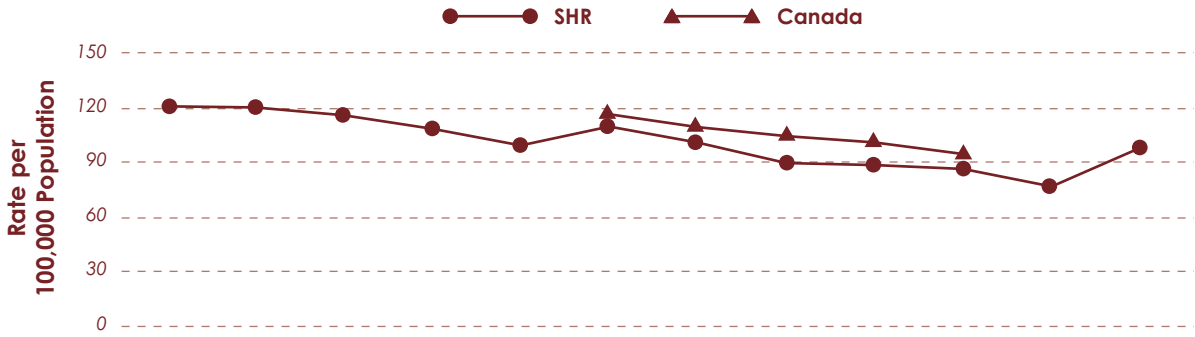
Coronary heart disease remains the leading cause of death in SHR, with 424 deaths in 2006. In 2005, approximately 7,600 people, or 3.2% of the SHR population aged 12 and over, self reported heart disease, about the same as the Saskatchewan (4.6%) and Canadian (4.8%) averages. (Canadian Community Health Survey (CCHS), custom tabulation).

Regional Trend

The trend in heart disease mortality over time has been downward, and SHR mortality rates were lower than the Canadian rates between 2000 and 2004 (see Figure 3.6). Despite the overall downward trend, the upturn in 2006 should be noted. While this might just be a temporary increase, it reinforces the importance of efforts to further reduce mortality from heart disease. Heart disease mortality tends to occur in older age groups (see Figure 3.7), with males having significantly higher mortality rates than females.

Similar to mortality, hospitalization rates for coronary heart disease have declined over time from 506.6 per 100,000 in 1995/96 to 380.6 per 100,000 in 2006/07.

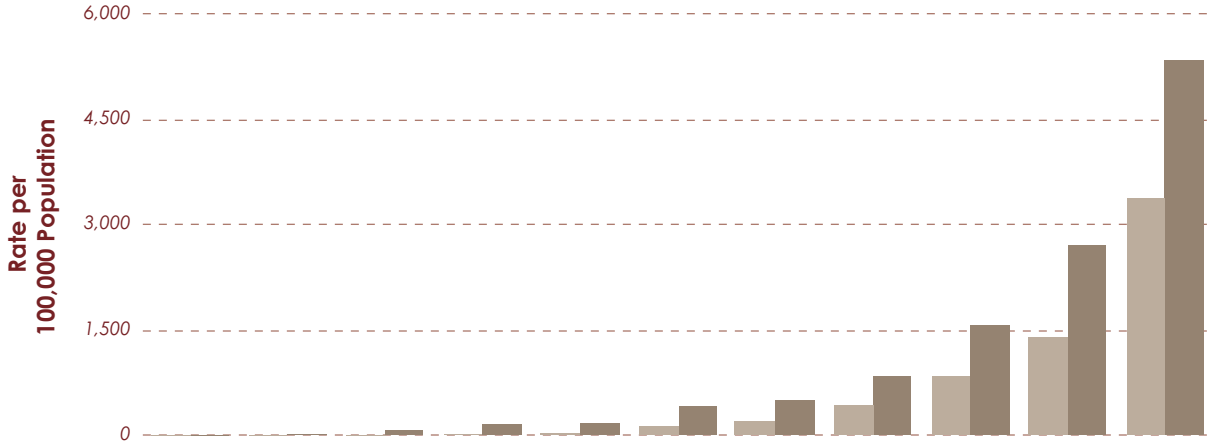
Figure 3.6: Age Standardized Heart Disease Mortality Rates, Saskatoon Health Region And Canada, 1995-2006



	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
SHR	121.7	121.2	117.0	109.7	100.8	110.9	102.3	91.4	90.3	88.2	78.8	99.5
Canada	n/a	n/a	n/a	n/a	n/a	117.5	110.6	105.8	102.4	96.2	n/a	n/a

Source: Saskatchewan Ministry of Health, Vital Statistics. CANSIM Table 102-0552 Deaths by selected grouped causes and sex, Canada, provinces and territories, annual.

Figure 3.7: Heart Disease Mortality Rates by Age Group, Saskatoon Health Region, 2004-2006 Combined



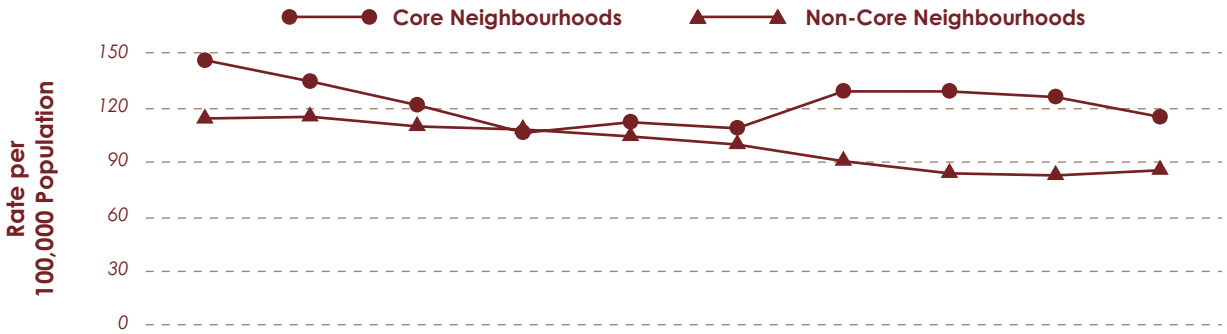
	<45	45 to 49	50 to 54	55 to 59	60 to 64	65 to 69	70 to 74	75 to 79	80 to 84	85 to 89	90+
Male	3.2	29.2	83.9	161.6	175.9	417.9	516.4	858.9	1,580.5	2,714.1	5,346.3
Female	0.4	8.6	13.5	22.1	37.6	141.4	207.5	434.8	848.0	1,407.3	3,379.8

Source: Saskatchewan Ministry of Health, Vital Statistics.

A Closer Sub-Regional Look

Inequities in heart disease rates are evident when comparing core neighbourhood residents to the rest of the city. Residents of the core neighbourhoods had higher heart disease mortality rates than residents of non-core neighbourhoods (though not statistically significant). The gap in rates is especially apparent from 2000-2002 onwards (see Figure 3.8). Smoking is a major risk factor for heart disease and smoking rates in the core neighbourhoods have been shown to be over twice as high as the rest of Saskatoon, which may help explain these findings.[5]

Figure 3.8: Age Standardized Heart Disease Mortality Rates by Neighbourhood, 1995-2006, Three Year Rolling Averages



	1995-97	1996-98	1997-99	1998-00	1999-01	2000-02	2001-03	2002-04	2003-05	2004-06
Core Neighbourhoods	146.4	134.6	121.6	106.4	112.2	108.8	129.2	129.2	126.0	114.9
Non-Core Neighbourhoods	114.3	115.2	109.9	108.2	104.3	99.9	90.7	84.0	82.9	85.7

Source: Saskatchewan Ministry of Health, Vital Statistics.

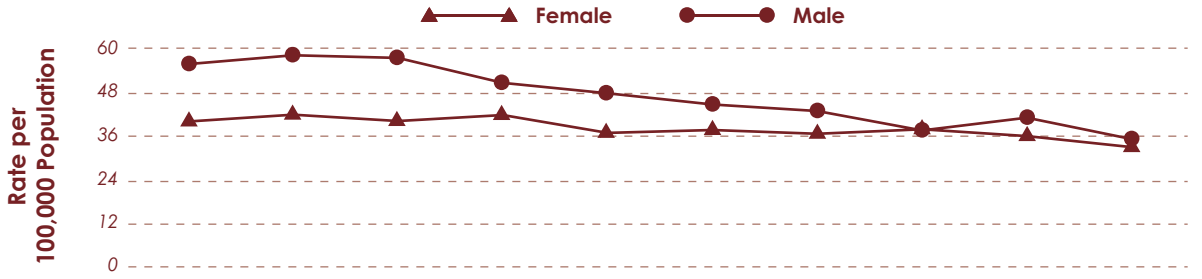
Acute Myocardial Infarction

Acute myocardial infarction - or heart attacks - are one manifestation of coronary heart disease. Each year, more than 500 hospital discharges result because of heart attacks. A recent report from the Health Quality Council examined 30 and 365 day mortality after a heart attack. The mortality includes any cause of death and is a broad measure which can be influenced by many factors such as the socio-economic, psychological, supportive, environmental and health circumstances of these individuals as well as access to a physician, health-care services or other community-based services. There were no statistically significant differences in either of these two indicators for SHR residents compared to the Saskatchewan average in 2004/05.[6] The 30-day mortality for SHR was 10.4 per 1,000 population compared to Saskatchewan's 12.2 per 1,000. The 365 day mortality for SHR was 20.4 per 1,000 compared to 21.9 per 1,000, respectively.

Stroke

A stroke is a sudden loss of brain function caused by an interruption of blood flow to the brain.[7] SHR mortality rates from stroke have, like coronary heart disease, decreased since 1995, and were about the same as the national age standardized rates in 2004 (36.6 per 100,000 compared to 34.9 per 100,000 respectively). In recent years, male stroke mortality rates have come close to female rates as shown in Figure 3.9. Most of the mortality, similar to heart disease, occurs in those aged 70 years and older.

Figure 3.9: Age Standardized Stroke Mortality Rate by Sex, Saskatoon Health Region, 1995-2006, Three Year Rolling Averages



	1995-97	1996-98	1997-99	1998-00	1999-01	2000-02	2001-03	2002-04	2003-05	2004-06
Female	40.3	42.1	40.4	42.0	37.1	37.9	36.9	38.1	36.2	33.2
Male	56.0	58.4	57.7	50.8	48.0	44.9	43.1	37.8	41.3	35.4

Source: Saskatchewan Ministry of Health, Vital Statistics.

A coding change in 2001/02 from ICD-9 to ICD-10, contributed to a significant drop in the number of stroke hospitalizations. Since this coding change, the stroke hospitalization rate has been relatively stable at 131.0 per 100,000 population in 2001/02, decreasing slightly to 118.0 per 100,000 in 2006/07.

According to self report data from the CCHS, in 2005, an estimated 1.4% of SHR residents reported living with the effects of stroke, or about 3,200 people. This is about the same as the Saskatchewan (1.4%) and Canadian averages (0.9%).

Diabetes

Diabetes is caused by either the loss of the body's ability to make insulin (type 1 diabetes) or the inability of the body to respond to the insulin it makes (type 2 diabetes), or both.[8] About 90% of all diabetes is type 2, which typically occurs in adulthood. The information presented in this section includes both type 1 and type 2 diabetes.

It is important to note that diabetes is the only chronic condition examined in this chapter where increasing rates are seen in both mortality and hospitalizations since 2001/02 (see Appendices 2 and 3).

To get a sense of how many people have diabetes, the Province of Saskatchewan compiled diabetic case statistics based on hospital discharge, physician billing and prescription drug data. The total number of diabetic cases in SHR (prevalence) in 2005/06 was 53.3 per 1,000 population and the number of new cases of diabetic cases in SHR (incidence) in 2005/06 was 4.4 per 1,000. These are lower than provincial averages of 61.4 per 1,000 and 5.5 per 1,000 respectively.[11] Note that the values presented above are for the non-RIS populations. RIS population diabetes values were about the same for prevalence (54.4 per 1,000 population) and slightly lower for incidence (3.7 per 1,000 population).

My mother (72 years old) was just diagnosed with diabetes . . . She had 20 pounds extra weight. Since attending a class at the Field House and looking much closer at what she ate (portion size and label reading) she has lost the weight and her blood sugars are now normal . . . with a few behavioural changes she could make a difference.

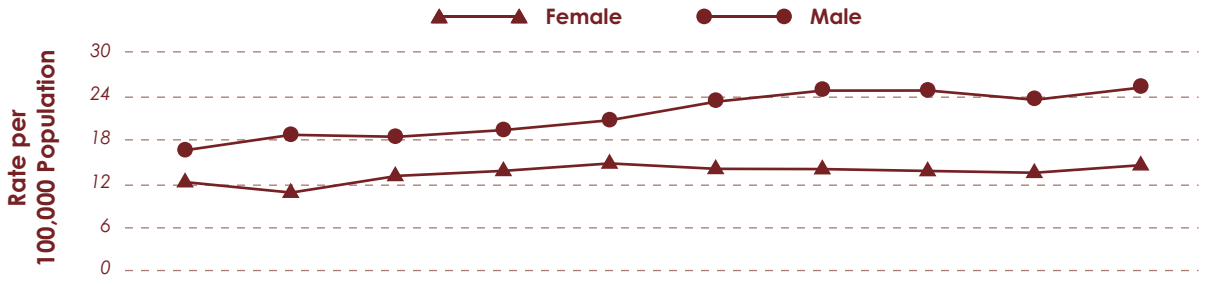
Public Health Services staff member, SHR.

Facts About Diabetes

- More than 90% of cases could be prevented through a healthy diet, regular physical activity, and not smoking.
- Three-quarters of diabetics suffer from other chronic conditions such as depression or heart disease.
- Diabetics are more likely to live in low income.[9]
- Diabetes is estimated to cost the Canadian health care system $15.6 billion by 2010.[10]

Diabetes mortality rates for SHR in 2004 (18.0 per 100,000) were about equal to Canadian rates (19.6 per 100,000) and provincial rates (22.9 per 100,000). SHR diabetes mortality rates are on the rise, with male rates increasing faster than female rates since 1995 (see Figure 3.10). Diabetes mortality is highest for age groups 70 years and older (data not shown).

Figure 3.10: Age Standardized Diabetes Mortality Rates by Sex, Saskatoon Health Region, 1995-2006, Three Year Rolling Averages



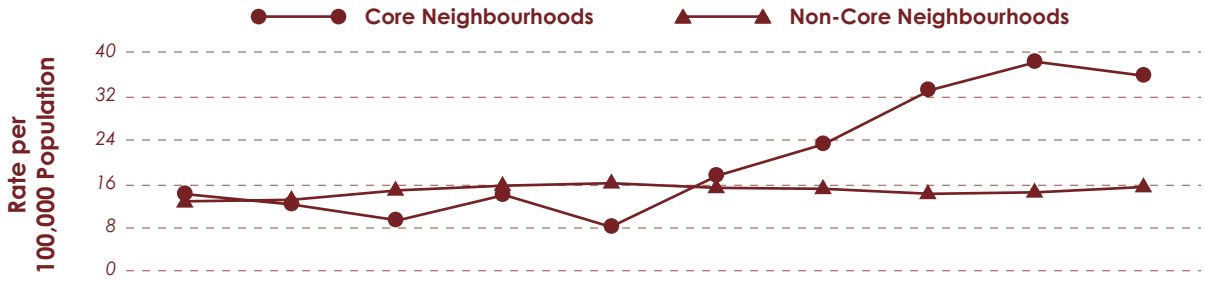
	1995-97	1996-98	1997-99	1998-00	1999-01	2000-02	2001-03	2002-04	2003-05	2004-06
Female	12.3	10.8	13.1	13.8	14.8	14.1	14.0	13.8	13.5	14.6
Male	16.6	18.7	18.5	19.4	20.7	23.3	24.8	24.8	23.5	25.2

Source: Saskatchewan Ministry of Health, Vital Statistics.

A Closer Sub-Regional Look

Similar to heart disease, inequities in diabetes mortality rates exist between residents of Saskatoon's core neighbourhoods and the rest of the city. Rates have increased in the core neighbourhoods since 2000. The 2004-2006 rate for core neighbourhood residents of 35.9 per 100,000 was more than twice that for non-core neighbourhood residents (15.6 per 100,000, see Figure 3.11). Small numbers of diabetes deaths for those living in the core neighbourhoods (roughly 5 per year) contributes to the instability of the trend, so these findings should be treated with caution. Rural SHR residents also have higher diabetes mortality rates than Saskatoon dwellers (Data not shown).

Figure 3.11: Age Standardized Diabetes Mortality Rates by Neighbourhood, 1995-2006, Three Year Rolling Averages



	1995-97	1996-98	1997-99	1998-00	1999-01	2000-02	2001-03	2002-04	2003-05	2004-06
Core Neighbourhoods	14.3	12.4	9.5	14.1	8.3	17.6	23.4	33.3	38.4	35.9
Non-core Neighbourhoods	12.9	13.2	14.9	15.8	16.2	15.4	15.2	14.3	14.6	15.6

Source: Saskatchewan Ministry of Health, Vital Statistics.

Chronic Obstructive Pulmonary Disease (COPD)

Chronic Obstructive Pulmonary Disease (COPD) is a lung disease characterized by chronic obstruction of lung airflow that interferes with normal breathing, and may also include shortness of breath, cough and sputum production.[12, 13] It is not reversible. COPD and allied conditions includes asthma, emphysema and bronchitis among other chronic respiratory conditions. As the population ages, respiratory conditions like COPD are likely to increase. Indoor and outdoor air quality and smoking are the major risk factors for COPD and allied conditions[12] and these issues are addressed in more detail in Chapter 7 Health Related Behaviours and Chapter 6 Physical Environment chapters of this report.

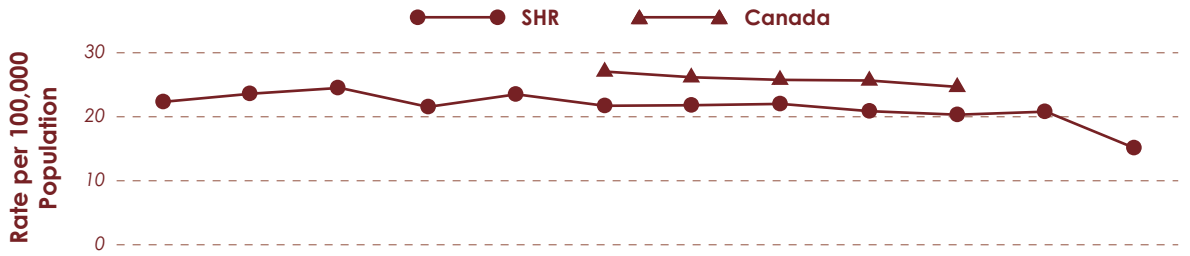
Economic Burden of Respiratory Conditions

> All types of respiratory conditions in Canada have been estimated at $5.7 billion in direct health care costs, one quarter of which are spent on COPD and asthma.[12]

COPD and allied conditions mortality rates have decreased slightly in SHR since 2001 and were lower than Canadian rates from 2000 to 2004, though the differences are not statistically significant (see Figure 3.12). Males have anywhere from two to three times the mortality rates of females in SHR (males 32.4 per 100,000 compared to females 10.6 per 100,000 in 2004-2006). Similar to other chronic conditions, ages 70 and older are when the majority of COPD deaths occur.

Unlike mortality rates, COPD and allied conditions hospitalization rates have increased between 2001/02 (201.5 per 100,000) and 2006/07 (231.7 per 100,000).

Figure 3.12: Age Standardized COPD and Allied Conditions Mortality Rates, Saskatoon Health Region and Canada, 1995-2006



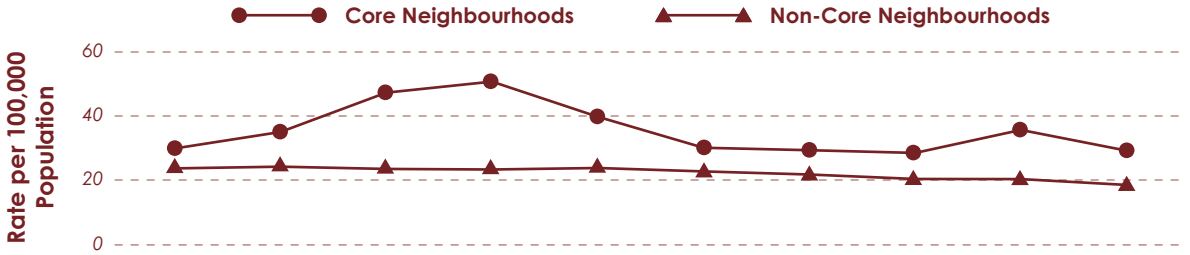
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
SHR	22.5	23.7	24.6	21.7	23.6	21.9	21.9	22.1	21.0	20.5	20.9	15.3
Canada	n/a	n/a	n/a	n/a	n/a	27.2	26.3	25.9	25.8	24.8	n/a	n/a

Source: Saskatchewan Ministry of Health, Vital Statistics. CANSIM Table 102-0552. Deaths by selected groups causes and sex, Canada, provinces and territories, annual. COPD and allied conditions ICD-10 codes = J40-J47

A Closer Sub-Regional Look

Residents of core neighbourhoods in Saskatoon have higher mortality rates for COPD and allied conditions than residents living outside the core neighbourhoods (though not statistically different). This has been consistent since 1995 (see Figure 3.13). Similarly, mortality rates for COPD and allied conditions among rural residents have been lower, compared to Saskatoon residents since 1995 (though not statistically different).

Figure 3.13: Age Standardized COPD and Allied Conditions Mortality Rates by Neighbourhood, 1995-2006, Three Year Rolling Averages



	1995-97	1996-98	1997-99	1998-00	1999-01	2000-02	2001-03	2002-04	2003-05	2004-06
Core Neighbourhoods	30.3	35.4	47.7	51.2	40.2	30.5	29.7	28.9	36.1	29.6
Non-core Neighbourhoods	24.0	24.6	23.9	23.7	24.2	23.1	22.1	20.7	20.7	18.9

Source: Saskatchewan Ministry of Health, Vital Statistics.

Cancer

Cancer is a disease that starts in the body's cells.[14] It occurs when cells in one part of the body become abnormal and multiply. It can then spread to other parts of the body and eventually lead to death. It is important to recognize that cancer is not a single entity but a wide range of different diseases with different causes, different treatment needs and different outcomes. Many risk factors for cancer are preventable through changes to our lifestyles (e.g. reducing tobacco use, incorporating a healthier diet, and increasing physical activity), as well as modifications to our environments (e.g. reduced exposure to pesticides). These issues are examined in more detail in Chapter 7 Health Related Behaviours and Chapter 6 Physical Environment.

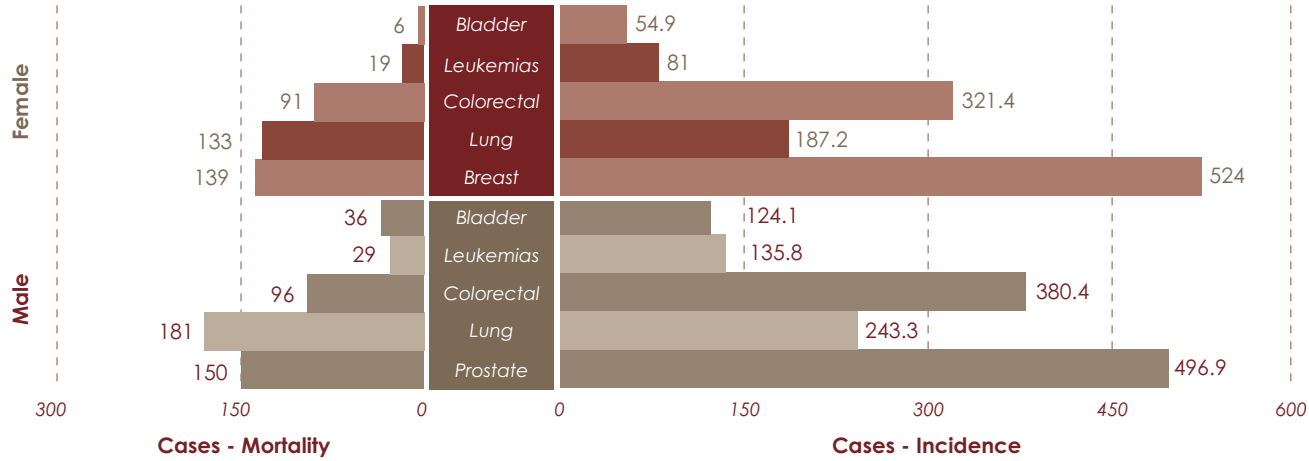
Based on self-report data, it was estimated in 2005 that 3,200 people in SHR were living with cancer, or 1.4% of the population, similar to Saskatchewan (1.7%) and Canada (1.4%) (CCHS, 3.1 custom tabulations).

Cancer Incidence

The most common types of cancer incidence (new cases) for males and females in SHR for the years 2004-2006 combined are shown in Figure 3.14. For females, breast cancer made up about 29% of all new cases, and for males, prostate cancer made up about 28% of new cases. The total number of new cases of cancer diagnosed in 2004 to 2006, not including non-melanoma skin cancer or in situ cancer for females was 1,693 and males 1,754.

Figure 3.14 also shows the number of deaths from certain types of cancer. Breast, lung, and colorectal cancers were the most common type of mortality for females. For males, lung, prostate, and colorectal cancers were the most common. Note that deaths and incident cases are not necessarily related. For example, an incident case of prostate cancer may not be related to a prostate cancer death in that same time period.

Figure 3.14: Number of Cancer Deaths and Incident Cases, Select Cancer Sites, Saskatoon Health Region, 2004-2006 Combined



Source: Incident data from SK Cancer Agency. Mortality from: Saskatchewan Ministry of Health, Vital Statistics. Information is based on case counts, not people, so that one person could be diagnosed with colorectal and bladder cancer in the same time period. Note difference in incidence and mortality codes. ICD-10 mortality codes for Prostate = C61; Lung = C34; Breast = C50; Colorectal = C18-C21, C26.0; Leukemias = C90.1, C91-C95; Bladder = C67. ICD-0-3 incidence codes for Prostate = C60-C63; Lung = C30-C39; Breast = C50; Colorectal = C15-C26; Leukemias = 9800-9989; Bladder = C64-C68.

For males, prostate cancer age-standardized incidence rates in the province and SHR have increased since 1983, but the rate of increase is slightly lower in SHR. Both lung cancer and colorectal cancer incidence rates have remained fairly stable over time. For females, breast and lung cancer age standardized incidence rates have increased over time with colorectal cancers remaining fairly stable. SHR cancer incidence rates have followed provincial patterns quite closely.[15]

Cancer Mortality

In 2006, there were more than 550 cancer deaths in SHR residents. The following section shows trends in mortality for four common types of cancer: prostate, breast, lung and colorectal. Not counting non-melanoma skin cancer, these four types of cancer make up about 55% of all cancers in Canada.[16]

Females

Lung cancer and breast cancer are the two most common types of cancer mortality among females in SHR (see Figure 3.15). Lung cancer mortality rates have dropped steadily since 2001, leaving lung cancer and breast cancer mortality rates tied for the first time in the 2004-2006 period. This trend is interesting given the

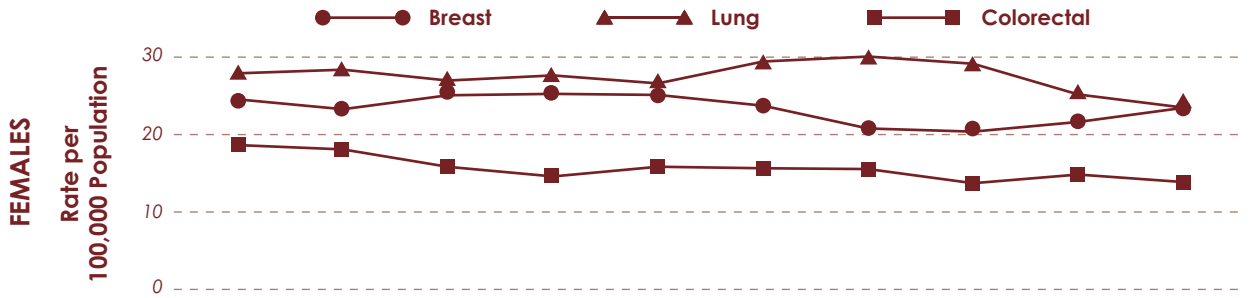
lung cancer mortality increases reported in Canada.[16] Breast cancer mortality rates in SHR in 2004-2006 were about the same as provincial and Canadian rates (23.4 per 100,000 compared to 22.3 and 23.1 respectively). Colorectal cancer mortality rates have decreased steadily since 1995. Female hospitalization rates from these three cancers have remained fairly stable since 1995/96 (see Appendix 3).

Males

Though lung cancer is the most common form of cancer mortality in males, it has decreased significantly since 1995 (see Figure 3.15). Prostate cancer is the second most common form of mortality and has been relatively stable since 1995. Prostate cancer mortality rates in Canada are much lower than for SHR (23.4 per 100,000 in 2004 compared to 34.7 per 100,000 respectively). Colorectal cancer mortality in SHR has dropped steadily since 1995.

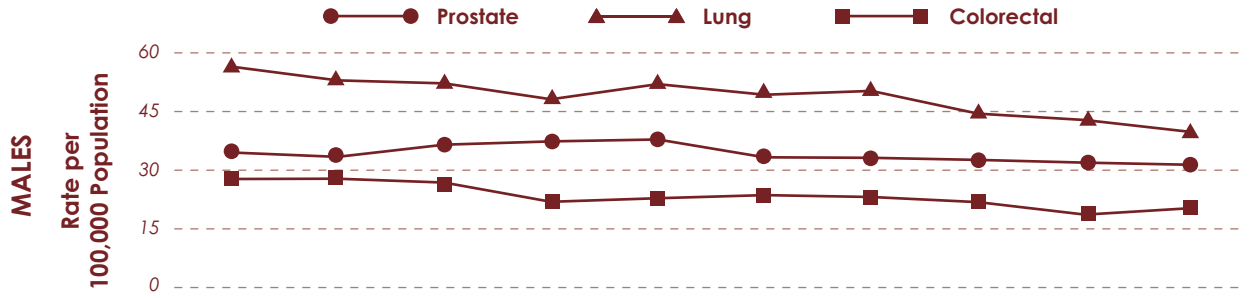
Male cancer hospitalization rates are shown in Appendix 3. Prostate cancer hospitalizations had the largest decrease relative to other cancers between 2001/02 and 2006/07. Lung cancer hospitalizations have also decreased, while colorectal has stayed relatively stable.

Figure 3.15: Age Standardized Mortality Rate, Select Cancers, by Sex, Saskatoon Health Region, 1995-2006, Three Year Rolling Averages



	1995-97	1996-98	1997-99	1998-00	1999-01	2000-02	2001-03	2002-04	2003-05	2004-06
Breast	24.5	23.2	25.0	25.2	25.0	23.7	20.7	20.3	21.6	23.4
Lung	27.8	28.3	26.9	27.6	26.5	29.4	30.0	29.1	25.1	23.4
Colorectal	18.6	18.0	15.8	14.6	15.8	15.6	15.5	13.7	14.8	13.8

Source: Saskatchewan Ministry of Health, Vital Statistics.



	1995-97	1996-98	1997-99	1998-00	1999-01	2000-02	2001-03	2002-04	2003-05	2004-06
Prostate	34.8	33.7	36.8	37.6	38.1	33.6	33.4	32.9	32.2	31.6
Lung	56.8	53.2	52.5	48.4	52.3	49.5	50.5	44.7	43.1	40.0
Colorectal	28.0	28.1	27.1	22.2	23.1	23.9	23.4	22.1	18.9	20.6

Source: Saskatchewan Ministry of Health, Vital Statistics.

So What's the Bottom Line?

Heart Disease: While still the leading cause of death in SHR, heart disease mortality rates have decreased over time and are lower than the Canadian average.

Respiratory Disease: Mortality rates in SHR are decreasing, though core neighbourhood residents continue to have higher rates than residents of non-core neighbourhoods.

Diabetes: Unlike other chronic conditions examined in this chapter, both hospitalization and mortality rates for diabetes are increasing in SHR. This has implications on the need for prevention programs and future increased programming and services for diabetics.

Cancers: Breast cancer (females) and prostate cancer (males) are the most common types of new cancers. Breast cancer in females and lung cancer in males are the most common types of death from cancer. Interestingly, though lung cancer mortality rates are increasing in Saskatchewan and Canada, no such increase has been seen in SHR residents.

Mental Health

Mental health refers to the capacity of each of us to think, feel and act in ways that enhance our ability to enjoy life and deal with challenges.[17] Many factors affect mental health, including genetics, personality, ability to handle stress, and environmental factors like socio-economic status and housing. Personal experiences in childhood, such as sexual abuse, can also affect an individual's mental health later in life.[17]

As reported in Chapter 7 on Health Behaviours, 72% of SHR residents reported very good or excellent mental health in 2007.

Mental Illness

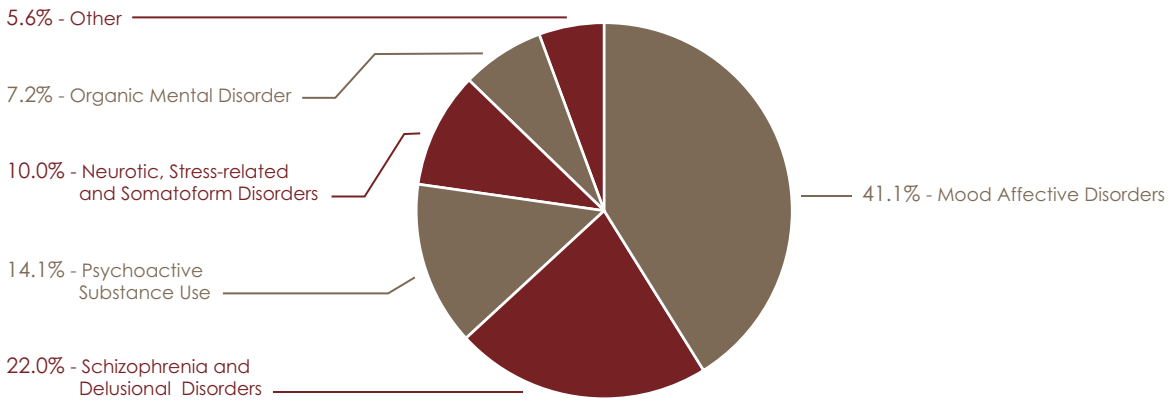
Mental illness is characterized by alterations in thinking, mood or behaviour and is associated with distress and disability.[18] This section includes data on hospitalizations and mortality from mental illness. Data is not available for many mental health indicators which is why mental illness is reported here.

Most mental health care today is provided outside hospitals. That said, hospital care for mental illness is an important part of the treatment continuum, and is a source of have accessible comparable data over time.[17]

Mental disorder hospitalization rates have been decreasing among SHR residents since 1995/96 when they were 569.4 per 100,000 to 2006/07 when they were 408.2 per 100,000. The decrease in hospitalization rates for mental disorders is also seen nationally.[17]

There are many types of mental disorders, and Figure 3.16 shows the most common types of hospital discharges for SHR residents. Mood affective disorders (primarily depression and bipolar disorders), schizophrenia and delusional disorders and substance use disorders (primarily associated with alcohol) are the most common types of mental disorders in SHR.

Figure 3.16: Types of Mental Disorders, Percentage of Hospital Discharges, Saskatoon Health Region, 2004/05 to 2006/07 Combined



Source: Saskatchewan Ministry of Health. Note: ICD-10 mental disorder codes are organic mental disorder = F00-F09, psychoactive substance use = F10-F19, schizophrenia and delusional disorders = F20-F29, mood affective disorders = F30-F39, neurotic, stress-related and somatoform disorders = F40-F48, other = F50-F99.

A Closer Sub-Regional Look

Between 2004/05 and 2006/07, rates for mental disorder hospitalizations in core neighbourhoods were nearly twice that of residents in non-core neighbourhoods in Saskatoon (769.8 per 100,000 compared to 407.3 per 100,000). Mental disorder hospitalization rates for rural residents were about the same as for Saskatoon residents overall (422.9 per 100,000 and 435.2 per 100,000 respectively).

Suicide

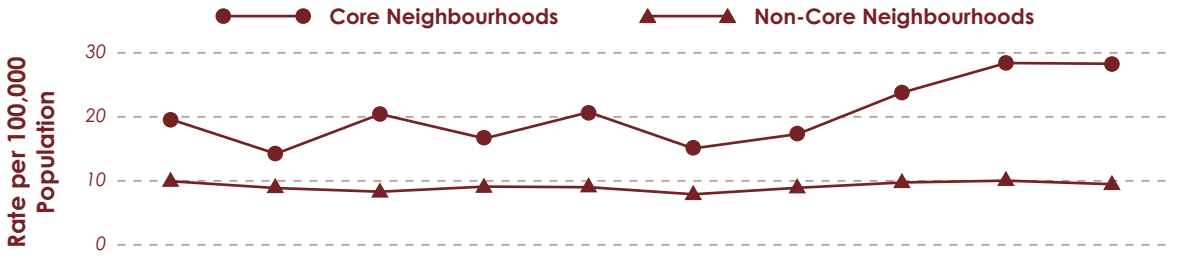
Suicide is death where there is evidence that a self-inflicted act led to the person's death. It can be precipitated by a significant crisis, such as loss of a job or end of a relationship, and those that kill themselves almost always have a mental illness.[17]

Suicide is the leading cause of injury mortality in SHR. In the years 2004 through 2006, approximately 90 SHR residents committed suicide, which equates to a rate of 10.6 per 100,000 population. The SHR rate is similar to Canadian (10.8) and Saskatchewan (11.2) rates in 2004. Age groups with the highest suicide mortality were the 20 to 29 years, 40 to 49 years, and 90+.

A Closer Sub-Regional Look

Differences in suicide rates are most apparent when comparing Saskatoon's core neighbourhood to non-core neighbourhood residents. Since 2001, suicide rates for core neighbourhood residents have shown an increase. In the 2004-2006 period, suicide mortality for core neighbourhood residents was 27.7 per 100,000 population compared to 9.9 for non-core neighbourhood residents (see Figure 3.17).

Figure 3.17: Age Standardized Suicide Mortality, Saskatoon Health Region, 1995-2006, Three Year Rolling Averages



	1995-97	1996-98	1997-99	1998-00	1999-01	2000-02	2001-03	2002-04	2003-05	2004-06
Core Neighbourhoods	19.5	14.4	20.3	16.7	20.5	15.2	17.3	23.4	27.8	27.7
Non-core Neighbourhoods	10.4	9.4	8.8	9.6	9.5	8.4	9.4	10.2	10.4	9.9

Source: Saskatchewan Ministry of Health, Vital Statistics.

So What's the Bottom Line?

Hospitalization For Mental Disorders: Mood affective disorders primarily related to depression are the most common cause of mental health hospitalization for SHR residents. Although mental health hospitalizations have been decreasing in recent years, core neighbourhood residents had hospitalization rates twice that of residents in non-core neighbourhoods.

Suicide: Suicide rates are more than twice as high for core neighbourhood residents. Mental health services need to pay particular attention to the needs of core neighbourhood residents.

Injuries

An injury is the physical damage that results when the human body is subjected suddenly to levels of energy beyond its ability to absorb, or the result of a lack of vital elements such as air, water or warmth.[19] It is a major cause of morbidity in Canada, and is one of the leading causes of death, especially for those age 1 to 44 years.[20] Injuries are also the leading cause of premature mortality (or potential years life lost) in SHR. Saskatchewan has historically had some of the highest injury rates of any province in Canada.[20,21]

Injury Facts

> More than 90% of all injuries are preventable.[22]

> For every one injury related death, there are about 40 hospitalizations and 670 emergency department visits.[23]

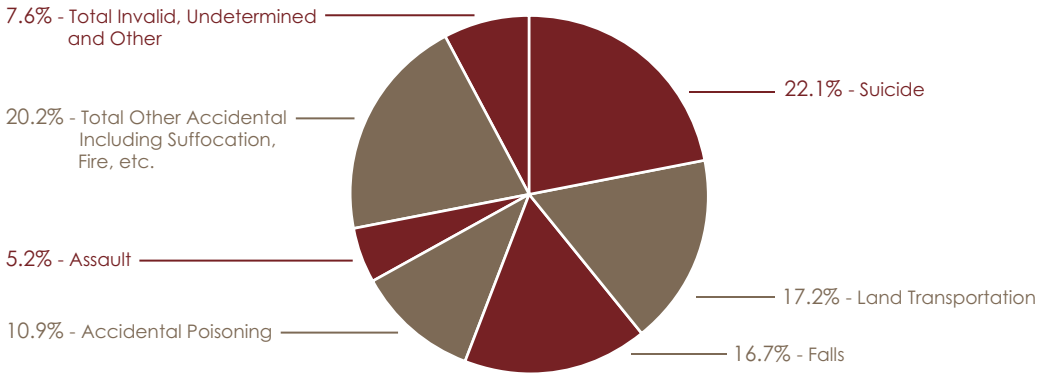
Self Reported Injury

Among all health regions in the province, residents of SHR had the second highest self-reported injury prevalence (16.1%), slightly higher than the provincial average of 14.6% in 2005. Sprains/strains (36.6%) and broken bones (27.4%) were the most common types of injury for SHR residents. The ankle/foot was the most common body part injured at 28.3%, and most injuries occurred in and around the home (30.0%). By far the most common cause of injury for SHR residents was for a fall at 45.7%, higher than the Saskatchewan percentage of 38.6%.[22]

Injury Deaths

The leading causes of injury related deaths in SHR are shown in Figure 3.18. Suicide (22%), transportation (17%), and falls (17%) are the most common causes, making up 56% of all injury deaths in SHR during this time period. Appendix 2 shows that unintentional injury mortality rates for SHR (27.1 per 100,000 population) are less than Saskatchewan (33.6), but slightly higher than the national average (24.7).

Figure 3.18: Leading Causes of Injury Related Deaths, Saskatoon Health Region, 2004-2006 Combined, N=420

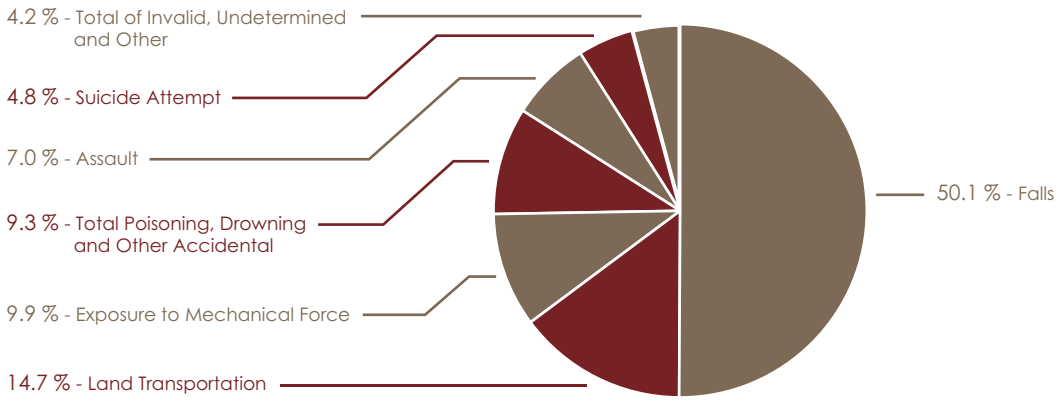


Source: Saskatchewan Ministry of Health, Vital Statistics. Excludes Y40-Y84 and Y88.0 and Y88.1 medical misadventures and adverse effects to drugs. ICD-10 codes for Suicide=X60-X87.0; Land transportation=V01-V89; Falls= W00-W19; Other accidental including suffocation, fire etc.=W20-X39; Accidental poisoning=X40-X49; Assault=X85-Y09; Total invalid, undetermined and other=all other ICD-10 injury codes.

Injury Hospitalizations

For SHR, the leading causes of injury hospitalizations are shown in Figure 3.19. Falls make up the overwhelming majority of the hospitalizations at 50.1% followed by transportation related at 14.7%. Suicide, while making up 22.1% of all injury related death, accounts for about 4.8% of injury hospitalizations.

Figure 3.19: Causes of Injury Related Hospitalizations, Saskatoon Health Region 2004/05–2006/07 Combined, N=5,199



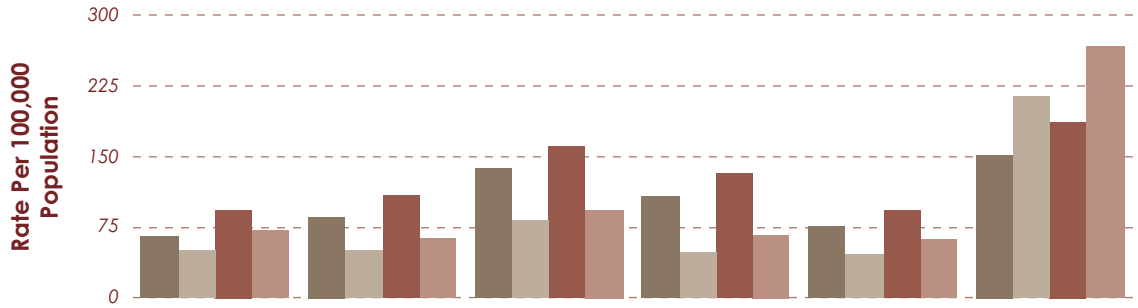
Source: Saskatchewan Ministry of Health, Hospital Separations. Excludes Y40-Y84 and Y88.0 and Y88.1 medical misadventures and adverse effects to drugs. ICD-10 codes for Falls=W00-W19; Land transportation=V01-V89; Exposure to mechanical forces=W20-W64; Poisoning, drowning and other accidental=W65-X59; Assault=X85-Y09; Suicide=X60-X84, Y87.0; Total invalid, undetermined and other=all other ICD10 injury codes.

Injury Hospitalizations by Age Group

Generally, SHR rates for injury hospitalizations are lower than the provincial average.

Between 1995/96 and 2004/05, the average annual age-sex adjusted rate per 10,000 population was 86.4 for SHR compared to 111.2 for Saskatchewan.[22] Figure 3.20 shows that the injury hospitalization rates for males are higher than for females for every age group except 65 and over. It also shows rates are higher for both sexes in core neighbourhoods relative to the overall rates. The 15 to 19 year age group is also of note as this has the highest injury rates for any age group except for those over 65 years.

Figure 3.20: Age Sex Specific Rates of Injury Hospitalizations, Saskatoon Health Region and Saskatchewan, 1995/96 – 2004-05 Combined



	0-9	10-14	15-19	20-34	35-64	65+
Male SHR	66.8	87.4	138.5	109.3	77.7	153
Female SHR	51.7	51.8	83.6	49.6	48	214.8
Male Saskatchewan	94.9	110.3	162.4	133.2	94.6	187.9
Female Saskatchewan	73	64.9	95	68.5	63.5	268.2

Source: Saskatchewan Ministry of Health, 2008.

Causes of Injury

Land Transportation

Land transportation-related collisions, those involving motor vehicles, bicycles, and pedestrians on public roadways, are a major cause of injury-related death and disability. In 2007, 142 people died on Saskatchewan roads.

In 2006, 25 SHR residents were killed in a land transportation collision. Figure 3.21 shows the age groups with the highest mortality rates from transportation, 15 to 24 years and 55+ age groups and that males contribute to more of the mortality than females.

I think that motor vehicle collision mortality displays another significant aspect of disparity, that of rural versus urban.

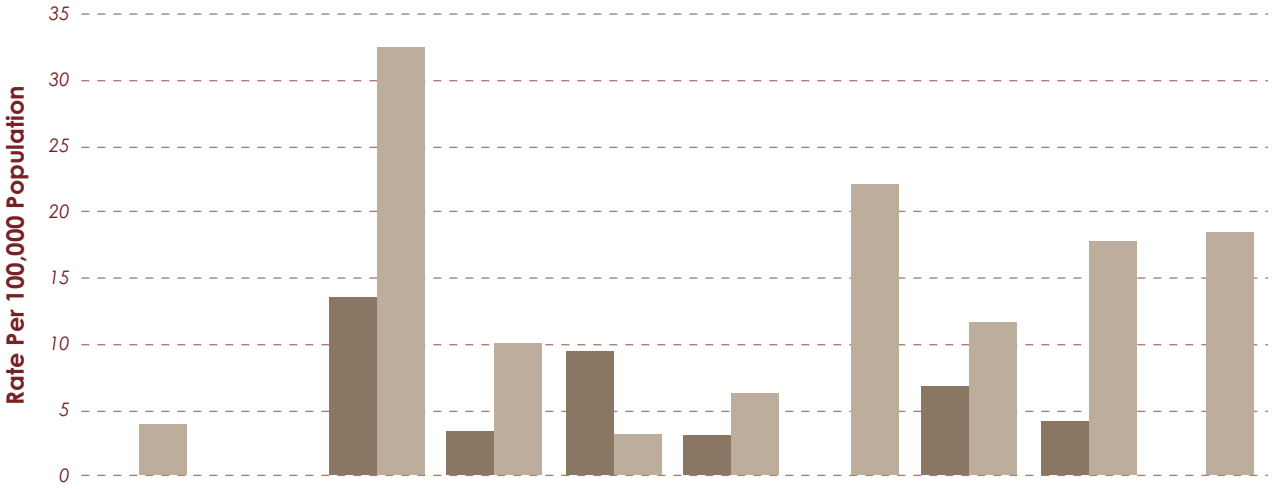
Dr. Johnmark Opondo,
Deputy Medical Health Officer, SHR

A Closer Sub-Regional Look

Figure 3.22 shows that transportation mortality for rural SHR residents has been roughly twice that for Saskatoon residents since 1995.

There were 242 transportation-related hospitalizations among SHR residents in 2006. As with mortality, male rates are about twice as high as female rates, and rural resident rates about twice that of Saskatoon residents, though the trends for both have been decreasing in recent years.

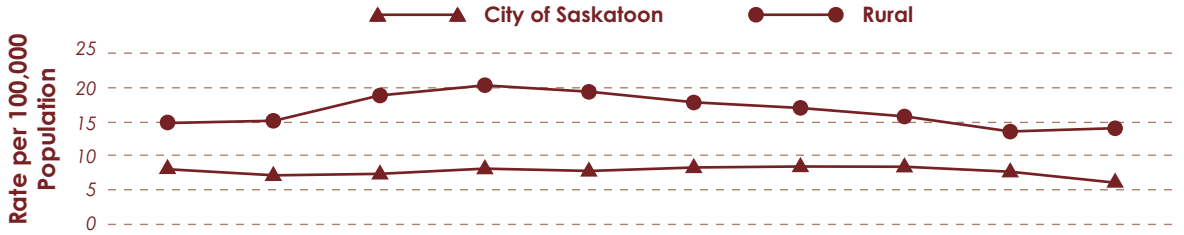
Figure 3.21: Transportation Mortality Rates by Age and Sex, Saskatoon Health Region, 1995-2006 Combined



	< 5	5 to 14	15 to 24	25 to 34	35 to 44	45 to 54	55 to 64	65 to 74	75 to 84	85+
Female	0.0	0.0	13.6	3.4	9.4	3.1	0.0	6.8	4.1	0.0
Male	3.9	0.0	32.5	10.1	3.2	6.2	22.2	11.7	17.8	18.5

Source: Saskatchewan Ministry of Health, Vital Statistics.

Figure 3.22: Age Standardized Transportation Mortality Rate by Region, Saskatoon Health Region, 1995-2006, Three Year Rolling Average



	1995-97	1996-98	1997-99	1998-00	1999-01	2000-02	2001-03	2002-04	2003-05	2004-06
City of Saskatoon	8.0	7.1	7.3	8.1	7.7	8.2	8.4	8.3	7.6	6.0
Rural	14.8	15.1	18.9	20.3	19.4	17.8	17.0	15.8	13.5	14.0

Source: Saskatchewan Ministry of Health, Vital Statistics.

Falls

In 2006, 28 SHR residents died as a result of a fall. Fall-related mortality for the Region has increased steadily since 1995, from 3.8 per 100,000 population in 1995-1997 to 5.3 in 2004-2006. SHR rates are comparable to Canadian (5.4 per 100,000 in 2004) and Saskatchewan (4.6 per 100,000 in 2004) rates. Most of the mortality occurs in those aged 70 and older. Table 3.2 shows higher falls mortality rates in males than females in every year since 1995.

Economic Burden of Falls

> 36% of Saskatchewan's annual economic burden due to unintentional injuries is because of falls.

> Falls accounted for $56 million in direct health care costs among older adults in 1998.[24]

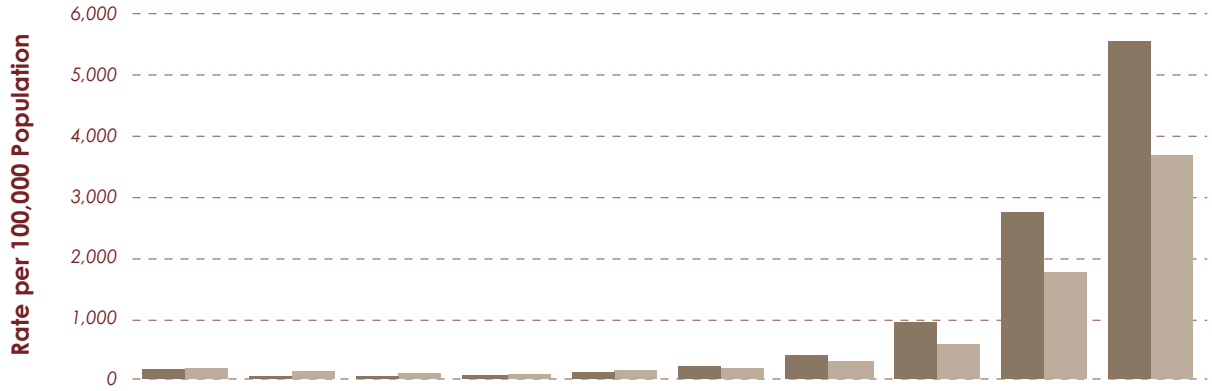
Table 3.2: Age Standardized Falls Related Mortality by Sex, Saskatoon Health Region, 1995-2006, Three Year Rolling Averages

	1995-97	1996-98	1997-99	1998-00	1999-01	2000-02	2001-03	2002-04	2003-05	2004-06
Female	2.5	2.6	2.1	2.2	2.2	2.5	2.4	2.9	2.8	3.8
Male	4.8	5.3	4.8	6.3	6.7	7.6	7.4	7.6	6.8	7.5

Source: Saskatchewan Ministry of Health, Vital Statistics.

Between 2004 and 2006, more than 2,600 falls-related hospital discharges were registered for SHR residents. The graph below shows that overwhelmingly, these falls are for those older than age 70. Males have higher hospitalization rates due to falls than females up to age 50 years. Females have higher hospitalization rates due to falls than males from 50 years of age and older (Figure 3.23). This might be because females experience greater social isolation, chronic disease and lower incomes than males in these older age groups.[23]

Figure 3.23: Falls Related Hospitalization Rate by Age and Sex, Saskatoon Health Region, 2004-2006 Combined



	< 10	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90 +
Female	177.1	58.9	59.0	83.4	132.8	227.3	402.0	943.2	2,753.9	5,557.2
Male	189.1	140.4	109.9	93.4	162.7	202.2	314.3	584.1	1,779.2	3,691.6

Source: Saskatchewan Ministry of Health.

Farm-related injuries

Between 1995 and 2004 there were 301 hospitalized farm injury cases reported in SHR, and 2,225 cases reported for the province as a whole.[20] Provincial data show that the most frequent cause of farm related injury was animal related at 19.4% of all injuries. The age group with the highest farm related injuries was the 80+ group, which was more than double that seen for all other age groups.[20]

So What's the Bottom Line?

Injury: Saskatchewan has some of the highest injury rates of any province in Canada. Seniors falls are a major concern for the health system and a seniors strategy is underway to help address this issue.

Transportation-related injuries are higher for rural SHR residents compared to urban dwellers. This is likely because rural residents need to travel longer distances for work, shopping and accessing services. Causal factors for the higher transportation mortality rates in rural SHR could include differences in the average speeds being travelled on rural highways versus in the city limits of Saskatoon, differences in road conditions, or longer emergency response times in rural SHR.

References for Chapter 3

1 *Ministry of Health. Performance management accountability indicators. Regina: Government of Saskatchewan; 2007. Available from: URL: www.health.gov.sk.ca/accountability*

2 *Heart and Stroke Foundation of Canada. Tipping the scales of progress: Heart disease and stroke in Canada 2006. Ottawa: Heart and Stroke Foundation of Canada; 2006.*

3 *Kaplan GA, Keil JE. Socioeconomic factors and cardiovascular disease: a review of the literature. Circulation 1993;88 (4 pt 1):1973-98.*

4 *Public Health Agency of Canada. Economic burden of illness in Canada, 1998. Ottawa: Public Health Agency of Canada; 2002. Available from: URL: http://www.phac-aspc.gc.ca/publicat/ebic-femc98/*

5 *Lemstra M, Mackenback J, Neudorf C, Nannapaneni U, Kunst A. Daily smoking in Saskatoon: The independent effect of income and cultural status. Can J Public Health 2009;100(1):51-54.*

6 *Verral T, Teare G, Basky G, Ragush S. Quality Insight 2008. Saskatoon: Health Quality Council. Indicators for Post heart attack care [online]. 2008 [cited 2008 Dec 5]. Available from: URL: http://www.hqc.sk.ca/hqcQInsight/Post%20AMI/Post%20AMI.html*

7 *Heart and Stroke Foundation of Canada. What is a stroke?[online]. 2008 [cited 2008 Nov 6]. Available from: URL: http://www.heartandstroke.sk.ca/site/c.inKMILNlEmG/b.3657421/*

8 *Ministry of Health. The provincial diabetes plan: Supporting Saskatchewan people to achieve their best possible well being. Regina: Government of Saskatchewan; 2004. Available from: URL: http://www.health.gov.sk.ca/adx/aspx/adxGetMedia.aspx?DocID=260,94,88,Documents&MediaID=105&Filename=diabetes-provincial-plan.pdf*

9 *Health Council of Canada. Why health care renewal matters: Lessons from diabetes. Toronto: Health Council of Canada; 2007.*

10 *Canadian Diabetes Association. The prevalence and costs of diabetes [online]. 2008 [cited 2008 Nov 6]. Available from: URL: http://www.diabetes.ca/about-diabetes/what/prevalence/*

11 *Ministry of Health. Regional diabetes numbers and rates: March 2007. Regina: Government of Saskatchewan; 2007. Custom tabulation.*

12 *Public Health Agency of Canada. Life and breath: Respiratory disease in Canada, 2007. Ottawa: Public Health Agency of Canada; 2007.*

13 *World Health Organization. Chronic respiratory conditions: COPD definition [online]. 2008 [cited 2008 Nov 7]. Available from: URL: http://www.who.int/respiratory/copd/definition/en/index.html*

14 *Canadian Cancer Society. What is cancer? Toronto: Canadian Cancer Society; 2008. Available from: URL: http://www.cancer.ca/Canada-wide/About%20cancer/What%20is%20cancer.aspx?sc_lang=en*

15 *Tonita J, Alvi R. Saskatchewan cancer control report 2004: Profiling cancer in regional health authorities. Regina: Saskatchewan Cancer Agency; 2004.*

16 *Canadian Cancer Society. Canadian cancer statistics, 2008. Toronto: Canadian Cancer Society, National Cancer Institute of Canada, Statistics Canada, Provincial/Territory Cancer Registries, Public Health Agency of Canada; 2008.*

[17] *Government of Canada. The human face of mental health and mental illness in Canada. Ottawa: Minister of Public Works and Government Services Canada; 2006. Available from: URL: http://www.phac-aspc.gc.ca/publicat/human-humain06/pdf/human_face_e.pdf*

[18] *Health Canada. A report on mental illness in Canada. Ottawa: Health Canada; 2002. Available from: URL: http://www.phac-aspc.gc.ca/publicat/miic-mmac/index-eng.php*

[19] *Health Canada. Healthy living: Safety and injuries [online]. 2007 [cited 2008 Sept 12]. Available from: URL: http://www.hc-sc.gc.ca/hl-vs/securit/index-eng.php.*

[20] *Canadian Institute for Health Information. National trauma registry: 2006 injury hospitalization highlights report. Ottawa: Canadian Institute for Health Information; 2007.*

[21] *Public Health Agency of Canada. Injury surveillance [on-line]. 2005. [Cited 2009 Feb 12]. Available from: URL: http://dsol-smed.phac-aspc.gc.ca/dsol-smed/is-sb/c_ind_e.html#top_list*

[22] *Ministry of Health. Saskatchewan comprehensive injury surveillance report, 1995-2005. Regina: Government of Saskatchewan; 2008.*

[23] *Public Health Agency of Canada. Measuring up: A health surveillance update on Canadian children and youth [online]. 1999 [cited 2008 Sept 12]. Available from: URL: http://www.phac-aspc.gc.ca/publicat/meas-haut/mu_v_e.html*

[24] *Safe Saskatchewan and the Seniors' Falls Provincial Steering Committee. Seniors' falls injury prevention strategy: A five-year strategic framework (2008-2013). Regina: Safe Saskatchewan and the Senior's Fall Provincial Steering Committee; 2007.*

[23] *Public Health Agency of Canada. Report on seniors' falls in Canada. Ottawa: Minister of Public Works and Government Services; 2005. Available from: URL: http://www.phac-aspc.gc.ca/seniors-aines/pubs/seniors_falls/pdf/seniors-falls_e.pdf*

CHAPTER 4

Communicable Disease

A Saskatoon Health Region public health nurse gets ready to immunize infants at a regular clinic.

HIGHLIGHTS

Communicable Disease

Vaccine-Preventable Diseases Low, but Monitoring Still Needed

- There has been a dramatic decrease in pertussis (whooping cough) since the introduction of the pertussis booster in adolescence. An increase in invasive pneumococcal disease (IPD) has been observed since 2002.
- Childhood immunization coverage is improving but there are disparities across the Region.
- Saskatoon Health Region (SHR) two-year-old immunization coverage for diphtheria, pertussis, tetanus, polio, and *Haemophilus influenzae* type b was 73% in 2008.

Influenza Immunization Needs Improvement

- Influenza immunization for children 6 to 23 months was 41.3% in 2008/09 and SHR ranked 6 of 13 regional health authorities on this measure.
- Seniors influenza coverage has averaged about 60% over the past 10 years, and is low compared with other regional health authorities.
- SHR staff influenza immunization coverage has greatly improved, however at 65% still falls short of the Regional target of 80%.

Enteric Diseases More Common in Rural SHR

- Campylobacteriosis rates have been two to three times higher in rural SHR than in Saskatoon for the past five years.

Hepatitis C and HIV a Concern

- SHR hepatitis C rates are more than twice the national rates, and core neighbourhood resident rates are seven times higher than non-core neighbourhood rates.
- Hepatitis C and HIV are mainly attributed to injection drug use in the Region.
- The number of HIV cases has risen in SHR. Between 2004 and 2008, 77% of new HIV cases have been Aboriginals.
- The age at which HIV infection is detected is becoming increasingly younger, with more cases reported among women of child-bearing age.

Sexually Transmitted Infections Double the National Average

- SHR chlamydia and gonorrhea rates continue to be double the national rates and syphilis is re-emerging in Alberta and Saskatchewan, as well as other parts of Canada.

Other Diseases

- An increase in the number of methicillin-resistant *Staphylococcus aureus* (MRSA) cases has been observed due in part to increased screening in SHR hospitals since 2006.
- In 2007 Saskatchewan reported the highest number of cases of West Nile Virus since its introduction in the province.

Public health has made considerable inroads in addressing communicable disease over the last century. However, common bacteria and viruses still account for significant illness and death. Antimicrobial resistant bacteria cause lengthy and substantial illness; sexually transmitted infections and blood-borne pathogens like HIV continue to cause major concern worldwide; food-borne illness has high associated economic and personal cost; and an increasing number of viruses have been shown to cause cancer and other chronic diseases. This chapter reviews communicable diseases that are provincially and/or nationally reportable.[a]

Vaccine-Preventable Disease

Immunization is one of the most efficient and cost-effective means of preventing communicable disease. Vaccine preventable disease (VPD) has decreased dramatically in the last century due largely to population based immunization programs. It is important to recognize that VPD has not been eradicated and that a single case represents significant risks in a poorly vaccinated population.

Table 4.1 shows that in SHR VPD is fairly low. VPD with long standing immunization programs, (e.g. measles and rubella), show low case counts compared to diseases in which new vaccines have been introduced, such as invasive pneumococcal disease (IPD). An increase in IPD in a number of western cities was reported in 2006 (see Selected Respiratory Illness). SHR has seen an increase in IPD rates since 2004. Pertussis (whooping cough) has decreased dramatically since the introduction of the tetanus and pertussis booster shot for Grade 8 students in 2003, however even a single case of pertussis presents a serious threat to an unimmunised infant. In recent years, pertussis outbreaks were observed in many rural schools. The overall number of pertussis cases in SHR has decreased.

Table 4.1: Case Counts of Vaccine Preventable Reportable Disease, Saskatoon Health Region, 1995-2007

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Haemophilus Influenzae Type B	<5	<5	<5	0	0	0	<5	0	<5	<5	0	0	<5
Influenza A	41	39	11	56	54	63	15	106	230	19	142	73	59
Influenza B	<5	<5	18	0	6	100	20	<5	88	0	12	46	5
Measles	0	<5	0	0	0	0	0	0	0	0	0	0	0
Meningococcal Invasive Disease	<5	<5	<5	0	0	<5	<5	0	<5	0	<5	<5	<5
Mumps	0	<5	<5	<5	0	<5	<5	0	0	0	0	0	0
Pertussis	54	70	129	39	150	125	148	107	372	137	105	53	6
Invasive Pneumococcal Disease*	0	39	42	40	34	28	31	34	32	18	30	47	60
Rubella	0	0	<5	0	0	0	0	0	<5	0	0	0	0

**Streptococcal Pneumoniae*
Source: Public Health Services, Saskatoon Health Region

Rates of respiratory illness vary substantially across the Region (see also Major Causes of Mortality and Morbidity, Chapter 3). The two respiratory diseases with high impact on the community in the past few years are IPD and influenza.

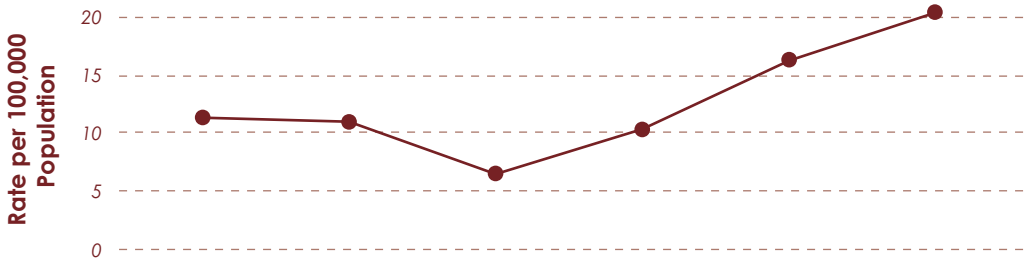
[a] *For Reportable Disease list see Appendix C. For Category I and Category II Communicable Disease see: http://www.qp.gov.sk.ca/documents/english/Regulations/Regulations/p37-1r11.pdf*

Selected Respiratory Illness

Invasive Pneumococcal Disease (IPD)

Streptococcus pneumoniae is a bacterium that causes serious illness. When the bacterium enters a normally sterile part of the body, such as the blood, the infection is called invasive. Not all IPD is vaccine preventable but many serotypes are included in available vaccines.[b] Most patients with IPD are hospitalized with pneumonia or bacteremia/sepsis and severe cases may require intensive care. Figure 4.1 shows that the IPD rate in SHR has almost doubled since 2002.

Figure 4.1: Invasive Pneumococcal Disease, Saskatoon Health Region 2002-2007



	2002	2003	2004	2005	2006	2007
IPD Rate	11.8	11.3	6.3	10.4	16.5	20.6

Source: Public Health Services, Saskatoon Health Region

The very young, the elderly and immune-suppressed individuals are at high risk for pneumococcal disease. Canadian First Nations have a higher risk of IPD and a higher risk of serotype 5 disease.[1] In 2006, outbreaks of IPD in Vancouver, Calgary and Saskatoon were subsequently linked to an increased incidence of *Streptococcal pneumoniae*, serotype 5, circulating in homeless and street-involved populations in urban communities. Urban outbreaks in BC have involved adult populations with a history of alcoholism, illicit drug use, hepatitis B or C and living in a housing shelter.[2] An SHR investigation into increased cases in 2006/07 found 78% were hospitalized, with a mean length of hospitalization of 10 days. The most common underlying conditions among those hospitalized were alcoholism (43.5%), cardiopulmonary disease (43.5%), smoking (52.2%) and hepatitis C (21.7%).[3] There is a disproportionately high rate of IPD in Saskatoon's core neighbourhoods. Between 2003-2007 the five-year average annual IPD crude rate in the core neighbourhood was 42.3 per 100,000 population compared to 11.4 and 10.7 in the non-core and rural SHR respectively.

Currently in Saskatchewan publicly funded polysaccaride vaccine (PPV23) is offered to adults 65 years and older, those at high risk of complications[c] and residents of special care homes. The SHR investigation revealed that of the hospitalized IPD patients eligible for publicly funded pneumococcal immunization, only one third were appropriately vaccinated.

Influenza

The influenza season occurs each year from late October to April. The most effective way to protect the population is annual immunization. Influenza A is often more severe than influenza B, however both types can cause significant illness. Complications are most common among the elderly and persons with certain underlying medical conditions.

[b] *Pneumococcal 23 valent polysaccharide vaccine (adult) protects against serotypes: 1 – 5, 6B, 7F, 8, 9N, 9V, 10A, 11A, 12F, 14, 15B, 17F, 18C, 19A, 19F, 20, 22F, 23F, 33F. Pneumococcal 7 valent conjugate vaccine (for children) protects against serotypes 4, 6B,9V,14,18C,19F and 23F. There remain other serotypes not included in the current vaccine formulation.*

[c] *See Saskatchewan Health Funded Vaccines Other Than Routine Childhood Immunization, Saskatchewan immunization Manual Section 9-20 online at http://www.health.gov.sk.ca/immunization-full-manual*

Trends in influenza depend, among other things, on host susceptibility, including how vulnerable the host is to infection. The annual influenza vaccine is changed each year to provide protection from the virus strains that are predicted to be the most common. The antibodies produced by the vaccine are effective for four to six months.[4] While not all influenza is vaccine preventable, for the past several years, the influenza A viruses circulating in SHR have closely matched the strain contained in the annual vaccine. The vaccine has been poorly matched to circulating influenza B strains. While the onset month can vary from season to season there is a predictable spike in case counts approximately mid-season. In the past four years, the greatest number of influenza A cases occurred in the 2004/05 season. There is moderate disparity in influenza rates between the core, non-core and rural areas.[d] Between 2003 and 2007, the five-year average annual influenza crude rate in the core neighbourhoods was 29 per 100,000 compared to 46.8 and 45.8 in the non-core and rural SHR respectively.

Influenza is a particular concern in long term care (LTC) facilities where it can spread quickly among this vulnerable population. Influenza immunization of LTC residents is high in SHR, ranging in 2007/08 between 85% (rural SHR) and 91% (Saskatoon). In 2007/08 there were four influenza B outbreaks and one influenza A outbreak in SHR. There were no influenza outbreaks in the previous year (2006/07, when overall influenza outbreak activity was low), however in 2005/06 there were 11 outbreaks of influenza A and one influenza B. In 2005/06 staff influenza coverage rates were much lower compared to recent years. The number of outbreaks in SHR facilities has decreased as staff influenza immunization coverage rates have improved.

So What's the Bottom Line?

Vaccine-Preventable Disease: Pertussis has decreased in recent years largely due to boosters offered to adolescents. In the years when pertussis rates were high the highest rates were seen in rural SHR. **Invasive Pneumococcal Disease** has increased substantially since 2002 and evidence suggests that immunization is lacking for many individuals with the disease who were eligible for publicly funded vaccine as well as among risk groups that are currently not funded. The reduced number of **influenza** outbreaks in long term care are attributable in part to improved SHR staff immunization rates, high resident coverage rates, and well-matched vaccines to circulating influenza A strains.

Immunization – Interventions to Keep VPD Low

Saskatchewan's vaccination program is offered through public funding to all children and other groups at high risk of developing complications from vaccine preventable disease (VPD). Appendix 4 describes publicly funded immunizations available in Saskatchewan and Appendix 5 describes the recommended immunization schedule for infants and children.

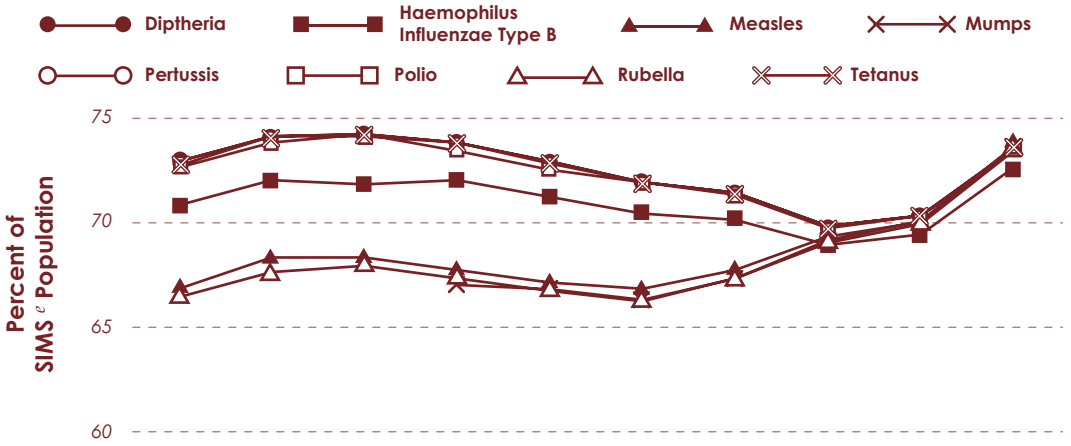
Immunization Coverage Rates

Immunizations are important as they provide protection from vaccine-preventable diseases. Incomplete immunization means not only failure to protect the individual but a lack of protection for families and communities. The principle of 'herd immunity', the presence of immune groups of people that limit the likelihood of disease becoming established in a population, is very important to disease prevention at a population level. It is important to achieve high rates of coverage, typically greater than 80% (up to 90% or higher for some diseases) so that susceptible individuals are protected and disease cannot easily move from person to person.

[d] *Influenza, like pertussis, is highly dependent on physician testing patterns and health-seeking behaviours, and may lead to falsely low rates in core neighbourhoods. IPD is less prone to reporting bias because it is severe and tested for in acute care settings.*

In SHR since 1999, coverage rates for two-year-old immunization has declined for certain antigens and increased for others (see Figure 4.2). A sharp increase in coverage is noted between 2007 and 2008.

Figure 4.2: Two Year Old Coverage Rates by Antigen, Saskatoon Health Region, 1999-2008



Antigens (# of doses)	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Diptheria (4)	73	74.2	74.3	73.9	73	72	71.5	69.9	70.4	73.6
Haemophilus Influenzae Type B (4)	70.9	72.1	71.9	72.1	71.3	70.5	70.2	69	69.5	72.7
Measles (2)	66.9	68.4	68.4	67.8	67.2	66.9	67.8	69.4	70.1	73.6
Mumps (2)				67	66.8	66.3	67.3	69.1	70	73.5
Pertussis (4)	72.8	74.2	74.2	73.9	72.9	72	71.5	69.9	70.4	73.5
Polio (4)	72.7	73.9	74.3	73.5	72.6	72	71.4	69.8	70.4	73.5
Rubella (2)	66.5	67.7	68	67.4	66.8	66.3	67.4	69.1	70	73.5
Tetanus (4)	73	74.2	74.3	73.9	73	72	71.5	69.9	70.4	73.6

Source: Saskatchewan Immunization Management System

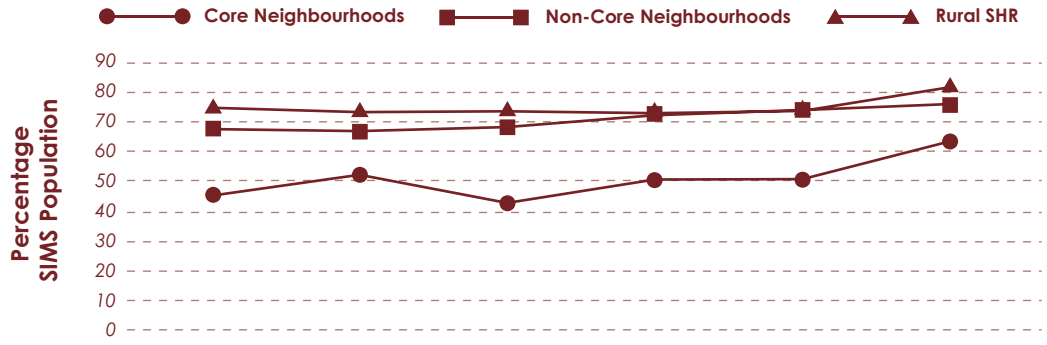
A Closer Sub-Regional Look

The SHR interim target for measles, mumps and rubella (MMR) immunizations is 85% (two doses) by two years. The overall coverage for MMR was 73.5% in 2008 (Figure 4.2). Disparities in immunization coverage rates exist between the core and non-core neighbourhoods of Saskatoon (Figure 4.3).

The 2010 national target for rubella is 97% of children by their second birthday (one dose).[5] SHR's coverage rate for a single dose (partial coverage) of rubella by two years was 86% in 2007, ranging from 80% in the core neighbourhoods to 90% in rural SHR (not shown).

[e] *SIMS population is the number of two year olds registered in the Saskatchewan Immunization Management Systems (SIMS). See Technical Appendix for further information.*

Figure 4.3: Two Year Old Coverage Rate for Rubella and Measles (Two Doses), Saskatoon Health Region, 2003-2008

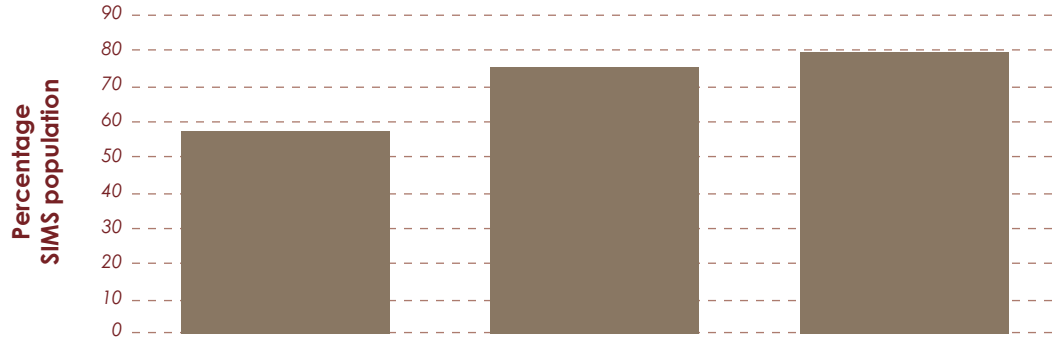


	2003	2004	2005	2006	2007	2008
Core Neighbourhoods	45.4	52.3	42.9	50.7	50.9	63.5
Non-Core Neighbourhoods	67.6	66.9	68.3	72.2	74.0	76.0
Rural SHR	74.7	73.3	73.5	72.9	73.7	81.6

Source: Saskatchewan Immunization Management System

Figure 4.4 shows a disparity of approximately 20% between Saskatoon's core neighbourhoods and the non-core and rural areas of the Region for childhood pneumoccocal vaccine.[f] In 2008 the two year coverage rate for the core neighbourhoods was 57.4% compared to 75.3% in the non-core neighbourhoods and 79.6% in rural SHR.

Figure 4.4: Two Year Pneumococcal Vaccine Coverage, Saskatoon Health Region, 2008



	Core Neighbourhoods	Non-Core Neighbourhoods	Rural SHR
2008	57.4	75.3	79.6

Source: Saskatchewan Immunization Management System

Influenza Immunization Coverage

Research shows that influenza vaccination decreases the incidence of pneumonia, hospital admissions and death in the elderly, and reduces complications in persons with chronic obstructive pulmonary disorder (COPD).[6] In Saskatchewan, publicly funded vaccine is offered to persons at high risk of influenza-related

[f] *7 Valent pneumococcal vaccine is administered to children younger than 24 months.*

complications[8], adults 65 years and older, residents of special care and chronic care homes, and children 6 to 23 months. Influenza vaccine is encouraged for all Canadians, including pregnant women, with no medical reason that makes immunization inadvisable.

In 2006/07 the SHR coverage rate for children 6 to 23 months (one or two doses) was 30.8%.[h] In 2008/09 this rate increased to 41.3%.[7] In comparison to other Saskatchewan regional health authorities, SHR ranked 6 of 13 for this measure.[8]

Table 4.2 shows the percentage of adults age 65 and older who have received influenza vaccine annually since 1998. The percentage of persons over age 65 in SHR immunized against influenza has decreased over the past four years to 61% in 2007, well below the national immunization coverage target of 80%.[5]

Impacts of Influenza on Health Care and Seniors[6]

- Influenza results in an average of 20,000 hospitalizations and 4,000 deaths per year in Canada.
- Hospital admissions attributable to influenza in persons 65 and older are estimated at 125 to 228 per 100,000 population.
- Death rates from influenza increase with age.

Table 4.2: Influenza Coverage Rate of Persons Aged 65 Years and Older, Saskatoon Health Region, 1998-2007

1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
55.4	57.8	65.6	62.5	61.7	66.9	68.0	66.7	62.2	61.0

Source: Public Health Services, Saskatoon Health Region

Saskatoon Health Region Staff Influenza Immunization

Health-care workers are at risk for occupational exposure to influenza and may contribute to transmission of influenza in health care settings. Staff absenteeism is costly and may compromise health care delivery. The National Advisory Committee on Immunization (NACI) considers the provision of influenza vaccination for health-care workers with direct patient contact to be an essential component of the standard of care for the protection of patients.[6]

Figure 4.5 shows that significant improvements have been made in staff influenza vaccine coverage since 2002. While the increase of 66% between 2006 and 2007 is impressive, the coverage rate still falls short of the NACI recommendation that more than 80% of staff be immunized in order to effectively prevent influenza outbreaks in a health-care setting. These overall rates also mask differences between care-groups and across facilities in the Region. Coverage also varies among full and part-time and casual employees. In 2007, full and part-time employee coverage was 75% compared to 44% among casual employees.

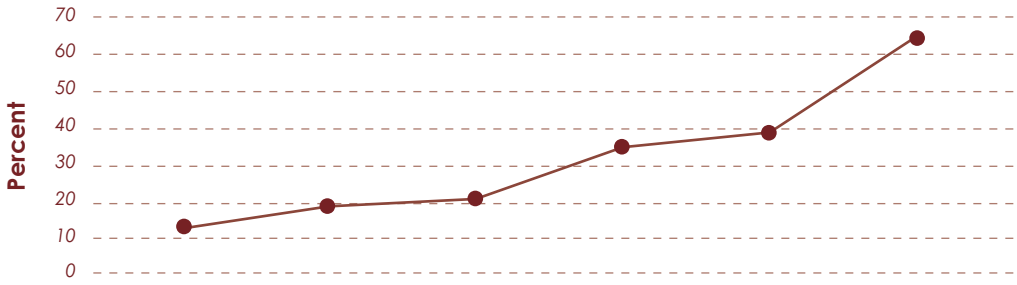
SHR Policy: Annual Influenza Immunization of Health-care Workers

- Every SHR employee and physician is expected to receive an annual influenza immunization.
- In the event of an influenza outbreak in a health care facility, the Medical Health Officer has the authority to exclude from work any persons who present a risk to the health of residents/ patients at the outbreak sites.

[8] *See Saskatchewan Health Funded Vaccines Other Than Routine Childhood Immunization , Saskatchewan Immunization Manual Section 9 – 2 http://www.health.gov.sk.ca/immunization-full-manual*

[h] *For numerator and denominator parameters see Technical Appendix under Data Sources and Limitations, Immunization.*

Figure 4.5: Saskatoon Health Region Employee Influenza Immunization Coverage, 2002-2007



	2002	2003	2004	2005	2006	2007
SHR	13	19	21	35	39	65

Source: Occupational Health and Safety, Saskatoon Health Region

So What's the Bottom Line?

Immunization: Coverage rates in SHR are below targets, with significant disparities between geographical areas. Coverage rates in the core neighbourhoods are 20 to 30% below other areas in SHR signalling potential higher risks for vaccine preventable diseases.

Influenza Coverage Rates: For children 6 to 23 months, SHR ranked sixth out of the province's 13 regional health authorities. For seniors, coverage rates are stable at just over 60% but below optimal levels. For SHR staff, major improvements have been seen in the last two years, suggesting the possibility of achieving the region's 80% target in 2010/11.

Gastrointestinal Illness

Infectious gastrointestinal (GI) illnesses are caused by bacteria, viruses and parasites that may be food or water borne or transmitted by direct contact with an infected person or animal. Good personal hygiene, safe food handling procedures and ensuring a clean and safe water supply are the mainstays of prevention of GI illness. Annually SHR reports between 200 and 300 cases of GI illness, with spikes in outbreak years. Since 2002 campylobacteriosis accounted for between one quarter to one third of all GI illness in SHR annually.

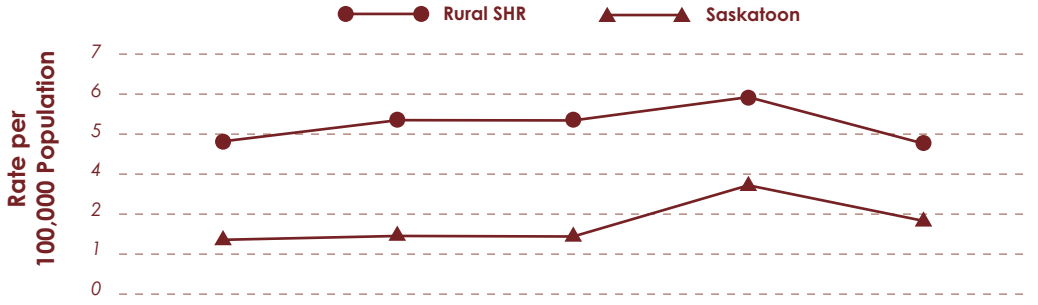
Campylobacteriosis

Campylobacteriosis is an acute zoonotic bacterial disease characterized by gastroenteritis. It is most commonly found in poultry and farm animals but it may also be present in pets and is transmitted by hand to mouth contact through contaminated food and water. Periodic outbreaks among workers in poultry processing plants have accounted for occasional increases in SHR.

A Closer Sub-Regional Look

Figure 4.6 show the disparity between the rate of campylobacteriosis in Saskatoon and rural SHR.

Figure 4.6: Campylobacteriosis Crude Rates, Saskatoon Health Region, 2003-2007



	2003	2004	2005	2006	2007
Rural SHR	4.5	5.1	5.1	5.8	4.4
Saskatoon	1.6	1.7	1.6	3.2	2.1

Source: Public Health Services, Saskatoon Health Region.

Norovirus

Among organisms with the potential for outbreaks in institutions and the community, norovirus is the most common in SHR. Noroviruses cause gastroenteritis, which may have severe outcomes in the youngest and oldest age groups; those most vulnerable to the effects of dehydration.

Outbreaks of norovirus have increased in SHR since 2005. The increase, noted across Canada and the United States, is most likely linked to better reporting as well as more incidents. These outbreaks are very disruptive in institutions and can linger for weeks, compromising staffing of facilities.

In 2007/08 there were 11 norovirus outbreaks[i] in SHR long term care facilities, and two in hospitals. In addition there were three community norovirus outbreaks including a private care home. Seven community norovirus outbreaks were reported (including private care and group homes) and twelve outbreaks in long term care facilities in 2006/07.

So What's the Bottom Line?

Gastrointestinal Illness (GI): Between 200 and 300 cases of GI illness are reported every year. One of the leading infections is campylobacteriosis, more commonly found in rural SHR than in Saskatoon, where poultry processing plants may be implicated.

Norovirus is the most common organism responsible for GI outbreaks in long term care facilities in SHR.

Blood-Borne Pathogens

Hepatitis B

Hepatitis B virus (HBV) is a blood borne virus spread by direct contact with the blood of an infected person or transmitted sexually through body fluids. About 6% of liver cancers in North America and 35% worldwide are attributed to chronic infection with HBV.[9]

SHR's annual number of HBV cases are fairly low, averaging about 30 cases per year over the past five years (See Appendix 6).

[i] *Outbreaks were evenly distributed between rural and urban long term care facilities.*

Hepatitis C

Hepatitis C virus (HCV) is transmitted mainly by blood to blood contact, but may also be sexually transmitted through body fluids. Hepatitis C is the most commonly reported blood-borne pathogen in SHR. With 200 to 230 new cases reported annually over the past four years, hepatitis C represents approximately 10% of all reportable communicable disease in SHR.

Hepatitis C Facts

- About 23% of liver cancer in North America and worldwide is attributed to chronic infection with HCV.[9]
- About 75% of hepatitis C cases are chronic carriers of the disease.[10]

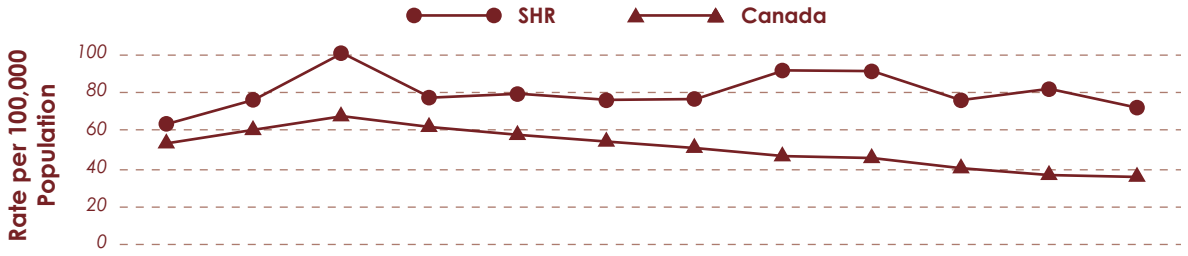
Regional Trend

In our Region, as in Canada, hepatitis C is mainly transmitted through injection drug use (see Chapter 7, Health Behaviours). The incidence in females has increased to the level of male rates. Although the annual incidence of new cases has remained fairly stable, the prevalence (cumulative cases) of hepatitis C in SHR is increasing. Figure 4.7 shows that the national incidence of hepatitis C has been decreasing since 1997 while the SHR rate has not declined during the same period and is significantly higher than the Canadian average.

Follow-up of hepatitis C is a major concern. People are hard to contact in rural areas too. Some are concerned about stigma, and don't want their partner to know. The problem can only get worse if they don't want to share information with partners.

Marilyn Craswell, Public Health nurse, SHR

Figure 4.7: Hepatitis C Crude Incidence Rate, Saskatoon Health Region and Canada, 1996-2007



	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
SHR	63.3	76.2	100.6	77.3	79.3	76.1	76.6	91.6	91.2	76.0	81.9	73.2
Canada	53.3	60.45	67.56	61.9	57.8	54.3	50.9	46.7	45.7	40.4	36.8	35.8

Source: Public Health Services, Saskatoon Health Region and Public Health Agency of Canada

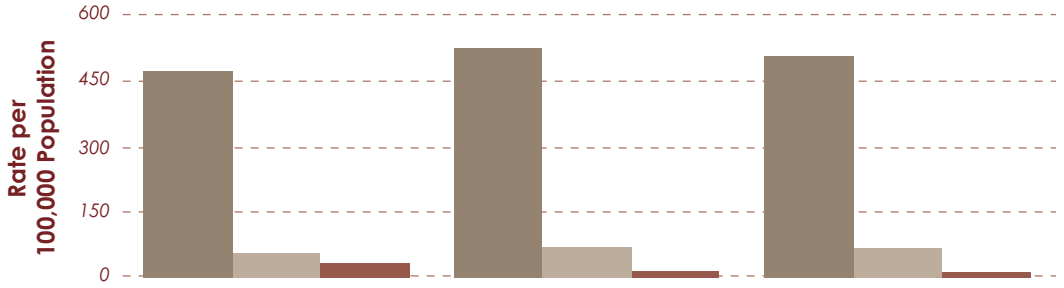
A Closer Sub-Regional Look

The hepatitis C rate in Saskatoon's core neighbourhoods is roughly seven times that in the non-core neighbourhoods, a statistically significant difference. Figure 4.8 shows the distribution across the geographic areas in SHR. Easy access to treatment services continues to be a concern for many persons infected with hepatitis C.

I feel like hep C is not taken seriously by those in the core who are involved with injection drug use. So many of their friends and family members are testing positive, so it's a very normalized thing. Clients were rarely upset when told of their diagnosis and were often not very interested in the education.

Karina Basset, Street Health nurse, SHR

Figure 4.8: Hepatitis C Age Standardized Incidence Rate, Saskatoon Health Region, 2005-2007



	2005	2006	2007
Core Neighbourhoods	471.3	525.5	505.4
Non-Core Neighbourhoods	57.8	71.5	69.5
Rural SHR	35.9	17.0	15.5

Source: Public Health Services, Saskatoon Health Region.

I'll never forget the young girl who was happy about her hepatitis C diagnosis. This meant she could get more Social Assistance money meant for diet and medical expenses. Her diagnosis also meant she was like others in her family.

Nicole Kimball, Street Health Nurse, SHR

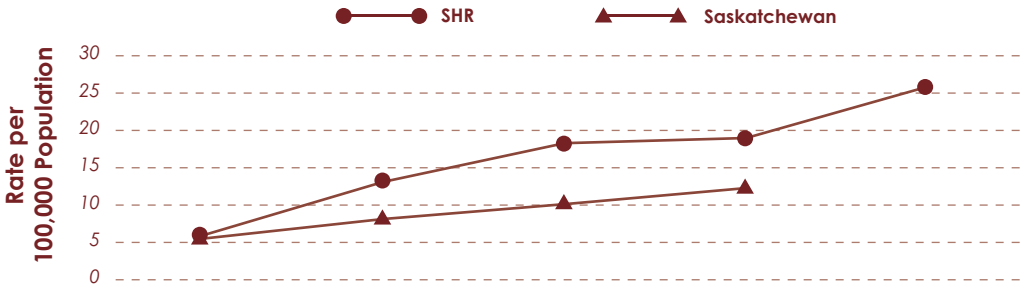
Human Immunodeficiency Virus (HIV)

Human immunodeficiency virus (HIV) is in the family of retroviruses, an infection that can lead to acquired immunodeficiency syndrome (AIDS), where the immune system fails, leading to life-threatening infections. Transmission occurs through blood, semen and other body-fluids. It is estimated that Canada-wide 27% of persons with HIV are unaware of their infection.[11] HIV infection is also one of the health problems with the largest disparity across socio-economic groups in the region. People who are unaware of their HIV infection cannot get effective care, are more likely to become severely ill (i.e., develop the signs of AIDS) and die sooner, or infect others. A small number of people in SHR first learn they are HIV-positive when they are already sick with AIDS, and this is still a serious concern.

Since 2004 there has been a sharp increase in the number of new cases of HIV reported in Saskatchewan. Previous to 2003, most HIV cases in Saskatchewan were in men who have sex with men (MSM). However, injection drug use is now the principal risk factor. A 2006 SHR HIV cluster investigation yielded important information about the growing epidemic.[12] Figure 4.9 shows the higher SHR incidence compared to Saskatchewan.

Between 1985 and 2006, Saskatchewan has accounted for 1.1% of all positive HIV tests in Canada,[13] while having approximately 3% of the total population of Canada. The provincial HIV profile differs from the national profile. Across Canada, men who have sex with men (MSM) continue to account for the greatest number of new infections. Compared to the national HIV profile, a higher proportion of cases in Saskatchewan are Aboriginal, female and injection drug users.

Figure 4.9: HIV Crude Incidence Rates, Saskatoon Health Region and Saskatchewan 2004-2008



	2004	2005	2006	2007	2008
SHR	5.6	13.5	18.2	19.6	25.8
Saskatchewan	5.4	8.1	10.1	12.2	n/a

Source: Public Health Services, Saskatoon Health Region; Public Health Agency of Canada

Regional Trend

Since 2005 SHR has reported the highest number of HIV cases across all regional health authorities in Saskatchewan. This most likely represents intensive HIV case finding efforts by Public Health, however increased transmission is also occurring. Since 2004, more than 300 individuals in the region have been reported with HIV, including those previously reported out of region or province or who may reside here temporarily.

Between 2004 and 2008, 77.3% of SHR cases with known ethnicity[j] were Aboriginal.

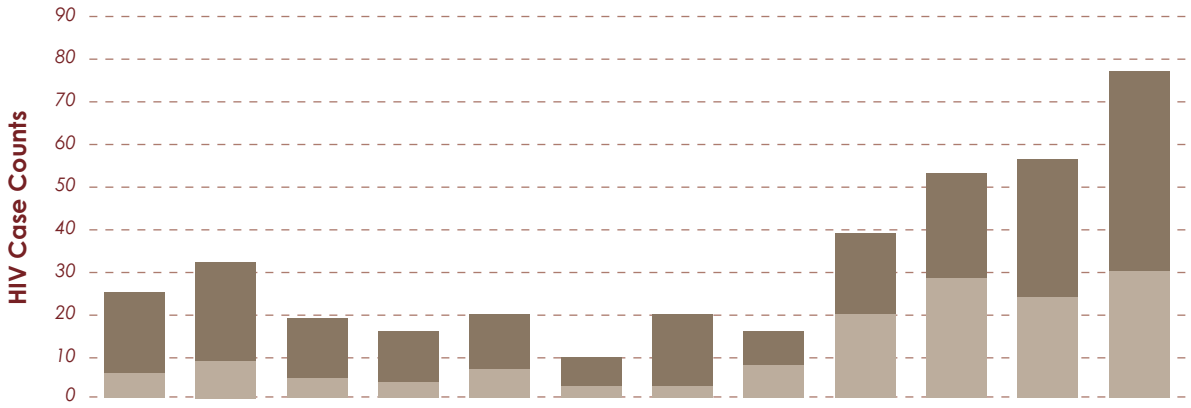
In SHR, as in Saskatchewan, most newly acquired HIV transmission is attributed to injection drug use (see Chapter 7, Health Behaviours). The majority of cases between 2004 and March 2007[k] reported injection drug use as a risk exposure (80.5%), or sex with an injection drug user (73%). Relatively few cases (7.3%) reported sex between males (MSM). Unprotected sex continues to be a concern with HIV, with 34% indicating sex with a confirmed or suspected person with HIV or AIDS. Five percent indicated sex with a person from a country where HIV is endemic. Each year persons who have been notified of their HIV status are diagnosed with new sexually transmitted infections (STI's), indicating continued unprotected sex. In 2007, eight individuals with previously reported HIV had new sexually transmitted infections in 2007.[l] Figure 4.10 shows the proportion of female cases since 2004 is now almost equal to male cases.

[j] *Twenty-nine out of 241 confirmed HIV cases are of unknown ethnicity. Aboriginal ethnicity in this analysis includes North American Indian and Métis.*

[k] *Not all cases have risk exposures indicated, therefore the percentage of total cases with risk exposure data is the denominator rather than percentage of total cases. This represents a snap-shot current to March 2007.*

[l] *Three of these were diagnosed less than 30 days after HIV diagnosed and may have been co-infected or secondarily infected before HIV notification.*

Figure 4.10: HIV Case Counts by Sex, Saskatoon Health Region, 1997-2008

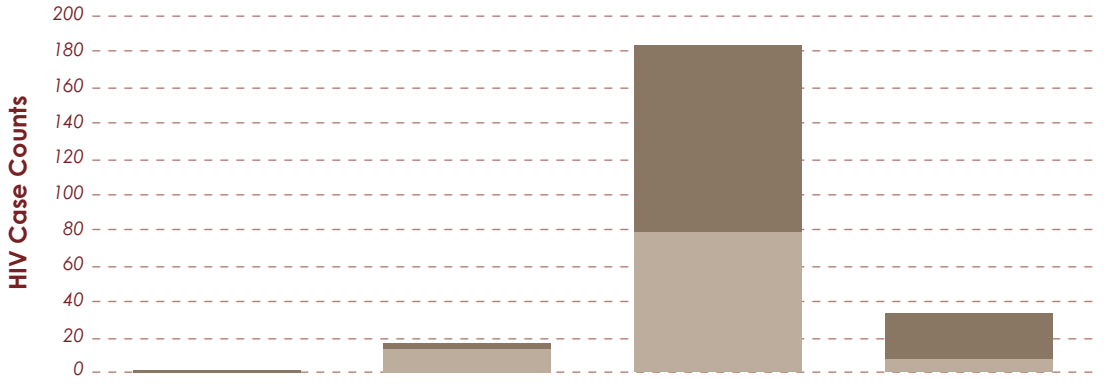


	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Male	19	23	14	12	13	7	17	8	19	24	33	47
Female	6	9	5	<5	7	<5	<5	8	20	28	24	30

Source: iPHIS, Public Health Services, Saskatoon Health Region

Figure 4.11 shows over a four-year period, a greater proportion of female cases in the 10 to 19 year age range compared to male cases. A greater proportion of male cases are reported in the 45 to 64 year age category. (See Technical Appendix for data limitations).

Figure 4.11: Age and Sex HIV Case Counts by Age Category, Saskatoon Health Region, 2004-2008



Age	<1	10 to 19	20 to 44	45 to 64
Male	2	4	101	24
Female	0	28	77	5

Source: iPHIS, Public Health Agency of Canada, Saskatoon Health Region

In the past four years a small number of neonatal HIV cases have been reported in SHR. Preventative treatment for perinatal transmission reduces the risk of infection from 25% to less than 2%.[14] As more HIV cases are identified among young women of child-bearing age, the number of babies born to HIV positive mothers is also increasing. This shift signals a potential increased risk for infection to newborns through perinatal transmission. Table 4.3 shows the female age specific rate. The trend shows progressively younger age-groups infected with HIV. 2006 marked the first year in SHR of cases reported in the 10 to 14 age range in females.

Table 4.3: Female HIV Incidence Rate per 100,000 Population, Saskatoon Health Region, 2004-2008

Age Group (years)	2004	2005	2006	2007	2008
10 to 14	0	0	10.6	0	0
15 to 19	0	37.8	19.4	57.3	9.6
20 to 24	26.9	35.5	44.4	104.9	43.2
25 to 29	19.6	38.5	58.9	18.8	44.6
30 to 39	15.7	26.4	49.2	5.3	56.6
40 to 59	0	7.3	14.6	7.2	18.9

Source: Public Health Services, Saskatoon Health Region

Acquired Immunodeficiency Syndrome (AIDS)

AIDS is a disease of the human immune system caused by HIV. It is a group of infections and conditions that must be recognized in persons with HIV infection and reported by a physician. From 1984 to 2006 there were 235 cases of AIDS reported in Saskatchewan.[13] Between 2004 and 2007 there were eight confirmed cases of AIDS reported in SHR, a decrease partly attributed to effective antiretroviral treatment. Antiretroviral treatment now enables persons with HIV to live longer, however access to treatment may be complicated for persons who are struggling with addictions.

Between 2002 and 2005 there were 14 deaths in SHR residents where HIV and AIDS were reported as the most responsible cause of death.

So What's the Bottom Line?

HIV: SHR has an increasing rate of HIV, due in part to more intensive testing and contact tracing, but also due to increased transmission. Injection drug use is the principle risk factor in HIV transmission in SHR. Each year a small number of persons previously notified of HIV status are diagnosed with new sexually transmitted infections, indicating continued unprotected sex. Among new cases, 34% had sex with a person known or suspected. HIV positive females in the child-bearing ages are increasingly reported, which, when coupled with inadequate prenatal care, presents an ongoing concern for neonatal transmission.

Sexually Transmitted Infections (STIs)

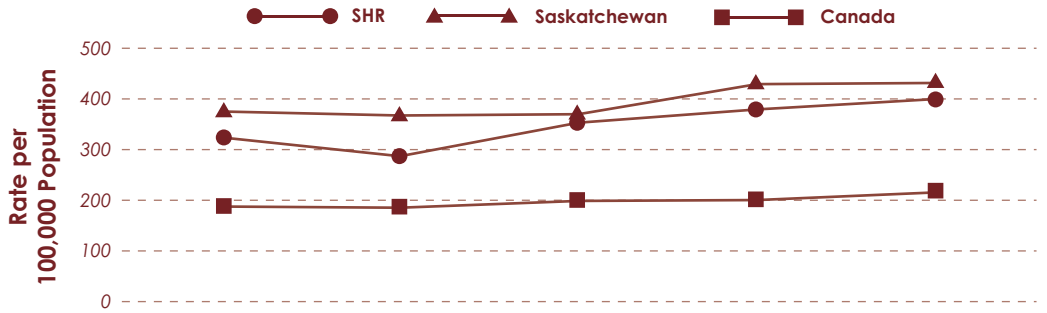
Chlamydia

Chlamydia is the most commonly reported communicable disease in SHR. The bacterium can damage reproductive organs, cause ectopic pregnancy and infertility. The greater the number of sexual partners, the greater the risk of chlamydia infection. Teenage girls and young women are more susceptible to infection if sexually active because the cervix is not fully matured.[15] (See Chapter 2 on Reproductive and Infant Health for more information on teen pregnancy).

Regional Trend

Chlamydia rates have escalated in the western world since the 1990s. Saskatchewan has a higher incidence rate of chlamydia than many provinces in Canada, and SHR's rate has increased by 24% since 2003 (Figure 4.12). SHR has reported approximately 950 to 1,200 cases of chlamydia annually for the past four years, which represents 46% of all reportable disease cases.

Figure 4.12: Chlamydia Crude Incidence Rates, Saskatoon Health Region, Saskatchewan, Canada, 2003-2007



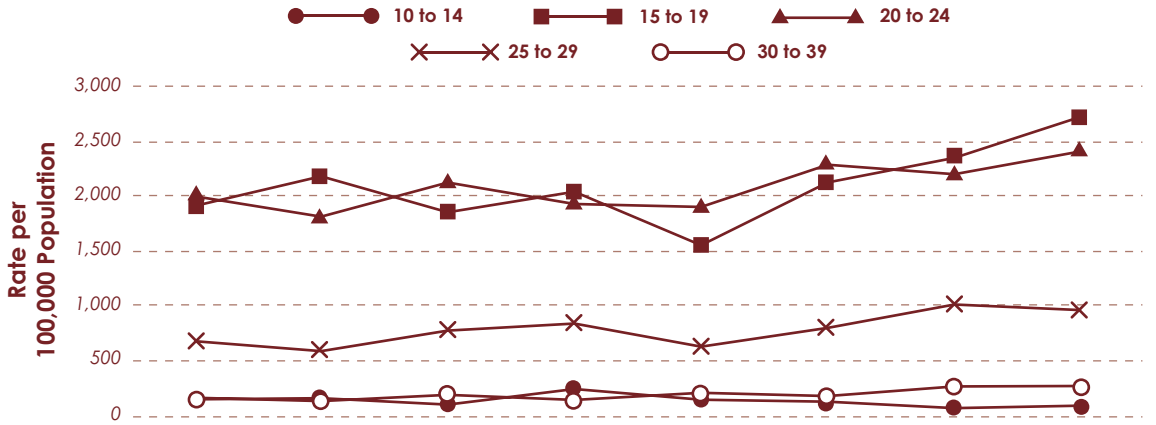
	2003	2004	2005	2006	2007
SHR	325.8	288.7	354.9	381.1	401.6
Saskatchewan	377	369.1	371.7	431	433.3
Canada	189.4	187.1	200.5	202.2	217.3

Source: iPHIS, Saskatchewan Ministry of Health, Public Health Agency of Canada (Preliminary data)

Although rates of chlamydia infection in both sexes are increasing, female rates are higher than male, due in part to gender-specific testing patterns and to biological susceptibility. The highest rates are in females between the ages of 15 and 24 with the fastest growing increase in 15 to 19 year olds (Figure 4.13). In males the highest rates occur between age 20 and 24 years (Figure 4.14).

> *There are a multitude of risk factors at work that can influence the rate of chlamydia, including substance and alcohol abuse, lack of knowledge, housing issues, not considering the long term consequences of the infection, etc. Addressing only one issue at a time can't make an impact on this trend. Many approaches must be utilized.*
>
> *Brett Dow, Sexual Health Nurse, SHR*

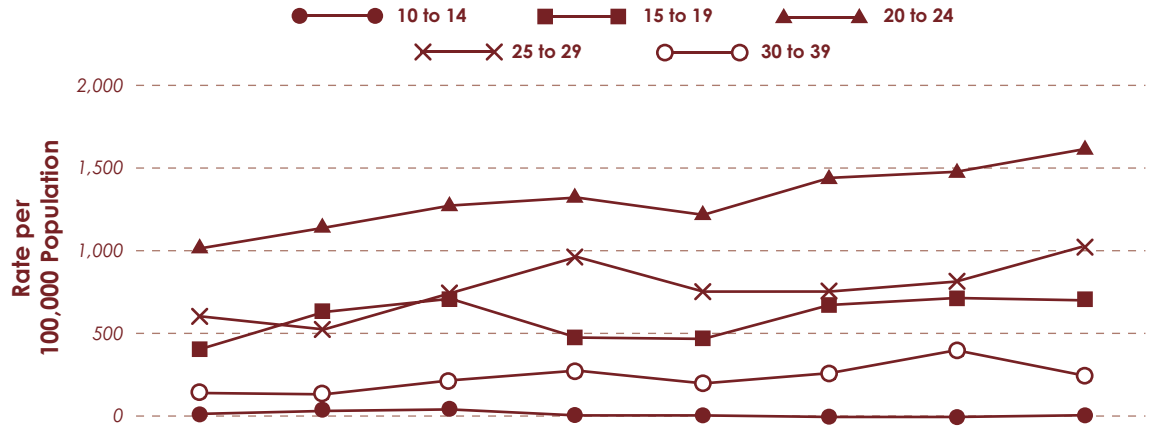
Figure 4.13: Chlamydia Female Age Specific Incidence Rate, Saskatoon Health Region 2000-2007



	2000	2001	2002	2003	2004	2005	2006	2007
10 to 14	144.3	154.6	96.0	238.5	140.9	122.7	63.8	86.4
15 to 19	1912.3	2184.2	1855.0	2042.9	1553.9	2128.2	2352.7	2729.8
20 to 24	2002.1	1815.0	2127.2	1930.9	1903.8	2290.0	2203.4	2412.8
25 to 29	676.3	585.1	772.9	837.4	626.1	798.0	1011.5	960.3
30 to 39	158.9	128.3	185.3	138.8	203.9	174.3	262.2	266.2

Source: Public Health Services, Saskatoon Health Region

Figure 4.14: Chlamydia Male Age Specific Incidence Rate, Saskatoon Health Region 2000-2007



	2000	2001	2002	2003	2004	2005	2006	2007
10 to 14	18.3	36.4	45.6	9.3	9.4	0.0	0.0	10.2
15 to 19	405.6	634.7	715.1	480.2	472.2	677.3	719.5	705.6
20 to 24	1017.0	1144.4	1278.7	1327.1	1222.4	1446.1	1482.8	1618.1
25 to 29	610.4	529.3	748.9	968.0	758.2	758.6	818.9	1030.2
30 to 39	145.0	136.9	221.4	280.5	202.9	265.1	403.5	252.2

Source: Public Health Services, Saskatoon Health Region

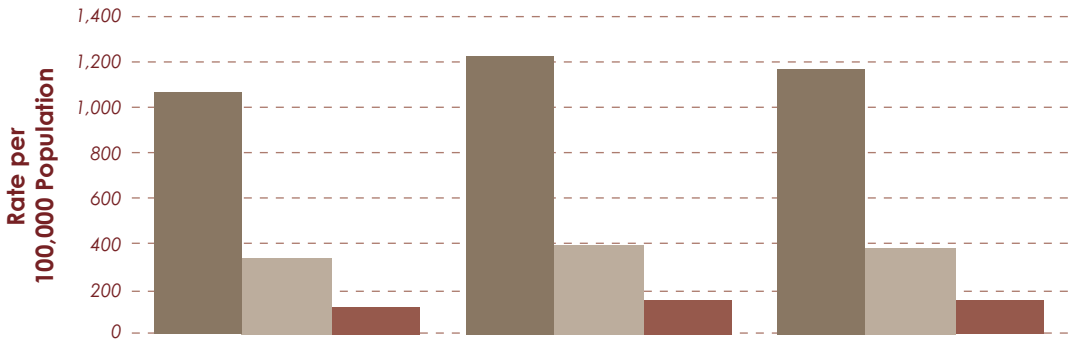
A Closer Sub-Regional Look

As shown in Figure 4.15 there are clear disparities in the rates of chlamydia across the region. Rates in Saskatoon's core neighbourhoods have averaged three times greater than those in non-core neighbourhoods for the past five years, while rural rates are comparatively low but present.

Youth in rural communities are bored and use alcohol as an outlet. Alcohol contributes to relaxing inhibitions and increases risky sex.

Public Health Services staff member, SHR

Figure 4.15: Chlamydia Age Standardized Rates, Saskatoon Health Region, 2005-2007



	2005	2006	2007
Core Neighbourhoods	1064.1	1222.7	1167.5
Non-Core Neighbourhoods	338.8	395.8	383.8
Rural SHR	125.3	154.9	154.1

Source: Public Health Services, Saskatoon Health Region

Gonorrhoea

Gonorrhoea is caused by the bacterium *Neisseria gonorrhoeae*, which left untreated can cause permanent health problems in both women and men. Co-infections with chlamydia are common. Penicillin and tetracycline resistant strains have been identified around the world. Fluoroquinoline resistance was first identified in 1992 and has been documented in many parts of the world, including Canada[16] but is believed to be at a low rate. Nationally gonorrhea has been increasing since 1999, with much higher incidence rates per population in Saskatchewan. In 2007 the national incidence rate was 34.9 per 100,000 population while the rate in Saskatchewan was 102 per 100,000. SHR has seen a sharp increase in both male and female gonorrhoea rates since 2004.

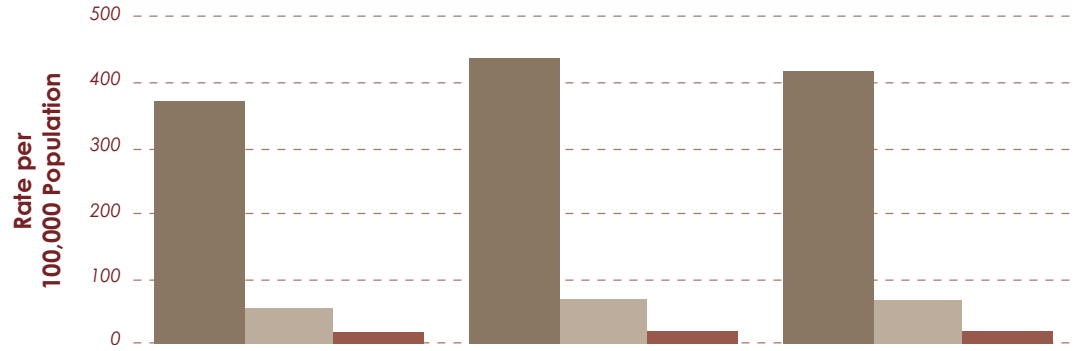
Risky sex is related to poor self esteem and lack of connectiveness to family and schools. For many youth it's about belonging, being in a relationship at any cost.

Public Health Services staff member, SHR

A Closer Sub-Regional Look

There are significant disparities in gonorrhoea rates between neighbourhoods in Saskatoon's core and non-core and in rural SHR (Figure 4.16). Similar to chlamydia, female rates of gonorrhoea are highest in 15 to 19 year olds, while male rates are highest in 20 to 24 year olds.

Figure 4.16: Gonorrhoea Age Standardized Rates, Saskatoon Health Region, 2005-2007



	2005	2006	2007
Core Neighbourhoods	371.5	436.8	417.8
Non-Core Neighbourhoods	56.8	69.7	67.8
Rural SHR	20.1	21.3	20.8

Syphilis

The introduction of penicillin in the 1950s led to a rapid decrease in syphilis rates, but rates began to increase again in the late 1980s and 1990s. Outbreaks in Canada and the United States have been linked to the use of crack/cocaine, an increased number of sexual partners and connection to the commercial sex trade.[17] Localized outbreaks of syphilis have been reported in Canadian urban centres since 2005.[18] Alberta, for example, has seen a sharp increase in reported cases since 2005, and the incidence is no longer confined to high-risk groups but has spread into the general population. In western Canada some of the increase in STIs is now being attributed to the sociocultural and structural conditions that are fostered by a resource-extraction boom in oil and gas industries. Sexual health inequalities are exacerbated among younger adults who live and work in rapidly urbanising remote locales,[19] and can result in an increase in STIs in migrant workers, trends not unlike those seen in African countries.

STIs in Street Youth

Among the growing number of Canadians affected by homelessness and instability in housing, youth are particularly vulnerable. Saskatoon has participated in four phases of the Enhanced Surveillance of Canadian Street Youth, a national study of STI, blood-borne infections and risk determinants that spans more than ten years in seven cities. Street-involved youth are frequently at a higher risk for STIs, blood-borne infections and substance use. In 2005 the prevalence of hepatitis and HIV in Saskatoon street youth was much higher than national rates: 14.7% and 3.8% respectively in Saskatoon compared to 4.5% and 0.7% nationally. Saskatoon also had a higher rate of injection drug use, more youth who had left school permanently and a higher proportion of youth who had spent time in a correctional centre.[20]

After decades of very low case counts, Saskatchewan saw syphilis resurface in 2006, mostly among men between the ages of 20 and 44 years. However, cases have been seen recently in women of child-bearing age. Untreated syphilis can cause permanent cardiac and neurological damage, as well as disease, deformity or death to unborn fetuses. The risk factors associated with the Saskatchewan cases in 2006/07 include unprotected sexual contact with a known case of syphilis, men who have sex with men, and multiple sex partners, including sexual partners acquired through the Internet.[21]

Syphilis is classified as infectious or non-infectious, depending on the stage of the disease when the infection is transmissible. In SHR, between 2004 and 2007 there were 12 cases of infectious syphilis. Three quarters of cases were male across age groups from 20 years upward and female cases reported in women of 20 to 44 years. Since 2004 there have been 12 cases of late latent syphilis (non-infectious) in SHR. Non-infectious syphilis includes formerly treated and/or cleared or resolved cases that do not present risk of transmission.

So What's the Bottom Line?

Sexually Transmitted Infections: Chlamydia rates continue to be double the national rates. Gonorrhea rates are also increasing. Residents of core neighbourhoods have much higher rates than other parts of SHR. The 15 to 24 age groups are most at risk for chlamydia and gonorrhoea. Syphilis has re-emerged in SHR since 2006 with the potential for outbreak, as experienced in Edmonton and Calgary in 2007 and 2008.

Other Communicable Diseases

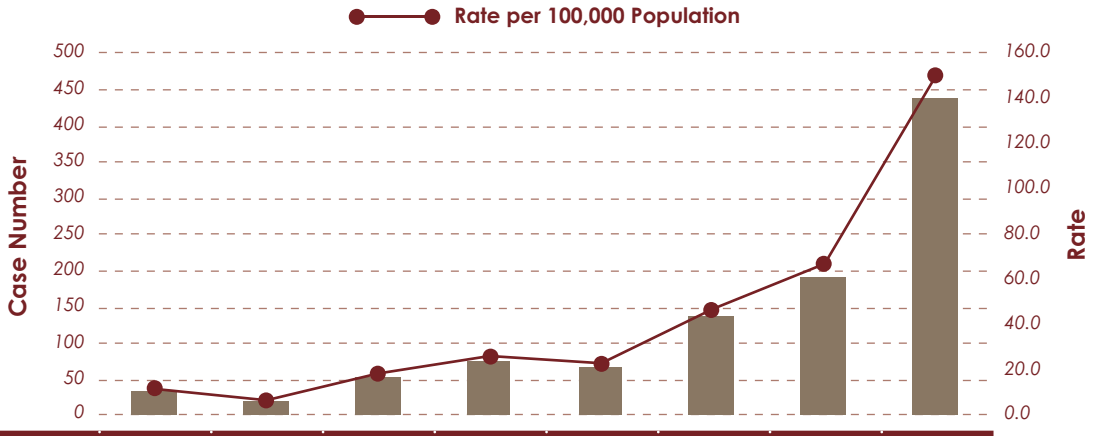
Methicillin-Resistant Staphylococcus Aureus (MRSA)

Staphylococcus aureus is a common bacterial infection with symptoms that range from skin infections to sepsis and death. Antibiotic resistant strains of this infection, like all antimicrobial resistant infections, are problematic because they are costly and difficult to treat. Since its identification in the 1960s, methicillin-resistant *Staphylococcus aureus* (MRSA) has been recognized as an important emerging pathogen and can be found in invasive medical or surgical wounds, as well as skin and soft tissue infections, such as boils, abscesses and wound infections.[22]

Canadian and US First Nations people have been found to be at high risk for MRSA skin and soft tissue infections.[23] Other high risk groups include athletes, the homeless, injection drug users, military personal, incarcerated individuals, small children[24] and persons who have had surgery or other invasive medical procedures, or who have been hospitalized or resided in a care home in the past 12 months. Since skin to skin contact is the most significant mode of transmission, hand hygiene is the most effective way to control the spread of this infection.

Community-associated MRSA (CA-MRSA) is epidemiologically and genetically different from health care-associated MRSA. CA-MRSA can cause serious and sometimes life-threatening infections and has been increasingly identified in individuals in the community who lack health care associated risk factors.

Figure 4.17: MRSA Case Counts and Crude Rates, Saskatoon Health Region, 2000 - 2007



	2000	2001	2002	2003	2004	2005	2006	2007
Count	34	20	54	75	67	137	192	445
Rate Per 100,000 Population	12.0	7.0	18.8	26.5	23.3	47.3	67.2	152.9

Source: Public Health Services, Saskatoon Health Region.

Figure 4.17 shows the dramatic increase in case counts and rates of MRSA in SHR since 2000. Some of this increase is due in part to increased screening in hospitals since 2007. In 2008 enhanced surveillance was undertaken for three months in order to better understand the sources of new cases. In this study[25] 52% of cases were hospitalized, and 12% of cases had died (primary cause of death unknown). More than half the total cases were community acquired strains of MRSA; however, 40% of these cases had health care associated risk factors. In other words, these community acquired strains may have been acquired from health-care facilities. Overall, among all cases during the enhanced surveillance period, over 40% had been hospitalized within the past year and 12% had been a resident in a long term care facility within the past year. It is likely, in keeping with other evidence in Canada and the US, that community acquired strains are becoming endemic in SHR hospitals and long term care facilities.

Another important finding was that of those hospitalized, 67% were discovered to be MRSA positive 48 hours or more after admission. This means that patients who were high risk (and therefore screened) may not have been put on contact precautions until after MRSA was confirmed by laboratory tests - in other words, posing a great risk of increased hospital transmission of MRSA among inpatients.

The same SHR study also found that patient knowledge about MRSA - how it is spread and how to prevent it - was limited. Only 3% had good knowledge of how MRSA was spread, and 49% had poor or no knowledge of how to avoid spreading it once infected. The extent of physician and health-care provider knowledge about MRSA infection is not known.

Invasive Group A Streptococcus Pneumoniae

Group A Streptococcus (GAS) is a bacterium often found in the throat and on the skin. People may carry group A streptococcus bacteria but have no symptoms of illness. Most GAS infections are relatively mild illnesses such as 'strep throat' and impetigo, but occasionally these bacteria can enter the bloodstream or other normally 'sterile' parts of the body and cause severe and even life-threatening diseases known as invasive diseases (iGAS).

In 2007 an increase in iGAS was reported across Canada. While rates have been climbing nationally for the last decade, a particular increase of invasive disease linked to a specific strain[m] was observed in the western

[m] *emm type 59.*

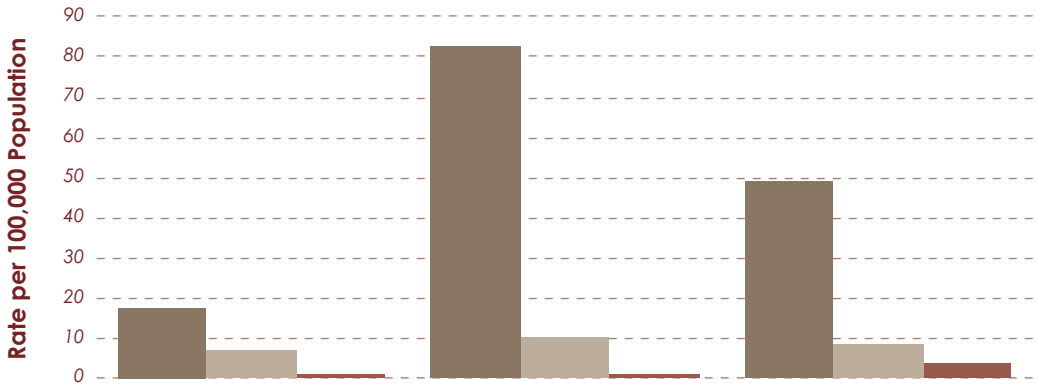
provinces in 2008. The risk of iGAS is associated with underlying conditions that include HIV infection, cancer, heart disease, diabetes, lung disease and alcohol abuse.[26]

In the past four years the majority of iGAS patients in SHR (80%) have required hospitalization with this serious invasive condition. The case fatality rate from 2004 to 2007 was 5%. The highest rate of iGAS was seen in the less than one year age group although there has been a slight increase in the rate in adults 20 to 64 years since 2005. The majority of patients have no known risk factors, but for those for whom risk information is known the highest risks are among patients with injuries (43%) followed by injection drug use (21%).[27]

A Closer Sub-Regional Look

While no pronounced increase of iGAS has been observed in SHR overall, there have been clearly elevated rates in Saskatoon's core neighbourhoods compared to non-core since 2005 (see Figure 4.18). Strain typing is not available for SHR cases to date, however the provincial laboratory has confirmed that the same type identified in the western outbreaks is now the most common type of iGAS in Saskatchewan.[28]

Figure 4.18: Invasive Group A Streptococcal Disease Crude Rates in Saskatoon Health Region, 2005-2007



	2005	2006	2007
Core Neighbourhoods	17.7	82.5	49.2
Non-Core Neighbourhoods	7.2	10.4	8.6
Rural SHR	1.3	1.3	3.9

Source: Public Health Services, Saskatoon Health Region.

West Nile Virus

West Nile virus (WNv) is a mosquito-borne flavivirus that causes a range of symptoms in humans from mild fever to neurological symptoms. WNv arrived in North America in 1999 and since 2003 in Saskatchewan, WNv has become a sporadic and endemic disease. As North American human and animal populations have only recently been exposed and immunity is believed low, public health is likely to face significant challenges from this disease into the future.

WNv is highly dependent on environmental and climactic conditions. Outbreaks are most likely to occur when environmental conditions favor emergence of high populations of *Culex tarsalis* mosquito, and when the virus is circulating in birds and in the *Culex tarsalis* mosquito species. Under these conditions the virus amplifies with each generation of mosquito and tends to peak in mid to late July in Saskatchewan.

During the summer of 2007, Saskatchewan reported its highest number of cases of WNv to date with 1436 cases, far more than has ever been seen in Canada. SHR reported 358 cases, including 32 neurological (WNNS - see box) cases and two deaths. Fifteen percent of these cases were hospitalized. For that same year, WNv was a leading cause of human encephalitis and aseptic meningitis in SHR. Most neurological cases require hospitalization and some require intensive care and long term use of ventilators. Many non-neurologic cases are also hospitalized during their illness and recovery is often slow. WNv presents a significant burden to survivors, their families and the health-care system. In 2008, SHR reported very low numbers of cases, exemplifying the sporadic nature of this disease.

West Nile Neurological Syndrome (WNNS) Risk Factors

- WNNS is the more severe clinical manifestation of WNv infection. People with underlying health conditions such as hypertension, cardiovascular disease, and compromised immune systems are at increased risk of developing WNNS.
- A 2008 SHR study[28] found that although individuals of all ages may develop WNNS, people with underlying health conditions and those greater than 60 years old were at increased risk for developing severe neurological disease.
- The same study found that the odds of developing encephalitis and/or acute flaccid paralysis was 5.6 times higher in those aged 60 years or greater.[28]

A Closer Sub-Regional Look

Rural rates of WNv are higher than urban rates. The rate for Saskatoon was 117.9 per 100,000 population in 2007 compared to the average rural SHR rate of 144.5.

So What's the Bottom Line?

Other Infections: Increased hospital screening in 2007 lead to an increase in the number of MRSA cases reported, however does not account for all the increase. Community acquired strains of MRSA identified in patients with health care associated risk factors means the distinction between community acquired and health care acquired MRSA is becoming blurred. Poor patient knowledge of MRSA is noted.

West Nile Virus: This sporadic disease saw the largest number of cases ever in 2007. In a high burden year neurological cases were the leading cause of human encephalitis and septic meningitis. Many non-neurological cases are also hospitalized and may recover slowly.

References for Chapter 4

1 *Vandry W, Talling D. Invasive pneumococcal infection in First Nations children in northern Alberta. Can Commun Dis Rep 2002;28(20):165-72.*

2 *Kellner J, Hastie L, Hui S, et al. Outbreaks of serotype 5 and serotype 9 invasive pneumococcal disease in Calgary, Alberta, Canada [online]. 2009 [cited 2009 Mar 19]. Available from: URL: http://www.promedmail.org*

3 *Wright J, Opondo J. Surveillance report of an outbreak of invasive pneumococcal disease in Saskatoon Health Region. Saskatoon: Saskatoon Health Region; Internal Working Report.*

4 *Public Health Agency of Canada. The role of vaccines and antivirals controlling and preventing influenza [online]. 2006 [cited 2009 Feb 4]. Available from: URL: http://www.phac-aspc.gc.ca/influenza/influenza-vacantiv-eng.php*

5 *Public Health Agency of Canada. Final report to outcomes from the national consensus conference for vaccine-preventable disease in Canada [online]. 2008 [cited 2009 Feb 24]. Available from: URL: http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/08pdf/34s2-eng.pdf*

6 *Public Health Agency of Canada. Statement on influenza vaccination for the 2008-2009 season. Can Commun Dis Rep 2008:34:1-46. Available from: URL: http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/08vol34/acs-3/index-eng.php*

7 *Saskatchewan Ministry of Health. 2008 Saskatchewan immunization management systems (SIMS). Influenza vaccine administered between specified immunization dates, coverage rates for clients 6 to 23 months old. Regina: Saskatchewan Ministry of Health; 2008.*

8 *Saskatchewan Ministry of Health. 2009 two year old coverage rate by Antigen, Saskatchewan 2007-08 (unpublished). Regina: Saskatchewan Ministry of Health; 2009.*

9 *American Cancer Society. 2005 cancer facts and figures [online]. 2005 [cited 2009 Feb 4]. Available from: URL: http://www.cancer.org/downloads/STT/CAFF2005f4PWSecured.pdf*

10 *Centers for Disease Control and Prevention. FAQs for health professionals: Hepatitis C [online]. 2007 [2009 Feb 11]. Available from: URL: http://www.cdc.gov/hepatitis/HCV/HCVfaq.htm#section1*

11 *Public Health Agency of Canada. HIV/AIDS epi updates. Ottawa: Public Health Agency of Canada; 2007. p.11. Available from: URL: http://www.phac-aspc.gc.ca/aids-sida/publication/epi/pdf/epi2007_e.pdf*

12 *Public Health Services. 2006 investigation of an HIV cluster among injection drug users in Saskatoon, Saskatchewan. Saskatoon: Saskatoon Health Region; 2006.*

13 *Public Health Agency of Canada. 2006 HIV and AIDS in Canada. Selected surveillance tables to June 30, 2007. [online]. 2007 [cited 2009 Feb 17]. Available from: URL: www.phac-aspc.gc.ca/aids-sida/publication/surveyreport/tables0607-eng.php*

14 *Mofenson L, Taylor AW, Rogers M, Campsmith M, Ruffo NM, Clark J, et al. Achievements in public health: reduction in perinatal transmission of HIV infection – United States, 1985-2005. MMWR 2006;55(21):592-597.*

15 *Centers for Disease Control and Prevention. CDC fact sheet: Chlamydia [online]. 2007 [2009 Feb 11]. Available from URL Http://www.cdc.gov/std/Chlamydia/STDFACT-Chlamydia.htm#WhatIs*

16 *Mann J, Kropp R, Wong T, Venne S, Romanowski B. Gonorrhea treatment guidelines in Canada: 2004 update. CMAJ 2004;171(11):1345-1346.*

17 *Lee MA, Aynalem G, Tabidzel, Gunn RA, Olea L, Taylor MM, et al. Symptomatic early neurosyphilis among HIV positive men who have sex with men – Four cities, United States, January 2002-June 2004. MMWR 2007;56(25):625-628.*

18 *Gratrix J, Honish L, Mashinter L, Jaipaul J, Baptiste B, Doering D, et al. Case series descriptive analysis of a primary syphilis outbreak in Edmonton, Alberta, July 2004-April 2006. Can Commun Dis Rep 2007;33(06).*

19 *Goldenberg S, Shoveller J, Ostry A, Koehoorn M. Youth sexual behaviour in a boomtown: Implications for the control for sexually transmitted infections. Sex Transm Infect 2008;84:220-223.*

20 *Plamondon K, Wright J. 2008 enhanced street youth study – phase V analysis (unpublished). Saskatoon: Saskatoon Health Region; 2008.*

21 *Opondo JM. Letter to physicians re: increased cases of Syphilis [online]. 2007 [cited 2009 Feb 17]. Available from: URL: http://www.saskatoonhealthregion.ca/your_health/documents/MHOLettertophysiciansreIncreasedCasesofSyphilisOct2607correctlink.pdf*

22 *Simor AE, Ofner-Agostini M, Bryce E, Green K, McGeer A, Mulvey M, et al. The evolution of methicillin-resistant Staphylococcus aureus in Canadian hospitals: 5 years of national surveillance, 1995-1999. CMAJ 2001:165(1):21-6.*

23 *Ofner-Agostini M, Simor AE, Mulvey M, Bryce E, Loeb M, McGeer A, et al. Methicillin-resistant Staphylococcus aureus in Canadian Aboriginal people. Infect Control Hosp Epidemiol 2006;27(2):204-207.*

[24] *Gilbert M, MacDonald J, Gregson D, et al. Outbreak in Alberta of community-acquired (USA300) methicillin-resistant Staphylococcus aureus in people with a history of drug use, homelessness or incarceration. Can Med Assoc J 2006;175:149-54.*

[25] *Mahamoud, A. Enhanced methicillin-resistant Staphylococcus aureau (MRSA) surveillance report Dec 2007-Feb 2008 (Internal report). Saskatoon: Saskatoon Health Region; 2008.*

[26] *Public Health Agency of Canada. Epidemiology of invasive GAS disease in Canada [online]. 2006 [cited 2009 Feb 4]. Available from: URL: http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/06vol32/32s2/4-epi-eng.php?*

[27] *Wright J. Invasive Group A streptococcus – October 15 Summary (unpublished). Saskatoon: Saskatoon Health Region, 2008.*

[28] *Tataryn J. Investigation of risk factors for neuroinvasive disease in west nile virus cases following an outbreak in Saskatoon Health Region (unpublished).Saskatoon: Saskatoon Health Region; 2008.*

CHAPTER 5

Social Environment

A vibrant core neighbourhood development will provide housing to a variety of family sizes and income levels.

HIGHLIGHTS

Social Environment

Household Income Up, Poverty Still a Concern

- Since 2001, median household income in Saskatoon Health Region (SHR) increased 4.8% - a bigger increase than both Saskatchewan and Canada.
- The percentage of low income individuals in Saskatoon decreased from 19.7% in 2001 to 17.7% in 2006. Despite the improvement, close to half of Saskatoon's core neighbourhood residents live below the poverty line.

Unemployment at Near Record Lows

- Saskatchewan's unemployment rate was 4.0% in June 2008, the lowest in the past 30 years. However, Saskatchewan has the highest unemployment rate for off-reserve Aboriginals in Western Canada.

Housing Costs Skyrocketed in 2007

- In Saskatoon and surrounding area, housing resale costs increased 45% in 2007, the biggest single year increase on record.
- The proportion of Saskatoon renters who spent more than 30% of their income on shelter was 44% in 2006 (before the cost increases noted above), compared to 56% of core neighbourhood renters and 32% of rural SHR renters.

Housing Conditions Worse In Core Neighbourhoods, Rural

- The percent of houses in need of major repair in Saskatoon's core neighbourhoods (13%) and in homes in rural SHR (11%) is double the city average (6%).

Food Security An Important Issue

- Food costs are higher in rural SHR and access to vegetables and fruits is more limited than in Saskatoon.
- Food deserts - geographic areas with few grocery store locations - exist in Saskatoon, especially in the central downtown and Riversdale areas.

Quality Of Life In Saskatoon Improving - For Some

- In 2007, about two out of three Saskatoon residents rated their quality of life as excellent or very good, a slight increase from previous years. Only about one in two low income neighbourhood residents responded the same way.

Social Determinants of Health

The social determinants of health have been shown to be the greatest predictors of health. It is well known that income, education, employment, housing, food security, early childhood development, family structure and social supports all greatly impact individual and community health.[1] While many Saskatoon Health Region (SHR) residents enjoy very good health, a 2006 Saskatoon study identified a number of very disturbing gaps in health status between the city's most affluent and least affluent neighbourhoods.[2] While the findings did not come as a big surprise to many, what was startling was the extent of the gaps.

[a] *See Technical Appendix for a definition of "core neighbourhoods"*

More recently, a 2008 study of cities across Canada examined health disparity and found for Saskatoon and surrounding area, people living in the lowest income areas had 6.4 times the rate of substance related disorder, 3.4 times the rate of diabetes, and 2.8 times the rates of land transport injury as people living in the highest income areas.[3] For most of the indicators presented in this report, Saskatoon and area had among the highest rates of health disparity between low and high income groups across the country.

Income and Health in Saskatoon (2006)[2]

Low income residents in Saskatoon are:

> 3.8 times more likely to attempt suicide;

> 1.3 times more likely to have heart disease; and

> 8.0 times more likely to have Hepatitis C than residents elsewhere in Saskatoon.

A recent report titled "*Health Disparity in Saskatoon: Analysis to Intervention*" looked at a host of causes of health disparity and proposed a number of evidence-based policy options for local, provincial and federal governments to consider to reduce the disparity.[4] These options included program and policy changes in the areas of income redistribution, education, employment, housing and health sector, to name a few. Taken together, the report argues that a blend of these options could go a long way to reducing poverty and over time, help to close the gap in health disparity.

The above reports tackle these issues from an urban perspective and a rural SHR report has been developed. Early findings suggest that while there are pockets of poverty in rural SHR, mostly centered around the four First Nations reserves, poverty in rural areas is harder to study since it is less concentrated than in the urban setting.

Income [b]

The association between higher income and better health is one of the most well researched relationships in public health.[5] People with low income are shown to have much poorer health outcomes than those in higher income groups.[6] It is also true that there is a gradient effect with income on health. In other words, an individual at any point on an income scale is likely to be less healthy than those above and healthier than those below that point.[3]

A Closer Sub-Regional Look

Table 5.1 shows a rise in median household incomes for SHR, Saskatchewan, and Canada between 2001 and 2006. The SHR median household income has increased at a faster rate than Saskatchewan and Canada.

Table 5.1: Median Household Income, Saskatoon Health Region, Saskatchewan, and Canada, 2001-2006

	2001	*2001 (in 2006$)**	*2006*	*% Change***
SHR	$41,660	$46,726	$48,989	+ 4.8
City of Saskatoon	$41,991	$47,097	$49,313	+ 4.7
Rural SHR	$40,515	$45,442	$47,449	+ 4.4
Saskatchewan	$40,251	$45,146	$46,705	+ 3.5
Canada	$46,752	$52,437	$53,634	+ 2.3

Source: Statistics Canada. Median is the point at which half of the income values are below, and half of the income values are above.
** Multiplying 2001 dollars by 1.1216 converts it to 2006 dollars.*
*** % change from 2001(in 2006$) to 2006.*

[b] *All income values reported in this chapter are based on pre-tax values. After tax income is new to the 2006 census year, and will be useful as a comparator for future reports.*

Poverty

Poverty is a key determinant of health. The number of people living below the Low Income Cut-Off (LICO) is an indicator of poverty in Canada. LICO values are adjusted based on size of community, family size, and either before or after-tax income.[c] For example, in Saskatoon, the before-tax LICO for a family of one was $17,895, whereas for a family of four it was $33,251.[7] While critics argue that LICO does not equate to a "poverty line", it is widely used for this purpose, and a better measure for poverty rates in Canada has not been widely endorsed.

In a back alley, between two old buildings, we discovered sheets of rusted corrugated metal roofing. On top of the metal sheets was placed a body pillow which was being used as a mattress. Under the 'mattress' was a pair of neatly folded jeans and a somewhat worn sweater. There were partially burnt candles - used for light at night and a bag of partially eaten buns to feed hunger.

Jacqui Barclay, Street Outreach Worker, SHR

A Closer Sub-Regional Look

SHR had a slightly higher percentage of people living below LICO compared to Saskatchewan and Canada (15.7%, 14.4%, 15.3% and respectively). The difference in the proportions of people living below the LICO is most noticeable when comparing Saskatoon's core neighbourhoods to the city as a whole (see Appendix 7). Forty-seven percent of core neighbourhood residents lived below LICO in 2006, compared to 17.7% for Saskatoon. Rural SHR residents had a smaller percentage of people living below LICO at 10.7% and this has remained relatively stable since 2001.

In Saskatoon in recent years, the proportion of individuals living below the LICO has decreased. In 1991, about 36,300 persons, or 20.0% of individuals were living below LICO. By 2006 that number had dropped slightly to about 35,200 persons, or 17.7% (see Table 5.2).

Table 5.2: Proportion of Individuals Living Below LICO, Saskatoon, 1991-2006

	1991	1996	2001	2006
Individuals Living Below LICO %	20.0	22.8	19.7	17.7

Source: Statistics Canada, Census 1991-2006.

Neighbourhoods in Saskatoon that are considered low income (that is with 30% or more families living below LICO) have remained virtually unchanged from 2001 to 2006 (see Figure 5.1).

The low income neighbourhoods have been very consistent since at least 1991 and mostly concentrated on the city's west side with the six contiguous 'core' neighbourhoods, along with the Airport Business Area. This neighbourhood has a relatively small population compared to its land area. The one neighbourhood on the east side of Saskatoon that shows more than 40% low income families is adjacent to the University of Saskatchewan and is home to many students.

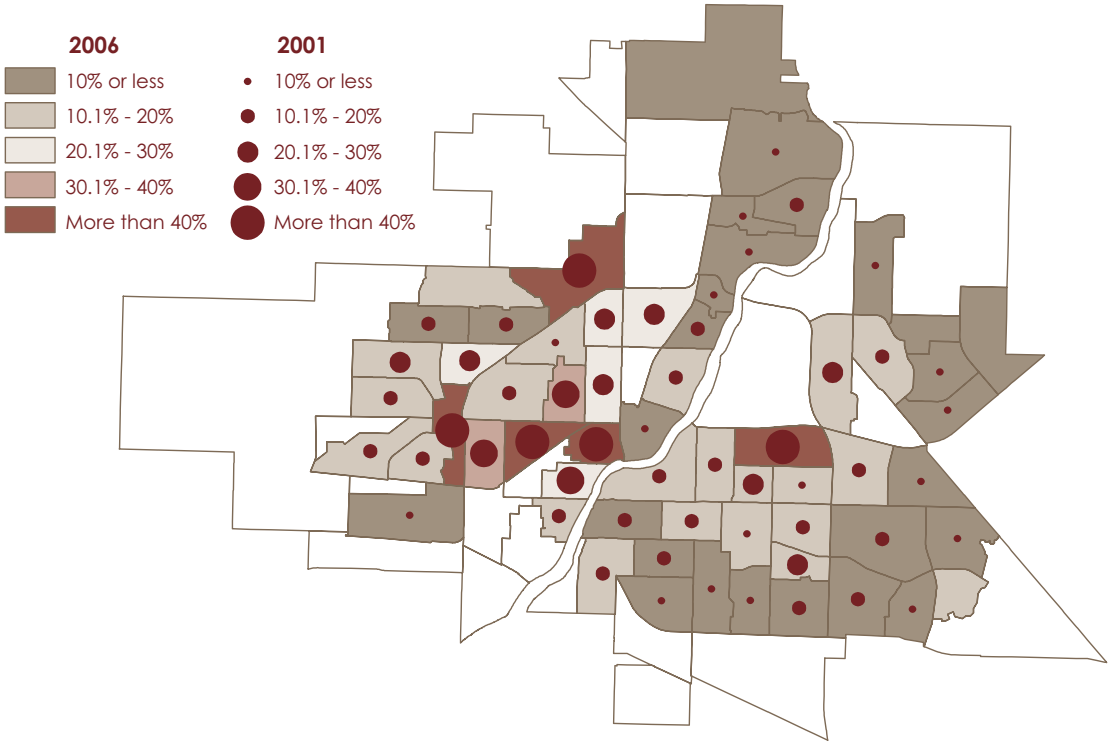
On a positive note, preliminary analysis shows that between 2001 and 2006, both median incomes and percentage of families below LICO improved in the low income neighbourhoods. This good news story however, should not overshadow the fact that there are still thousands of people living below LICO in our region.

None of the families I work with want hand-outs. They want support, control and power to make healthy choices.

Public Health Services staff member, SHR

[c] *The values reported here are before-tax LICO as after-tax values are unavailable before 2006.*

Figure 5.1: Percent of Families Living Below LICO, Saskatoon, 2001 and 2006



Source: Statistics Canada, Census 2001 and 2006.

Children Living Below LICO

The proportion of children living below LICO is higher than for the general population. For example, in Saskatoon in 2006, about 3,700 (27.4%) of children under the age of six lived below the pre-tax LICO. This compares to 17.7% of the general population in the city. In rural SHR, about 660 or 12.8% of children were living below the pre-tax LICO.

Seniors Living Below LICO

The proportion of seniors aged 65 years and over living below LICO is lower than for the general population and virtually the same in SHR's urban and rural areas. In Saskatoon, about 3,200 (13.1%) seniors lived below the pre-tax LICO in 2006, while in rural SHR, about 1,500 or 12.6% lived below the pre-tax LICO. The proportions decrease substantially for seniors if after-tax LICO values are used (5% and 3.3% respectively), due to successful policy interventions on this issue in Canada in recent years.[8]

So What's the Bottom Line?

Household Income: Income is up between 2001 and 2006 for Saskatoon and SHR rural areas and is growing faster for SHR residents compared to Canada as a whole, after taking into account cost of living.

Poverty: The incidence of people living below LICO has decreased in SHR. While some gains have been made since 2001 in the low income neighbourhoods, there are still more than 35,000 people living below LICO in Saskatoon. Early findings from a rural SHR report show that rural poverty is most concentrated in areas surrounding First Nations reserves.

Family Structure

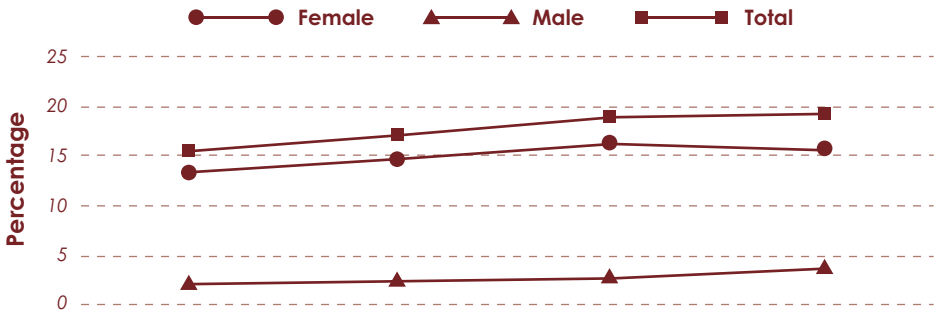
Family structure has important links to health. In particular, single parents are more likely than those with a spouse or partner to report fair or poor mental health. Further, lone parent families often have less income, less ability to afford food, and less time to spend with children compared to two parent families. Children from single parent families are also at risk for poor health outcomes such as increased behavioural problems and lower educational achievement.[9] Income is also an issue for female lone parent headed families who have about 65% of the income of male lone parent families.

A Closer Sub-Regional Look

The percent of lone parent families in SHR is about the same as the national and provincial averages (16.4%, 15.9% and 16.6% respectively – see Appendix 7). The proportion of lone-parent families is on the rise in Saskatoon (see Figure 5.2), now at 19.3%, with nearly twice that in the core neighbourhoods (36.8%). The percentage of lone parent families in rural SHR is about half of that within Saskatoon.

The number of male lone parent families in Saskatoon has nearly doubled since 1991. By contrast, the proportion of female lone parent families has decreased from 2001 to 2006 though they remain more than four times as prevalent as male lone parent families.

Figure 5.2: Percent of Single Parent Census Families, Saskatoon, 1991-2006

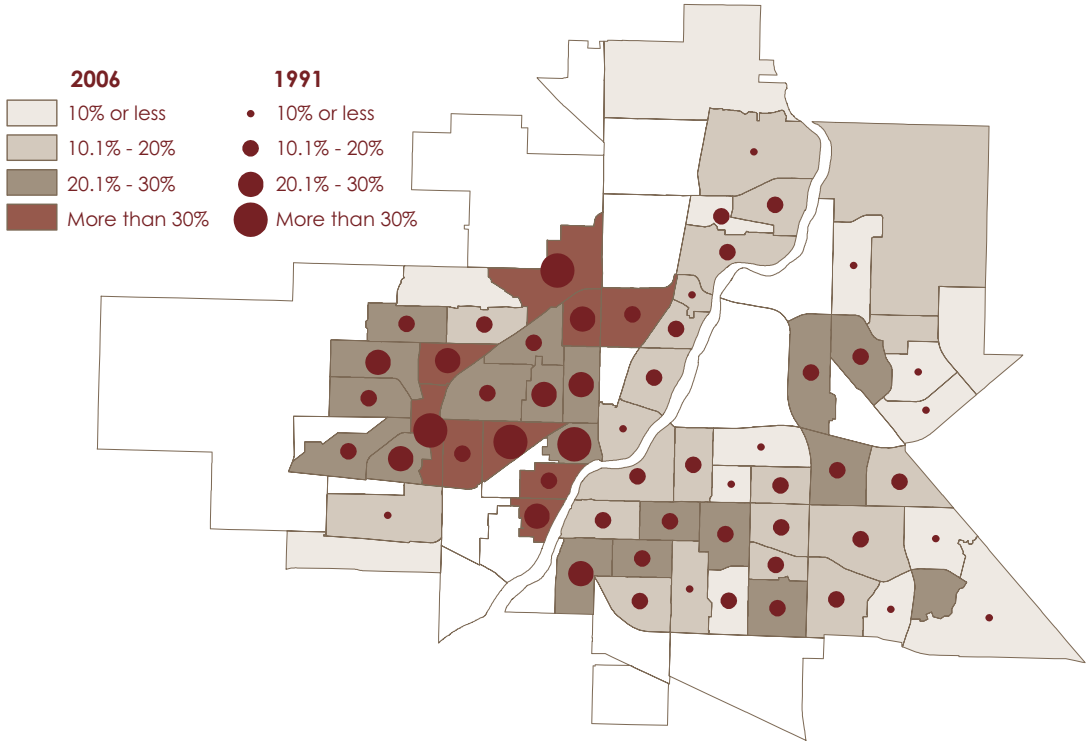


	1991	1996	2001	2006
Female	13.4	14.7	16.2	15.6
Male	2.1	2.4	2.7	3.7
Total	15.5	17.1	18.9	19.3

Source: Statistics Canada, Census 1991-2006.

A map of single parent families by neighbourhood illustrates the concentration of lone parent families (greater than 30%) on Saskatoon's west side (Figure 5.3). Between 1991 and 2006, the percent of lone parent families increased more for families on the west side of Saskatoon than for those on the east side.

Figure 5.3: Percent of Lone Parent Families, Saskatoon, 1991-2006



Source: Statistics Canada, 1991 and 2006.

Education

A person's level of education is one of the most important social determinants of health as it is a pre-requisite for social and economic success. People with higher levels of education generally have better health outcomes and conversely the lack of high school equivalency has been associated with increased risk for many negative health outcomes.[10]

A Closer Sub-Regional Look[d]

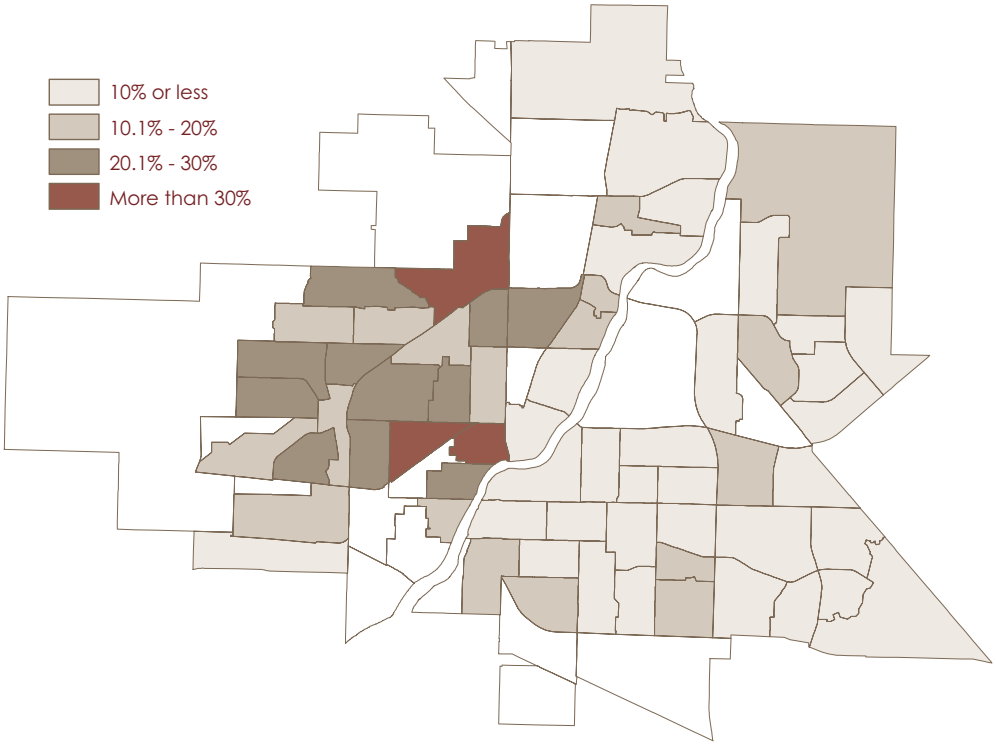
Generally, more residents aged 25 to 64 years in Saskatoon have high school equivalency or higher (87.5%) than residents in rural SHR (78.2%), province (80.6%), or country (84.6). Far fewer residents of Saskatoon's core neighbourhoods (66.2%) have high school or higher qualifications compared to 84.9% in SHR (see Appendix 7). The percent of people with a university degree or higher is 30.8% for Saskatoon residents compared to 17.1% for the province and 22.9% for Canada.

By way of comparison, people with Aboriginal identity in Saskatoon are less formally educated than for the city as a whole. For example, 70.9% of Aboriginal populations 25 to 64 years had a high school certificate or higher (compared to 87.5% for the city), and 18.8% had a university education or higher (compared to 30.8% for the city).

The percent of the population that does not have at least a high school certificate is shown by neighbourhood in Figure 5.4. In three neighbourhoods, 30% or more of individuals between 25 and 64 years do not have a high school education. These neighbourhoods are closely correlated to those with higher percentages of low income and single parent families.

[d] *Because of changes in the way the 2006 census questions were asked, comparisons with previous years are not available.*

Figure 5.4: Percent of Population 25 to 64 Years with No High School Certificate, Diploma or Degree, Saskatoon, 2006



Source: Statistics Canada, 2006.

Employment

Employment, along with education and income, is another key component of socio-economic status. Unemployment has been clearly linked to a reduction in good mental health, and some evidence suggests an association between unemployment and poor physical health.[11] Although employment contributes to economic well being, it also contributes to overall well being and gives people a sense of self control and mastery that is difficult to achieve if not working.

The unemployment rate within SHR in 2006 (5.1%), was slightly lower than the provincial average (5.6%) and lower than Canada's values (6.6%).

A Closer Sub-Regional Look

The unemployment rate has been falling over the past number of years. For Saskatoon residents overall, the 1991 unemployment rate was 9.0%, and this number has gone down to 5.5% in 2006 (see Table 5.3). There is evidence that the unemployment rate has continued to plunge as findings from the Labour Force Survey show Saskatchewan's unemployment rate at 4.0% in June 2008.[12]

Table 5.3: Unemployment Rate Age 15 Years and Older, Saskatoon Health Region, Saskatchewan, and Canada, 1991-2006

Percent Unemployment Rate 15+	*1991*	*1996*	*2001*	*2006*
SHR	n/a	7.1	6.4	5.1
Saskatoon	9	7.8	7.2	5.5
Rural SHR	n/a	n/a	4.2	3.9
Core Neighbourhoods	17.7	15.7	18.1	10.9
Saskatchewan	n/a	7.2	6.3	5.6
Canada	10.2	10.1	7.4	6.6

Source: Statistics Canada, Census 1991-2006.

There is variation in unemployment figures depending on where people live. Saskatoon residents had higher unemployment rates than rural SHR (5.5% compared to 3.9%).

Although Saskatoon's core neighbourhoods had unemployment levels more than twice that of the city overall, they have decreased from 2001 to 2006 (18.1% compared to 10.9%).

Lower unemployment rates are certainly good news, but there are disparities within SHR. Aboriginal people had an unemployment rate of 15.4% from the 2006 census and Statistics Canada stated from recent data that Saskatchewan has the lowest employment rate among its off-reserve Aboriginal population of the western provinces.[12]

So What's the Bottom Line?

Lone Parent Families: Saskatoon has a higher percentage of lone parent families compared to rural SHR, Saskatchewan, and Canada. Male lone parent families are increasing faster than female lone parent families but are still a small proportion of the total. The increasing trend in lone parent families underscores the need for suitable supports for families including counselling and accessible, suitable child care.

Education: Residents of Saskatoon have achieved higher levels of education compared to the provincial and Canadian averages. Lower proportions of Aboriginal people and those in the core neighbourhoods have attained education at or above the high school level than for Saskatoon as a whole. It will be important to increase accessibility to educational opportunities for this population given they will make up a large portion of the future workforce.

Unemployment: Unemployment rates have decreased during the study period, owing to strong economies at the local, provincial and national level. A decrease in unemployment rates in the core neighbourhoods is a positive sign. Given the projected increases in the Aboriginal population, it will be especially important to ensure adequate employment opportunities for this population.

Housing

Shelter is one of the most fundamental of all human needs and is also an important social determinant of health. Housing affordability and physical characteristics are both important indicators to consider.

Housing has recently been a front and centre issue in the province. A 2008 task force on housing affordability found:[13]

- Saskatoon housing prices increased 50% between Sept 2006 and Sept 2007.
- The number of rental units in Saskatoon decreased from 31,000 to 29,000 between 1997 and 2007.
- Saskatoon had the lowest vacancy rate in the province at 0.6% in 2007, its lowest on record.
- Rental prices have increased ahead of people's ability to pay, which includes not only people on social assistance, but also low income seniors and the working poor.
- It costs much more to society to have chronic homeless people on the street than to invest in housing for these individuals.
- There are limited housing options in smaller rural communities of Saskatchewan.

Readers should take note that most of the housing cost data in this Health Status Report is from the 2006 Census, so it may not accurately reflect the housing situation during the production of this report. However, it does provide comparable snapshots over time and across many different areas of Saskatoon Health Region.

Seniors Housing Issues

- Affordability for seniors housing is a concern in SHR, especially for those with disabilities and limited incomes.
- Private care homes serve individuals who are no longer able to live independently and who have care needs less than required for long term care placement.
- A low income senior receives about $1,300 per month,[14, 15] whereas private care homes range in costs from $1,000 to $2,200 per month.[16]
- If unable to afford the costs of a private care home, seniors risk staying at home with possible decline in health and admission to acute care.

Rental and Homeowner Costs

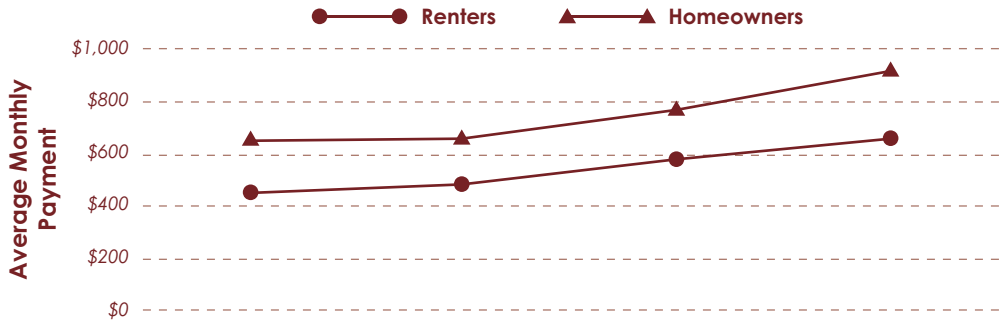
Within SHR, there are differences in rental payments and housing costs. In 2006, rural SHR had lower monthly rent ($503) and housing costs ($738) than for Saskatoon ($659 and $918 respectively).

Appendix 7 shows that average real estate values for dwellings were lower in rural SHR than Saskatoon ($131,963 compared to $173,904 in 2006). Average prices of dwellings in Saskatoon and surrounding area[e] increased 45% in 2007 far exceeding the previous record of 11% in 1997.[17] Note that the average value for a single detached home in June of 2008 in the Saskatoon and surrounding area was $289,420.[18]

In Saskatoon, rental costs and homeowner major payment costs have been increasing steadily since 1991 (see Figure 5.5), and faster than inflation. The inflation rate increased 11.3% between 2001 and 2006[19] while rental costs in the city increased 13.6% ($580 to $659), and homeowner major payment costs increased 19.4% ($769 to $918) in this same time period. Other evidence shows that 2008 rental costs increased by $129 from 2007 to $761 per month.[20]

[e] *Includes all communities within the Rural Municipalities of Corman Park, Dundurn, Colonsay, Blucher and Vanscoy.*

Figure 5.5: Average Monthly Payments for Renters and Homeowners, Saskatoon, 1991-2006



	1991	1996	2001	2006
Gross Rent Average	$451	$484	$580	$659
Homeowners Major Payments Average	$651	$659	$769	$918

Source: Statistics Canada, Census 1991-2006.

Housing Affordability

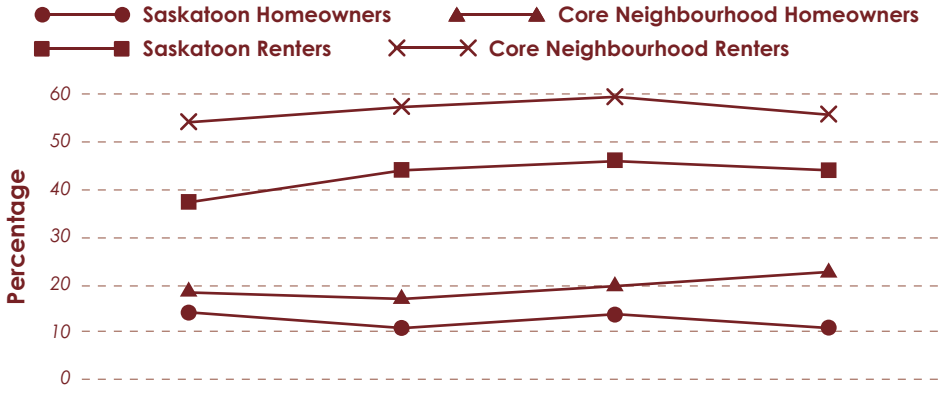
Households with housing affordability problems are defined as spending 30% or more of their income on housing. While some higher income households choose to spend more on shelter than on other goods, this measure provides a benchmark for assessing general trends in housing affordability.

A Closer Sub-Regional Look

More homeowners in rural SHR (14.7%) had housing affordability problems compared to city homeowners (10.9%) despite lower rural housing costs (See Appendix 7). Figure 5.6 shows that residents living in Saskatoon's core neighbourhoods, twice as many homeowners had housing affordability problems compared to the city (22.7% compared to 10.9%).

A higher percent of renters within Saskatoon had housing affordability problems compared to Saskatchewan and Canadian averages (44% compared to 39.8% and 40.3%). Housing affordability challenges are most prominent for renters living in the city's core neighbourhoods (55.7%). Thirty two percent of rural SHR renters also had housing affordability problems.

Figure 5.6: Percentage of Homeowner and Renter Households Spending 30% or More Income on Shelter Costs, Saskatoon, 1991-2006



	1991	1996	2001	2006
Saskatoon Homeowners	14.2	10.9	13.8	10.9
Core Neighbourhood Homeowners	18.4	17.0	19.7	22.7
Saskatoon Renters	37.3	44.0	46.0	44.0
Core Neighbourhood Renters	54.2	57.4	59.5	55.7

Source: Statistics Canada, Census 1991-2006.

Homelessness

The recent housing crisis caused by an increase in the cost of housing along with low vacancy rates affects homelessness. The Saskatoon Community Plan for Housing report stated there are growing numbers of homeless people in Saskatoon.[21]

A Closer Sub-Regional Look

A 2008 survey of 'absolute homeless' people (those with no fixed address and living in shelters, safe houses, transitional housing or outdoors) in Saskatoon found that 260 people fit the criteria.[22] While this is less than the 400 estimated previously, there are an estimated 6,000 individuals in Saskatoon who are deemed 'hidden homeless' (individuals or families living in locations not intended for human habitation and/or continuously moving among temporary housing arrangements provided by strangers, friends or family).[22]
The hidden homeless in Saskatoon are thought to be comprised of two unique groups: women with children; and youth.[21] A further 30,000 individuals have been identified in Saskatoon as being at risk of homelessness.[f]

Housing Conditions

There are many ways in which physical housing conditions can negatively affect individual health. Overcrowded and dilapidated housing can lead to safety issues, especially amongst children, and also contributes to emotional stress for those in the community.[23, 24] Mold growth and dampness have been associated with increased respiratory and mental health issues.[23] The percent of housing in need of major repair is a commonly used indicator to measure housing conditions.

[f] *At Risk of Homelessness: individuals or families who are at imminent risk of eviction from their current housing, who pay too high a proportion of their income for housing or who live in unacceptable housing or housing circumstances. Also includes those who will be discharged from the criminal justice system, those who are leaving a health facility after an extended stay, as well as youth exiting the child welfare system, and who do not have suitable housing in place prior to their discharge.*

A Closer Sub-Regional Look

In 2006, a higher percent of rural SHR dwellings were in need of major repair compared to Saskatoon (10.8% compared to 5.8% - See Appendix 7). Saskatoon's values are lower than provincial and national averages and the percentage has been stable since 1991 (see Table 5.4).

Saskatoon's core neighbourhoods have a higher percent of dwellings in need of major repair (13.4%) than any other area in SHR. This has increased over time from 10.6% in 1991 to 13.4% in 2006.

Table 5.4: Percent of Dwellings in Need of Major Repair, Saskatoon, 1991-2006

	1991	*1996*	*2001*	*2006*
Saskatoon	5.7	5.8	5.9	5.8
Core Neighbourhoods	10.6	11.2	13.1	13.4

Source: Statistics Canada, Census 1991-2006.

So What's the Bottom Line?

Housing Costs: Housing costs increased dramatically in 2007 and much of 2008. Even though housing costs are lower in rural SHR and Saskatoon's core neighbourhoods compared to the city overall, higher percentages of rural and core neighbourhood homeowners experienced housing affordability problems compared to city dwellers.

Affordability a Challenge for Renters: Renters in Saskatoon, especially those in the core neighbourhoods have more housing affordability challenges when compared to provincial and national averages. These numbers likely underestimate the affordability challenges given the recent increases in housing costs not reflected in the 2006 data. See the Progress on Recommendations Since 2004 section of this report on our website for more information. (www.saskatoonhealthregion.ca)

Homelessness: Despite a lower than expected number of absolute homeless in Saskatoon, there are still significant numbers of people (an estimated 36,000) who are hidden homeless or at risk of being homeless.

Housing Conditions: The percent of homes needing major repair in the city's core neighbourhoods is increasing at a faster rate than the Saskatoon average. Values for those in rural SHR are higher than in the city.

Food Security

Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life.[25] Food security is an important public health issue and is one of the social determinants of health. It is essential for healthy eating as without access to nutritious food, healthy eating cannot be achieved, increasing the risk of poor health.

Provincial estimates of food insecurity (i.e., those that had limited access to quality or quantity of food in the past 12 months) in Saskatchewan in 2004 was 8.1%, which was lower than the Canadian average of 9.2%.[26] However, as expected, those in the lowest income category had the highest percent of food insecurity at 48% nationally.

A Closer Look at Food Security

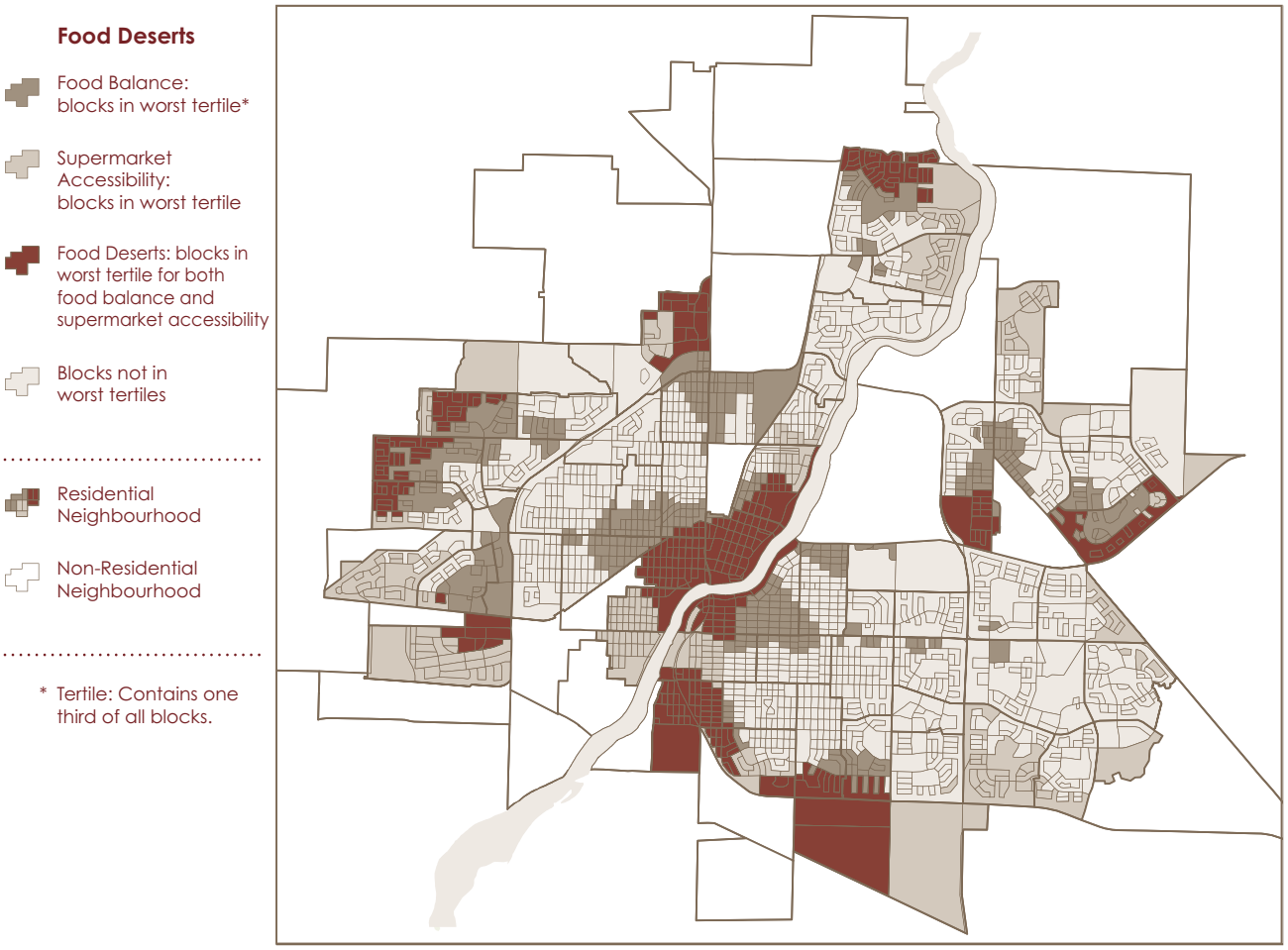
Food cost: Costs for a nutritious food basket were higher in rural areas of the province, where the weekly cost to feed a family of four was $166.26 in 2006 compared to $141.10 in Saskatoon and Regina. Much higher costs were reported in the far north of Saskatchewan.[27]

Use of Food Banks: In 2007, at least 1,183 requests to the food bank were first time requests, up slightly from 2006. Indications are that numbers of first time requests in Saskatoon in 2008 will be higher than 2007.[28]

Grocery Store Locations

Geographic areas that have few grocery store locations are considered "food deserts".[8] Grocery store locations in Saskatoon were recently mapped and Figure 5.7 shows that Riversdale, Central Business District, the southern part of City Park, and Nutana are areas where a large "food desert" exists. These are also relatively high population areas, and where a sizeable proportion of people live below the LICO.

Figure 5.7: Food Deserts by Block, Saskatoon, 2008



Source: Public Health Services, Saskatoon Health Region, 2008

[8] *Food deserts are those city blocks that have both poor accessibility to supermarkets, and a high imbalance in favour of fast food.*

So What's the Bottom Line?

Food Security: Low income segments of the population are at increased risk for food insecurity. Rural residents are adversely affected because of higher prices for nutritious foods and limited access to food banks, both of which could contribute to lower fruit and vegetable consumption (see Chapter 7, Health-Related Behaviours).

Food Deserts: There are areas in the central part of Saskatoon that could use a permanent food store, which could have negative implications for healthy eating.

Social Capital

Research has shown that social capital and a sense of belonging to a community are good for human health.[29] How active one is in their community is a broad category that has been shown to positively influence long-term physical and mental health.[1]

What is Social Capital?

> The norms, trust and social networks that can improve the efficiency of society by facilitating coordinated action.[30]

What Contributes to Social Capital?

> The extent to which people participate in their community (e.g. expressing opinions about desirable improvements, helping to formulate plans, raising awareness about needs, building coalitions along with organizations).

> How satisfied individuals are with their lives within those communities.

> Voter turnout, volunteerism, and donations per capita are indicators of community participation and social capital.

Voter Turnout

High voter turnout suggests that individuals believe their participation in the political process matters and that they feel a tie to their community and care about the outcome.[1]

In the last two federal elections, voter turnout for Saskatoon and area was similar to that for Saskatchewan and for Canada. In 2006, about two out of three eligible voters voted (see Table 5.5).[31, 32]

Table 5.5: Voter Turnout for Federal Election, Saskatoon, Saskatchewan and Canada, 2004 and 2006

	2004	2006
Saskatoon	58.6	64.6
Saskatchewan	59.1	65.1
Canada	60.9	64.7

Source: Elections Canada, 2004 and 2006. Saskatoon includes the electoral districts Saskatoon-Humboldt, Saskatoon-Rosetown-Biggar, and Saskatoon-Wanuskewin summed together.

Voter turnout for provincial elections has been higher than for federal elections in recent years. Almost 82% of Saskatoon eligible voters voted in the 2007 provincial election, compared to 76% of all Saskatchewan residents and 74% for residents in rural areas[h] of SHR.[33]

Voter turnout for the past three municipal elections in Saskatoon has been inconsistent, and is quite low compared to provincial or federal elections. For example, in 2007, only 37.1% of eligible voters cast a ballot for the mayoral elections.[34]

Charitable Giving

Another measure of community participation is the proportion of income donated to communities and other agencies. Twenty-six percent of Saskatchewan residents claimed a charitable donation on their income tax returns in 2006 (only amounts given to charities and approved organizations for which official tax receipts were provided can be deducted). This is consistent with the national rate of 25%. In 2006, Saskatchewan had 182,690 donors contributing a median of $310. The median donation nationally was $250. The number of donors was down 1.6% from 2005 but the amount of donations increased by 13%.[35] Regional data was not available.

Volunteerism

Volunteer work improves the well-being of an individual in many ways, primarily through enhancing social support networks. Research has found that volunteering can generate a heightened sense of self-esteem, self-worth and confidence, reduce heart rates and blood pressure, increase endorphin production resulting in greater feelings of well-being and calm, boost immune system and nervous system functioning, reduce life's stresses, and overcome social isolation.[36]

In 2007, 54% of Saskatoon respondents in the Community University Institute for Social Research (CUISR) Quality of Life survey reported that they had volunteered in the past year. This was down from 65% in 2001. In 2007, respondents spent 13 hours per month volunteering. The top four volunteer activities in 2007 were canvassing/campaigning/fundraising; organizing/supervising events; teaching/coaching; and sitting as a board member.[37] Among those 15 and older, Saskatchewan had the highest volunteer rates in Canada in 2004 at 54% compared to the national average of 45%.[38]

Crime

Crime is a proxy measure for the lack of social capital in a community. There is a strong link between poor health and crime. Health effects associated with either committing or being victim of crime include injury, stress, disability, and mental health problems. Poor mental health is considered as both a determinant and outcome of crime.[39]

[h] *The constituencies of Arm River-Watrous, Batoche, Biggar, Humboldt, and Martensville were summed to produce an overall result for rural. The constituency boundaries are not the same as SHR boundaries so some residents in the constituencies would not be considered SHR residents.*

Violent crime rates[i] for youth are much higher than for adults. Table 5.6 shows violent crime rates for youth 12 to 17 and adults 18 and older. Both age groups have changed minimally since 2001. The Saskatoon CMA had the highest violent crime rates in Canada in 2007.[40] Crime statistics from the City of Saskatoon show that the central business district and west central areas have the highest rates of crimes against persons.[41] No rural crime data was available for SHR.

Table 5.6: Crude Violent Crime Rates per 100,000 (Based on Charges Cleared), Saskatoon and Area, 2001-2007

	2001	2002	2003	2004	2005	2006	2007
Adult	790.4	769.5	820.8	802.9	728.9	783.4	809.6
Youth	1,769.2	1,854.4	1,722.9	1,664.1	1,581.5	1,635.3	1,679.5

Source: Statistics Canada, Criminal Justice Statistics.

Youth Bullying

While most bullying is not yet considered a crime, youth bullying (victim, bully or both) has been linked to other violent behaviour and crime. For instance, one study found that bullying at age eight strongly predicted criminality in adolescence, including greater likelihood of involvement in violent, property and traffic crime when compared to non-bullying children.[42] This is consistent with other research which found that youth who self reported involvement in bullying were significantly more likely to be involved in other violence-related behaviours.[43]

Not only is bullying linked to more serious violent behaviour, but also to negative health outcomes. Nansel et al. (2004) used data collected from the 1997-1998 Health Behaviour School Aged Children Study in 25 countries and found that youth involved in bullying - as bully, victim or both - consistently reported significantly higher levels of health problems and poorer emotional adjustment than non-involved youth.[44] A recent international journal editorial upheld bullying as worthy of being viewed as a public health concern.[45]

How is Bullying Defined?

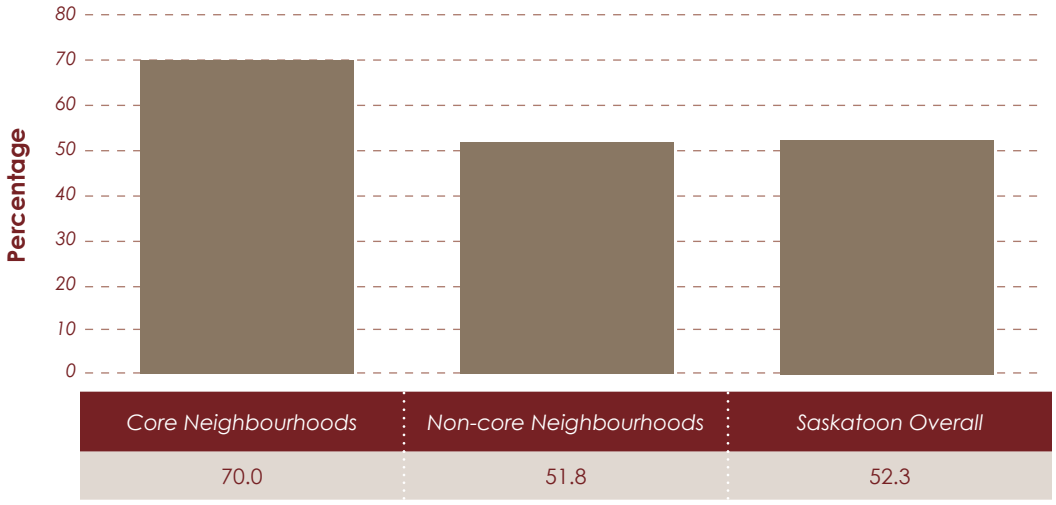
Bullying can be characterized by aggressive behaviour or intentional harm-doing that is carried out repeatedly over time in an interpersonal relationship characterized by an imbalance of power. This aggressive behaviour may be verbal, physical or relational.[44]

A Closer Sub-Regional Look

In 2007, over half (52.3%) of students in Saskatoon reported they had been bullied physically or verbally at least once in the past year.[46] Students from schools in the core neighbourhoods reported higher rates of having been bullied (70.0%) compared to non-core neighbourhood students (51.8%) (Figure 5.8). Further, a significantly higher percentage of Aboriginal students (67.7%) reported that they had been bullied in the past year compared to Caucasian (50.9%) or "other cultural status" students (50.5%).

[i] *Violent crime includes homicide, attempted murder, sexual assault, non-sexual assault, other sexual offences, abduction and robbery.*

Figure 5.8: Percent of Children Victim of Bullying by Neighbourhood, Saskatoon, 2007 (n=4,093)



Source: Saskatoon School Health Survey, Public Health Services, Saskatoon Health Region, 2007.

So What's the Bottom Line?

Social Capital: There are positive signs about social capital in Saskatoon and Saskatchewan as evidenced by higher donations per capita and volunteerism rates than national averages. However, violent crime rates are among the highest in the country, and voter turnout levels have been relatively low for municipal elections. Bullying is prevalent in Saskatoon; with over half of all students surveyed reporting being bullied.

Quality of Life

Quality of life can be defined as the overall enjoyment of life. There are many factors that influence quality of life including: good health, family, friends, community conditions, opportunities for employment, income and housing. Between 2001 and 2007, CUISR conducted three telephone surveys to approximately 1,000 residents in low, middle and high socio-economic status (SES) neighbourhoods in Saskatoon to measure their perceptions of their quality of life. Rural SHR data was not available for this survey.

In 2007, 67% of respondents rated their quality of life as either 'excellent' or 'very good', higher than in 2004 and 2001. Perceptions of quality of life improved in the middle and high SES neighbourhoods, (e.g. about 70% of high SES neighbourhood residents stated they had excellent or very good quality of life in 2001 compared to 80% in 2007). For residents of low SES neighbourhoods [j] they remained relatively constant (between 45% and 50%), indicating a potentially widening gap.[37]

Based on the survey results, the top two priorities to improve quality of life among all SES groups for governments to focus on were roads and housing. This has shifted from 2001 and 2004 where health services were identified as the top priority. When asked which groups of people should be given priority for funding programs to improve quality of life, respondents consistently responded that poor families with children should be given priority (among all income groups). These findings are similar to a survey among 5,000 SHR residents which showed that 83.8% supported early intervention programs for infants and higher support for any policy initiative aimed at families with children compared to the same initiative aimed at the general population.[47]

[j] *Low SES neighbourhoods not the same as core neighbourhoods used throughout this report.*

So What's the Bottom Line?

Quality of Life: Saskatoon residents in middle and high income neighbourhoods reported improved quality of life between 2001 and 2007, with residents in low income neighbourhoods remaining stable. This is important to note given that income and employment levels in low income neighbourhoods have improved since 2001. This emphasizes the impact that the broader social environment has on quality of life.

References for Chapter 5

1 *Butler-Jones D. Report on the state of public health in Canada. Ottawa: Public Health Agency of Canada; 2008. Available from: URL: http://www.phac-aspc.gc.ca/publicat/2008/cpho-aspc/pdf/cpho-report-eng.pdf*

2 *Lemstra M, Neudorf C, Opondo J. Health disparity by neighbourhood income. Can J Public Health 2006;97(6):435-439.*

3 *Canadian Institute for Health Information. Reducing gaps in health: A focus on socio-economic status in urban Canada. Ottawa: CIHI; 2008.*

4 *Lemstra M, Neudorf C. Health disparity in Saskatoon: Analysis to intervention. Saskatoon: Saskatoon Health Region; 2008.*

5 *Lynch J, Smith GD, Harper S, Hillemeier M, Ross N, Kaplan GA, et al. Is income inequality a determinant of population health? Part 1: A systematic review. Milbank Q 2004; 82(1):5-99.*

6 *Wolfson M, Rowe G, Gentleman JF, Tomiak M. Career earnings and death: a longitudinal analysis of older Canadian men. J Gerontol 1993;48(4):167-179.*

7 *Statistics Canada. Low income before tax cut-offs (1992 base) for economic families and persons not in economic families, 2005. Ottawa: Statistics Canada; 2007. Available from: URL: http://www12.statcan.ca/english/census06/reference/dictionary/tables/table18-family20.htm*

8 *Canadian Institute for Health Information. Improving the health of Canadians. Ottawa: CIHI; 2004.*

9 *Public Health Agency of Canada. Mental health in the human face of mental health and mental illness in Canada, eds. P.H.A. o. Canada, M.D.S. o. Canada, H.Canada, S. Canada and C.I. f. H. Information. Ottawa : Minister of Public Works and Government Services Canada; 2006. pp. 1-188.*

10 *Public Health Agency of Canada. Education [online].2002 [cited 2008 Aug 25]. Available from: URL: http://www.phac-aspc.gc.ca/dca-dea/publications/healthy_dev_partb_3_e .html*

11 *Korpi W. Accumulating disadvantage: longitudinal analyses of unemployment and physical health in representative samples of the Swedish population. Eur Sociol Rev 2001;17:255-74.*

12 *Statistics Canada. The Daily, July 11, 2008. Labour Force Survey [online]. 2008 [cited 2008 Aug 25]. Available from: URL: http://www.statcan.ca/Daily/English/080711/d080711a.htm*

13 *Merriman T, Pringle B. Affordable housing: An investment. The report of the task force on housing affordability. Regina: Task Force on Housing Affordability; 2008.*

14 *Government of Canada. Table of rates for Old Age Security, Guaranteed Income Supplement, and the Allowance, Jan-Mar, 2009. Ottawa: Government of Canada; 2009. Available from: URL: www1.servicecanada.gc.ca/eng/isp/oas/tabrates/tabmain.shtml*

15 *Saskatchewan Ministry of Social Services. How much is the Senior's Income Plan payment? Regina: Government of Saskatchewan [online]. 2009 [cited 2009 Feb 3]. Available from: URL: www.socialservices.gov.sk.ca*

16 *Saskatoon Health Region. Personal care homes directory: A joint project of the Personal Care Homes Association and Saskatoon Health Region. Saskatoon: Saskatoon Health Region; 2009.*

17 *Canadian Mortgage and Housing Corporation. Housing market outlook: Saskatoon CMA. Date released Spring 2008. Saskatoon: Canadian Mortgage and Housing Corporation; 2008.*

18 *Canadian Mortgage and Housing Corporation. Housing now: Saskatoon CMA. Third quarter 2008. Saskatoon: Canadian Mortgage and Housing Corporation; 2008.*

19 *Rea W, MacKay D, LeVasseur S. Changing patterns in Canadian home ownership and shelter costs, 2006 Census. Ottawa: Statistics Canada; 2008.*

[20] Canadian Mortgage and Housing Corporation. Rental market report: Saskatoon CMA. Date released Fall 2008. Saskatoon: Canadian Mortgage and Housing Corporation; 2008.

[21] Wallace B. 2007 Saskatoon community plan on homelessness and housing. Saskatoon: Saskatoon Housing Initiatives Partnership; 2007.

[22] Chopin NS, Wormith JS. Count of Saskatoon's homeless population: Research findings. Saskatoon. Saskatoon: Community-University Institute for Social Research; 2008.

[23] World Health Organization. Large analysis and review of European housing and health status (LARES): preliminary overview. Copenhagen: World Health Organization; 2007.

[24] Ellaway A, MacIntyre S. Mums on Prozac, kids on inhalers: The need for research on the potential for improving health through housing interventions. Health Bull 2000;58(4):336-339.

[25] Government of Canada. Canada's Action Plan for Food Security: 1998. Ottawa: Government of Canada; 1998. Available from: URL http://www.agr.gc.ca/misb/fsec-seca/pdf/action_e.pdf

[26] Office of Nutrition Policy and Promotion. Income-related household food security in Canada. Ottawa: Health Canada; 2007. Available from: URL: http://www.hc-sc.gc.ca/fn-an/alt_formats/hpfb-dgpsa/pdf/surveill/income_food_sec-sec_alim-eng.pdf

[27] Lints A, Keenan TA, Vance L, Veregin J, Woods F. The cost of healthy eating in Saskatchewan. Saskatoon: Public Health Nutritionists of Saskatchewan; 2006.

[28] Food Banks Canada. Hunger count 2008. Toronto: Food Banks Canada; 2008. Available from: URL: http://www.cafb-acba.ca/documents/HungerCount_en_fin.pdf

[29] Hillemeier MM, Lynch J, Harper S and Casper M. Data set directory of social determinants of health at the local level. Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention; 2004.

[30] Putnam R, Leonardi R, Nanetti R. Making democracy work: Civic traditions in modern Italy. Princeton NJ: Princeton University Press; 1993.

[31] Elections Canada. Official voting results: Thirty-eigth general election. Ottawa: Elections Canada; 2004. Available from: URL: http://www.elections.ca/scripts/OVR2004/default.html

[32] Elections Canada. Official voting results: Thirty-ninth general election. Ottawa: Elections Canada; 2006. Available from: URL: http://www.elections.ca/scripts/OVR2006/default.html

[33] Elections Saskatchewan. Statement of votes: Twenty-sixth provincial general election. Regina: Elections Saskatchewan; 2008. Available from: URL: http://www.elections.sk.ca/pdfs/stat-of-votes-26.pdf

[34] City of Saskatoon. Elections: City-wide results. Saskatoon: City of Saskatoon; 2007. Available from: URL: http://www.saskatoon.ca/org/clerks_office/elections/election_results_2006/city_wide.asp

[35] Statistics Canada. The Daily, November 1, 2007. Charitable donors [online]. 2007 [cited 2008 Oct 22]. Available from: URL: http://www.statcan.ca/Daily/English/071101/d071101c.htm

[36] Graff L. Volunteer for the health of it: Report of the findings from a health promotion grant funded by the Ontario Ministry of Health. Ontario: Volunteer Ontario; 1991.

[37] Community University Institute for Social Research. Tracking quality of Life in Saskatoon: 2001-2004-2007. Saskatoon: CUISR; 2007.

[38] Hall M, Lasby D, Gumulka G, Tryon C. Caring Canadians, involved Canadians: Highlights from the 2004 Canada survey of giving, volunteering and participating. Ottawa: Imagine Canada, Statistics Canada; 2006. Available from: URL: http://www.givingandvolunteering.ca/pdf/CSGVP_Highlights_2004_en.pdf

[39] Canadian Institute for Health Information. Improving the health of Canadians: Mental health, delinquency, and criminal activity. Ottawa: CIHI; 2008.

[40] Statistics Canada. Crime statistics in Canada, 2007. Ottawa: Statistic Canada; 2007. Catalogue no. 85-002-XIE. Vol 28. No. 7.

[41] Saskatoon Police Service. 2007 environmental scan. Saskatoon: Saskatoon Police Service; 2007.

[42] Sourander A, Jensen P, Ronning J, Elonheimo H, Niemela S, Helenius H, et al. Childhood bullies and victims and their risk of criminality in late adolescence. Arch Pediatr Adolesc Med 2007;161:546-552.

[43] Nansel T, Overpeck M, Haynie D, Ruan J, Scheidt P. Relationships between bullying and violence among US youth. Arch PediatrAdolesc Med 2003;15:348-353.

[44] Nansel T, Craig W, Overpeck M, Saluja G, June R. Cross-national consistency in the relationship between bullying behaviours and psychosocial adjustment. Arch Pediatr Adolesc Med 2004;158:730-736.

[45] Feder L. Bullying as a public health issue. Int J Offender Ther Comp Criminol 2007;51(5):491-494.

[46] Saskatoon Health Region. Public Health Services. School Health Survey Saskatoon, SHR; 2007. Custom tabulations.

[47] Lemstra M, Neudorf C, Beaudin G. Health disparity knowledge and support for intervention in Saskatoon. Can J Public Health 2007;98(6):484-488.

CHAPTER 6

Physical Environment

This natural wetland is located near Clavet, Saskatchewan.

HIGHLIGHTS

Physical Environment

Water Quality

- Saskatoon Health Region's (SHR) rural communities have seen an increase in Precautionary Drinking Water Advisories and Emergency Boil Water Orders from 6.1% in 2003/04 to 17% in 2007/08. The increase coincides with increased testing, and tends to confirm chronic seasonal problems rather than identify new problems.
- Since 2004 there has been a substantial increase in the percentage of waterworks with certified operators in Saskatchewan.
- The Drinking Water Quality Index rates Saskatoon's waterworks as "consistently meeting or exceeding regulatory standards" for drinking water.
- Saskatoon's level of water fluoridation has decreased steadily over the last 10 years and sits below optimal levels recommended by Health Canada. In 2005, 83% of SHR residents had access to fluoridated water, but only 1% of SHR residents had access to optimal levels (0.8 mg/l) of fluoride in their water.

Air Quality Good

- Air quality is considered good to excellent most of the time in Saskatoon. While this is good news, those with respiratory health problems will continue to experience concerns from time to time.

Soil, Pesticides and Waste

- In 2006, 57% of Saskatoon households used chemical fertilizers and 46% used pesticides resulting in the second highest usage of all census metropolitan areas in Canada.
- While recycling has increased in Saskatoon, waste disposal rates and total waste tonnage in the landfill increased 60% between 2001 and 2007.
- Saskatoon residents do not compost as much as other national counterparts (22% compared to 68% in Halifax for example).

Impacts of Climate Change on Health Cannot be Ignored

- Adverse health outcomes from climate change are likely to be observed within our lifetime. The elderly, children, people with underlying health conditions and people of lower socioeconomic status are likely to be more adversely affected than the rest of the population.
- 86% of Saskatoon residents who work outside the home travel to work by motor vehicle, and 49.6% travel five kilometres or less. Given that transportation accounts for 40% of greenhouse gas emissions (GHGs), this is of concern.

Our health and well being is intimately connected to our physical environment which in turn is influenced by population density, land-use patterns and human behaviour. This chapter examines some of the latest available data for the most important indicators of physical and environmental health including water, soil and air quality. The role of climate change, with its overall impact on health now and into the future is also noted throughout this chapter. Most of the sub-regional data available for this chapter centres on the city of Saskatoon.

Water

Access to good quality water is essential to health. Water quality is based both on a healthy ecosystem and sound monitoring and treatment practices.

Water Sources

As of 2007, there were four types of water systems in SHR:

- 83 municipal systems regulated by the Ministry of the Environment (MOE);
- 135 small public water supplies regulated by SHR Public Health Services (PHS);
- communal systems taking water from established pipelines (potable and non-potable) which may be regulated or non-regulated and;
- private water systems served by wells or surface water supply that is unregulated.

The majority of SHR residents receive their water from surface supplies. Groundwater is the main source for many of SHR rural communities as well as for about 43% of Saskatchewan's population.[1]

Water Quality

A good measure of the quality of surface and groundwater is the Surface Water Quality Index (SWQI) rating.[2] It evaluates water quality parameters against the Saskatchewan Surface Water Quality objectives. In 2005, the SWQI rated both the North and South Saskatchewan rivers as 'Good to Excellent', similar to ratings between 1996 and 2001.

The Drinking Water Quality Index (DWQI) is similar to the SWQI and is used to rate quality of drinking water of the systems regulated by the Ministry of Environment (MOE). The DWQI is based on ion, metal and chemical analysis from samples submitted by communities (does not take into account bacteriological quality, turbidity and fluoride). According to DWQI findings, the City of Saskatoon (regulated by MOE) whose waterworks serve many outlying communities, consistently meets or exceeds regulatory standards for drinking water quality.[3] A list of communities served by the City of Saskatoon waterworks is found in Appendix 8.

Lead Levels in Drinking Water

Lead may impact human health, especially in small children. Health Canada has set a limit of 0.010 mg/L of lead in drinking water. As with other municipalities with aging distribution systems, service connections cause some concern. In 2008 the City of Saskatoon issued a notice to residents in response to this concern. The drinking water leaving the Saskatoon Water Treatment Plant and in the distribution system is virtually lead free. The lead level when drinking water enters the distribution system is less than 0.002mg/L or five times lower than the Health Canada limit. However, lead may be present in household tap water due to its presence in the service connection or in household plumbing

Effects of Climate Change on Water Quality and Supply

Extreme rainfall events, such as the flooding in the South Saskatchewan River basin in 1995 and 2004, have been linked to climate change.

Temperature increase may result in:

- Contamination of water supply.
- Water scarcity which influences agriculture, land-use patterns and industry.
- Decreased river stream flow and erosion which can cause eutrophication of water bodies with increased pathogen loads.

Changes in winter precipitation:

- May have substantial impact on surface water sources like the South Saskatchewan River, which supplies the City of Saskatoon, Humboldt and Wakaw.

systems containing lead, including solder and brass fittings. Small amounts of lead can dissolve into drinking water when it sits in household plumbing. In Saskatoon, water is treated so that it leaves a deposit which coats the plumbing system, and along with other water quality characteristics, may help reduce water contact with lead service connections or lead in plumbing systems.[4]

The City of Saskatoon has provided residents in older parts of the city with advice on how to minimize exposure and is continuing work on the issue as this report is being finalized.

Water Monitoring

A 2006 environmental scan in Saskatchewan found important issues that can affect drinking water quality. Water is classified as potable (drinking water quality) or non-potable (non-drinking water quality). Non-potable sources are not inspected or tested. Potable sources are inspected and tested on a quarterly basis and additional samples are required if bacteria are present.

Municipalities have the option to provide potable or non-potable water and can choose to provide a non-potable water supply. Compliance with testing requirements involves a significant cost to municipalities and the more testing the higher the cost. In 2002 provincial guidelines allowed municipalities to change classification of their water sources from "potable" to "non-potable" resulting in many municipalities reclassifying to "non-potable," thus by-passing inspection and sampling requirements.

Ensuring a safe water supply in SHR requires water source protection, sound waterworks infrastructure and monitoring. Provision of safe drinking water depends, among other things, on the knowledge of waterworks operators. Inadequate knowledge and monitoring can lead to contamination with serious results as was shown in the 2000 Walkerton Ontario E. coli outbreak and the 2001 cryptosporidium outbreak in North Battleford Saskatchewan. The MOE reported that as of March 31, 2007 98.9% of communities with human consumptive waterworks have operators that have achieved some level of certification, a significant increase from 54.3% in 2004.[5]

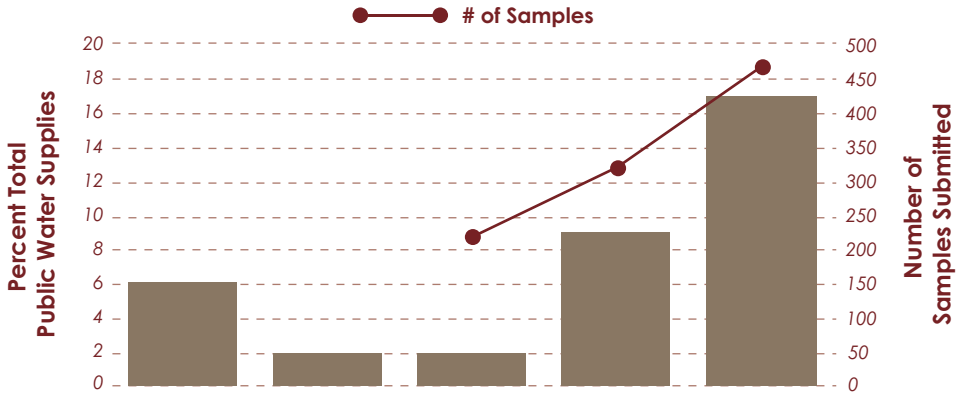
In addition to certification for waterworks operators, regulated public and municipal water supplies also undergo annual inspection. The MOE has the authority to require water system operators to issue Precautionary Drinking Water Advisories (PDWAs) to the public in situations where water quality may pose a risk to consumers (e.g. initial start up of new water pipelines, inadequate treatment or operational concerns). The Medical Health Officer has authority under the Public Health Act (1994) to issue PDWAs or Emergency Boil Water Orders (EBWOs) where water quality monitoring reveals an immediate health risk to consumers (e.g. presence of E. coli contamination or a series of samples showing the presence of bacterial contamination). When bacterial coliforms are identified in water samples, more samples are required over a set period until results indicate the problem has passed.

The percentage of PDWAs and EBWOs in SHR has risen from 6.1% in 2003/04 to 17% in 2007/08 (Figure 6.1). This percentage increased at the same time as the number of samples has risen; more problems are found as more testing is done. The costs associated with testing are substantial and do not necessarily reflect new problems, rather they tend to confirm chronic seasonal problems.

Testing water doesn't protect and prevent disease from occurring. Treatment to improve and control the quality of the water does prevent and protect people from disease.

Brent Latimer, Public Health Inspector, SHR

Figure 6.1: Percentage of PDWA and EBWO of Total Public Water Supplies and Number Samples Submitted, Saskatoon Health Region, 2003/04 to 2007/08



	2003/04	2004/05	2005/06	2006/07	2007/08
Percent PDWA & EBWO of Total Public Water Supplies	6.1	2	2	9.1	17
Number of Samples Submitted	n/a	n/a	221	323	471

Source: Public Health Services, Saskatoon Health Region

A Closer Sub-Regional Look

The number of PHS-regulated public water supplies in SHR decreased from 260 in 2004 to 135 in 2007. The decrease is not likely due to closures, but rather a shift in status from potable to non-potable designation. While the number of MOE-regulated water systems has increased since 2004, the increase is unlikely to account for the majority of change.

Given the decline in regulated water supplies, routine usage of non-inspected sources is a key concern in SHR. Rural communities with very small waterworks, (i.e., less than 100 people), and stand-alone water supplies (RM wells), often lack the financial resources to meet water quality standards despite efforts by SHR and MOE to assist them in achieving compliance at a low cost. When faced with water facility closure due to sub-standard measurements, many households and small communities may choose to replace their water with unregulated sources.

Protecting the Water Supply - Wastewater Management

Wastewater management has important consequences for water safety. Storm waste runoff can also influence water quality in rivers. Occasionally storm water overwhelms treatment processes which results in raw sewage entering the river. When the treatment plant has been overwhelmed the situation is usually dependent on a combination of factors: weeping tiles from homes tied into the sanitary sewer, groundwater infiltration and sanitary street manholes allowing some storm-water to enter the sanitary system. The City of Saskatoon currently treats the storm water that enters through the sanitary system and monitors approximately half the other storm water runoff points that enter the river. The City's Spill Response Program includes deployment of staff for immediate sampling, floating dams, and a call-out system that includes notification to MOE and PHS.

People aren't aware of water safety and don't consider water as a health determinant. I spoke with a lady who has been using surface water from a slough for 30 years, not realizing that it wasn't a safe source. When she needed a safe source for a facility supply and contacted us she suddenly realized how much about water safety she wasn't aware.

Public Health Services staff member, SHR

Nature's Natural Water Filters

Natural areas within a region or community help to ensure a healthy sustainable community as well as a healthy ecosystem. In addition to the direct role monitoring and wastewater management can play in assuring water quality, natural wetlands are important filters and reservoirs that protect against flooding, and in turn, against water contamination.

Impacts of Wetland Loss and Water Quality

A recent study in the St. Gregor area of SHR compared wetland area in 1974 vs. 2002 and showed 90% loss of wetland area representing 11,000 acres. Upland acres were also reduced by over 4,000 acres for a combined total loss of 15,000 acres. Wetland and upland losses of this magnitude could significantly affect the ability of the land to filter pollutants and thus impact water quality and health in SHR.[6]

A Closer Sub-Regional Look

In Saskatoon, wetland conservation is at risk due to the increased rate of housing development. The City of Saskatoon is currently undertaking a study to guide the development of a new wetland policy. A critical component of the study will be an inventory of wetlands within the city limits.

Conserving Water Resources

Water conservation is an important indicator of environmental stewardship. If ignored, some experts estimate an annual flow reduction of the South Saskatchewan River at Lake Diefenbaker as high as 8.5% by the 2050s. This would result in higher concentration of pollutants, leading to increased treatment and capital costs for improved treatment technologies. Water scarcity can also result in abandonment of major and costly water infrastructure.[7]

Did You Know?

> Average provincial water consumption decreased in 2005 to 72.2 imperial gallons (328 litres) per capita per day, a decrease of 10% since 2001.[1] Average daily consumption for Saskatoon's residential customers was 228 litres.[1]

> With added focus on water conservation the projected decrease in the South Saskatchewan River could be offset. See the Progress on Recommendations Since 2004 section of this report on our website for information on conservation efforts. (www.saskatoonhealthregion.ca)

Fluoridated Water: Protecting Oral Health

Water is also closely linked to oral health. Adding fluoride to drinking water is a cost-effective method of reducing oral caries. The optimal level of fluoridation is a measurement in milligrams per litre (mg/L) and expresses the amount of fluoride recommended in drinking water to prevent dental caries. The optimal level set by Health Canada is 0.8mg/L.

In 2003-04, 87% of kindergarten and Grade 1 children in SHR lived in communities with water fluoridation. Table 6.1 shows substantial differences in dental health measures for fluoridated and non-fluoridated communities. Children in communities with fluoridated water have a deft/DMFT[a] of 1.9 compared to 2.42 for children in non-fluoridated communities: 58.9% of children were cavity free in fluoridated communities while in non-fluorinated communities, 47.8% were cavity-free. Children in non-fluoridated communities have 5% more current caries than those living in fluoridated communities.[8]

I see many young children and babies in my work who have extensive early childhood caries… how much is related to poor dental care and diet and how much is related to fluoridation levels in the water? If we can do something that makes an impact on all of our population, regardless of socioeconomic level, and we can help reduce the cost and pain of caries, we should be doing it!

Public Health Services staff member, Saskatoon Health Region

Table 6.1: Dental Health Measures in Children, Saskatoon Health Region, 2003-04

Dental Health Measure	Community Water	
	Fluoridated n (%)	Non-fluoridated n (%)
Average *deft/DMFT	1.9	2.4
Current Caries	802 (15.5)	150 (20.7)
Cavity-free	3054 (58.9)	346 (47.8)
Total Screened	5185	724

Source: Public Health Services, Saskatoon Health Region

A Closer Sub-Regional Look

In 2005, 83% of SHR residents had access to fluoridated water but only 1% of residents had access to optimal levels of fluoride[9] as defined by Health Canada (Figure 6.2). Between 1998 and 2003 there was a 7% increase in the incidence of early childhood caries in SHR, including Saskatoon children. Children screened in 2003 would not have had access to optimal levels of fluoride in the drinking water during their first five years of life, which may have contributed to the increase in dental caries.

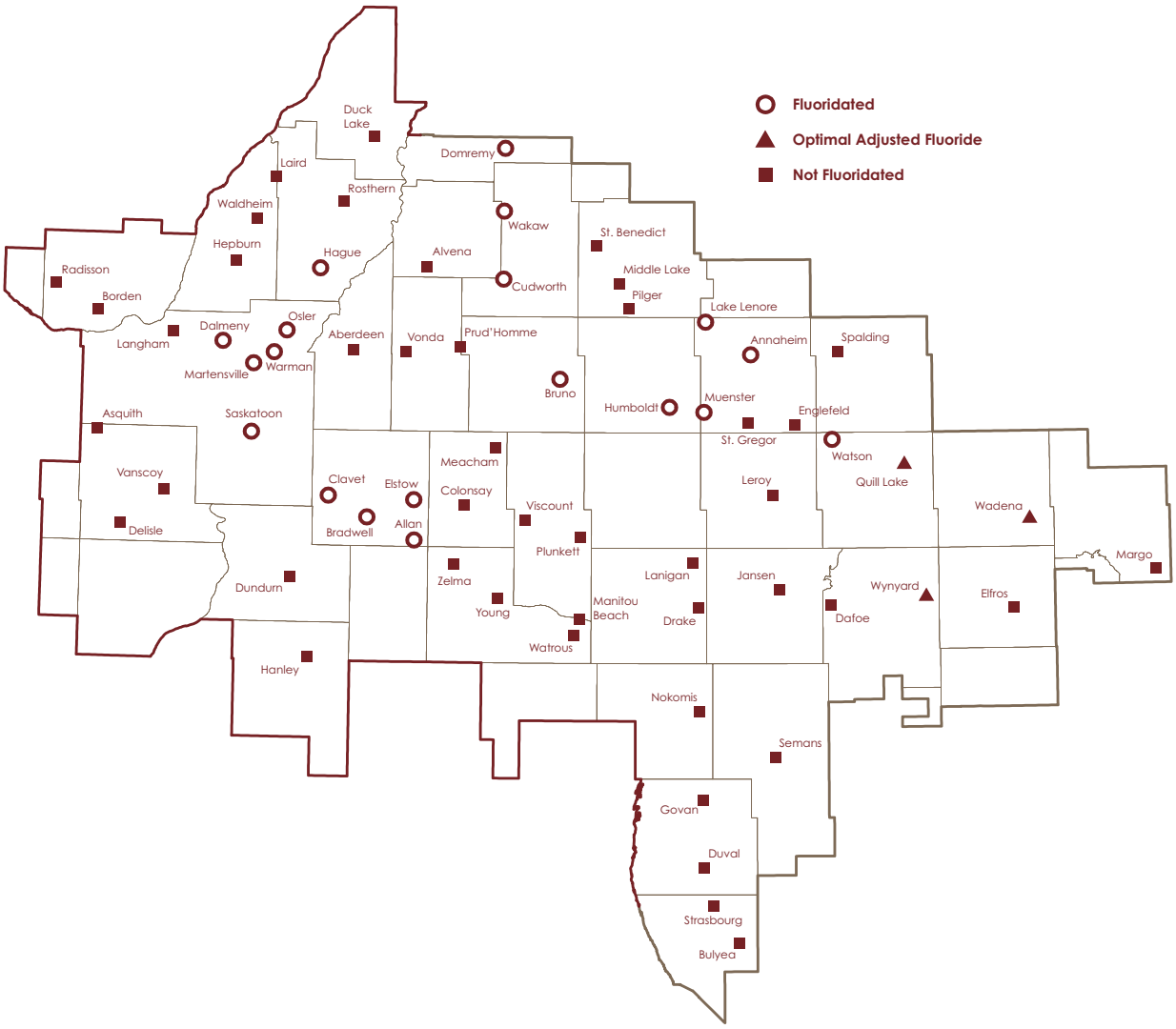
In Saskatoon, fluoridation levels have decreased since 1998, below the optimal level recommended by Health Canada (Figure 6.3). The City of Saskatoon has decreased levels due to consumer concerns. In 2008, an expert group commissioned by Health Canada recommended that the level in drinking water systems be set at 0.7 mg/L rather than the previous Health Canada guideline of 0.8-1.0 mg/L.[10] Health Canada, in light of this work, is considering resetting the recommended optimal level. Despite the Health Canada recommendations, there are only maximum fluoride limits set by regulatory agencies.

If the scientific evidence proves the optimal level of fluoride . . . then the optimal level should be followed; to do less is a waste of taxpayers money.

Public Health Services staff member, Saskatoon Health Region

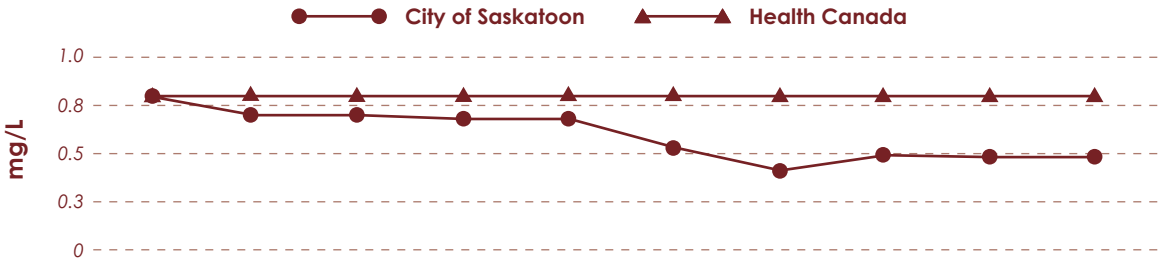
[a] *Deft/DMFT is a universal indicator of oral health that measures the number of decayed, extracted and filled primary teeth and the number of decayed, missing and filled permanent teeth. Example: O is good oral health with no disease; the higher the number is, the poorer the oral health.*

Figure 6.2: Water Fluoridation in Saskatoon Health Region Communities, 2005



Source: Dental Health Screening Program, Public Health Services, Saskatoon Health Region 2006

Figure 6.3: City of Saskatoon Water Fluoridation Levels, 1998-2007



	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
City of Saskatoon	0.80	0.70	0.70	0.68	0.68	0.53	0.41	0.49	0.48	0.48
Health Canada	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80

Source: City of Saskatoon, Health Canada

So What's the Bottom Line?

Water Quality: is a concern in rural SHR. With the number of regulated public water supplies decreasing in our health region, unregulated sources are on the rise, which threatens quality drinking water in many communities. Loss of wetlands also poses a threat to the quality of water in these areas.

Wastewater Management: has important consequences for water safety in Saskatoon. While municipal water monitoring and treatment programs are in place, storm water can overwhelm treatment processes and urban development of natural wetlands may result in further problems with storm and sanitation systems.

Water Fluoridation: Saskatoon, like many communities across Canada, has decreased steadily over the last ten years and sits below optimal levels set by Health Canada which may have negative impacts on oral health.

Soil, Pesticide Use and Waste Generation

Waste generation and pesticide use influence soil quality and potentially, human health. Babies and young children may be at greater risk from the effects of pesticides because they are more likely to play on grass, put plants or hands in their mouths and have smaller body mass than adults. People also inadvertently come into contact with pesticides in other ways such as lawn herbicides being tracked indoors, produce containing traces of pesticides, and active ingredients in some pesticides volatilize into the air. A prudent approach to health is to decrease the use of pesticides, particularly where their use is for cosmetic reasons only, as for lawn weed control or in gardening.

Pesticides and Health

A growing body of evidence links pesticide exposure with the potential for neurological, immune, respiratory, skin and reproductive health effects.[12] Some childhood and adult leukemia, childhood brain cancer, non-Hodgkins lymphoma, prostate cancer and certain soft tissue sarcomas may be linked to environmental carcinogens.[13]

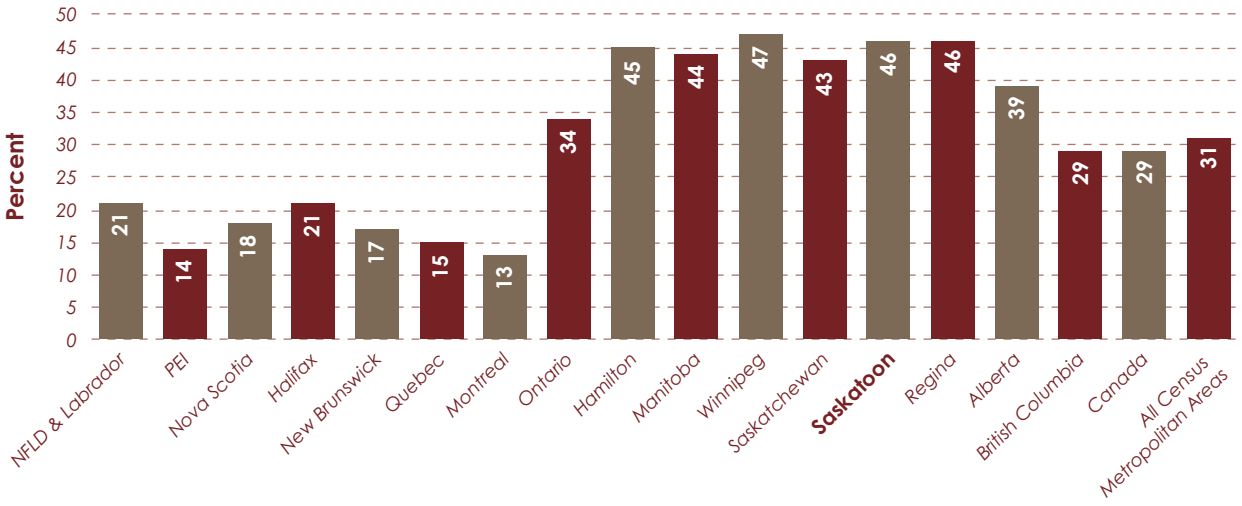
Pesticide Use

In Canada, pesticides are regulated by the Pest Management Regulatory Agency (PMRA), a branch of Health Canada. Saskatchewan is one of the heaviest users of garden fertilizers and pesticides. In 2005, 46% of Saskatchewan residents used fertilizers and 43% used pesticides[b] on lawn or garden, the highest of all provinces and considerably higher than eastern Canada.[11] This represents an increase of 6% since 1994.

A Closer Sub-Regional Look

Looking at metropolitan areas alone, 57% of Saskatoon households used chemical fertilizers and 46% used pesticides - Saskatoon had the second highest usage of all census metropolitan areas (CMAs) in Canada. The average usage of all CMAs was 34% for chemical fertilizers and 31% for pesticides. Figure 6.4 shows provincial pesticide use alongside selected metropolitan cities.

Figure 6.4: Percent of Households with Lawn or Garden Using Pesticides by Province and Selected Metropolitan Area, 2005



Source: Statistics Canada, Households and the Environment Survey

The public's concern over environmental exposures is growing. In a survey conducted by the Canadian Cancer Society in 2007, 77% of Saskatchewan residents indicated they were aware there may be a link between exposure to some components of pesticides and increased risk of some types of cancer.[13] Seventy-six percent of Saskatoon residents answered likewise.

In Saskatchewan, debates over pesticide bylaws have taken place in Regina (2002-03) and Saskatoon (2005). Both city administrations voted against implementing local pesticide bylaws, opting for education policies instead, which are yet to be evaluated. See the Progress on Recommendations Since 2004 section of this report on our website for details. (www.saskatoohealthregion.ca)

Pesticide Restrictions Across Canada

- Approximately 140 municipalities have stopped or restricted the use of pesticides, especially in parks and open spaces.[14]
- Quebec has prohibited most pesticides on lawns of public, semi-public and municipal properties and since 2006 on private and commercial properties, except golf courses. They are also prohibited inside and outside child care centres, elementary and secondary schools and specific rules must be observed when using authorized pesticides.[15]
- Ontario's proposed ban on the use and sale of lawn pesticides, will prohibit more than 300 pesticide products.[16]

[b] *"Pesticide" includes weed killer and fungicides. Stats Canada survey question: "Were any weed killers, pesticides or fungicides applied to your lawn/garden? Include fertilizes and pesticide mixes like 'Weed and feed'"*

A Growing Urban Waste Problem

Landfill gas, which is composed mainly of methane and carbon dioxide, is produced by the anaerobic decomposition of wastes. Greenhouse gases (GHGs) from the waste sector have increased 15% in Canada between 1990 and 2006 - slightly less than the population growth of approximately 18%.[17] In Saskatchewan between 1990 and 2003 waste emissions increased by 30%.[18]

Methane is a GHG that is 21 times more potent than carbon dioxide and responsible for 16% of global GHG emissions.[19] Cost-effective solutions now exist for capturing methane gas and converting it into clean energy. The ability to use landfill methane is partly dependent on the moisture content, age and size of a landfill. Regina is currently harnessing methane from their landfill for cogeneration. The City of Saskatoon harvests methane from the waste water treatment operation to heat the buildings at the Waste Water Treatment Plant. See the Progress on Recommendations Since 2004 section of this report on our website for further details. (www.saskatoonhealthregion.ca)

A Closer Sub-Regional Look

Waste disposal rates and total disposed tonnage for Saskatoon has increased between 1998 and 2007. After some reduction in 2001, waste disposal rates increased by about 60% to 151,491 total tonnage in 2007 or 674 kg per person per year,[20] despite having a fairly stable population over that period. Tonnage and kilograms per capita are predicted to decrease in 2008. The trend in waste disposal rates and tonnage is heavily influenced by the economy and construction, demolition and renovation, with the recent building boom in Saskatoon accounting for increases. In 2006, 54% of all sources of waste at the Saskatoon landfill were residential. Of residential waste 41% is made up of yard and food organics waste, 22% paper and 15% plastics.[20]

Recycling and composting can decrease waste generation. According to Statistics Canada, fewer Saskatoon residents composted (22%), compared to Halifax (68%) and St John (62%). Recycling trends are somewhat more positive. In 2006, 91% of Saskatchewan households had access to at least one recycling program, close to the Canadian average of 93%, but behind Prince Edward Island (99%) and Nova Scotia (96%). In Saskatoon, the recycling rate and total recycling tonnage has increased through recycling activities at City of Saskatoon depots and recycling through SARCAN Recycling and Cosmopolitan Industries. In 1999, the recycling rate for Saskatoon was 52 kg per person per year compared with 60 kg in 2006.[20] See the Progress on Recommendations Since 2004 section of this report on our website for City programs offered and future plans. (www.saskatoonhealthregion.ca)

Air Quality

The two main contributors to air quality concerns are suspended particulate matter (PM) and ozone. These and other contributors to air pollution are influenced by fuel usage, industrial processing, traffic patterns, agricultural activities and weather patterns. Air pollution disproportionately affects newborns and children, persons 65 and older and those with pre-existing respiratory and cardiovascular problems, like asthma or chronic obstructive pulmonary disease (COPD).[21]

Air Pollution and Health

> In 2008, an estimated 21,000 Canadians died prematurely from the effects of air pollution - mostly due to chronic exposure over a number of years but also as a result of acute short-term exposure.

> In Saskatchewan in 2008, it was estimated that air pollution would account for 70 premature deaths and 17,442 doctor's office visits.[21]

A Closer Sub-Regional Look

The Air Quality Index (AQI) is used to monitor long-term trends in chemicals and particulates in the air. The parameters taken into consideration when calculating an AQI are sulphur dioxide, carbon monoxide, ozone, nitrogen dioxide and fine particulate matter. The good news is that air quality is good at the Saskatoon monitoring station. Since 2004, Saskatoon's air quality has been rated as "good to excellent" between 98.7 and 99.8 percent of the time, with similar results for Regina and Prince Albert, based on an annual average.[22]

In 2007/08 both Saskatoon and Regina's index rating were 15, compared to Prince Albert with a rating of 11. A score of 0 to 25 is described as good.[23]

Although prairie cities have low levels of air pollution, and are below Canadian-wide standards for ozone, a 'no change' observed in ozone levels suggests a corresponding 'no improvement' in population health risk associated with ambient ozone levels.[24] This means that the current level of associated respiratory health problems will continue unabated or possibly grow.

So, What's the Bottom Line?

Pesticide Use: Saskatoon residents, as some of the highest users of pesticides across Canada, may be putting their health at risk given the growing body of evidence that links pesticide exposure to potentially negative neurological, immune, respiratory, skin and reproductive health outcomes.

Urban Waste: Increased rates of waste disposal in Saskatoon may mean a greater production of GHGs which threatens the environment.

Air Quality: It is encouraging that Saskatoon's air quality is good to excellent. While this is a positive sign, the impact of air pollution on respiratory health should not be discounted.

Health and Climate Change

Across the globe climate change is an established fact. The 2007 Assessment of the Intergovernmental Panel on Climate Change cites observational evidence from all continents and most oceans that many natural systems are being affected by regional climate changes especially temperature increases, which are higher in northern latitudes.[25] Much of this is due to the increase of greenhouse gases (GHGs) as a result of human activities since the industrial revolution. Agriculture, fossil fuel use and land-use change are believed responsible for escalating atmospheric concentrations of carbon dioxide, methane and nitrous oxide, the three top GHGs.

On the Prairies, increased dryness has major social and economic implications. Projected patterns of warming at the regional level will likely result in further ecosystem damage. Increases in extreme hot weather and storms are very likely.

The human health impacts of climate change are not likely to be evenly distributed regionally. The elderly, children, people with underlying health conditions and people of lower socioeconomic status will likely be vulnerable groups. People on fixed or low incomes may have more challenges to prepare for and deal with heat-related stress. They may

Potential Impacts of Climate Change on Our Health

- Potential increases in deaths and injuries from storm events due to increased drought and flooding.
- Heat-related mortality in the elderly, chronically sick, very young and socially isolated.
- Negative health burdens from air pollution and increased particulate matter including mortality, hospital admissions and emergency department visits.[1]
- An increase in vector-borne diseases (e.g., Lyme Disease and arthropod-borne diseases like West Nile virus) as a result of over-wintering survival and changing habitat.
- Increases in food and water borne disease due to contamination of surface and groundwater quality.
- Water shortage for many parts of the world leading to food shortages - with attendant malnutrition and migration-related health events.

also be unable to afford recovery from storm events. Children may be more affected than adults by pollutants and toxin concentrations from drought. Aboriginal peoples with traditional livelihoods are further at risk from ecosystems changes. People with underlying cardiovascular and respiratory conditions are likely to have lower heat tolerance and increased vulnerability to other environmental stresses.[7]

Greenhouse Gases

Burning fossil fuels releases air pollutants that produce GHGs. The single most significant global environmental challenge is climate change, brought about by GHG emissions.[26] In 1997, under the Kyoto Protocol, 160 countries agreed to work on the global challenge.

Saskatchewan is an intense user of energy. Climate, long travel distances, and agriculture and mining account for much of our energy consumption. While overall emissions are moderate compared to Alberta, Ontario and Quebec, Saskatchewan GHG emissions have increased substantially between 1990 and 2005 (75% compared to Alberta's 35% increase). When considered on a per capita basis, Saskatchewan produces a disproportionate share of greenhouse gas. When the Kyoto Protocol was signed and ratified Canada's target was to decrease emissions to 6% below 1990 levels by 2013[27] - about 26% reduction from business-as–usual projections. Canada's climate change policy changed in 2006 as Canada will[28] no longer honour the Kyoto agreement, and a new target has been set by the current Canadian government at a 20% reduction by 2020.[28] While the current Saskatchewan government has adopted the previous government's targets, it has stated that it may be unable to stabilize emissions by 2010.[29] See the Progress on Recommendations Since 2004 section of this report on our website for more information. (www.saskatoonhealthregion.ca)

Effects of Climate Change on Agriculture

- Negative impacts include drought, decreased ground cover, extreme hydrological events, increased forest fire activity and pest activity.
- Although positive impacts might include longer growing seasons, increased crop yields, more crop diversity and more rain leading to extending arable land in some prairie regions it is likely that the negative effects of climate change on human health will outweigh any positive agricultural impacts locally.

A Closer Sub-Regional Look

Between 1990 and 2003 Saskatoon saw a GHG increase of approximately 45% in community emissions[c] and 23% in municipal emissions[d, 30]

Municipal emissions reflect infrastructure needs of the community, for example buildings, water and wastewater operations and lighting. Community emissions include the industrial sector, residential, and commercial and transportation sectors. Transportation accounts for 40% of GHG emissions.[31]

In 2005, after completing the greenhouse gas emissions inventory, the City of Saskatoon set reduction targets and have implemented a number of initiatives to meet those targets. See the Progress on Recommendations since 2004 section of this report on our website for more details. (www.saskatoonhealthregion.ca)

Urban Form and Sustainability

Urban form is the physical design and layout of a city. Sustainability refers to the ability to maintain resources to support a given lifestyle. Urban form and sustainability will influence climate change in the long-run.

Many employers can change their employee's attitudes by creating a culture that supports efforts for active transportation, like flexible work hours.

Public Health Services staff member, SHR

[c] *Includes residential, commercial, industrial, transportation and community waste.*
[d] *Includes buildings, vehicle fleet, streetlights, water and sewage, corporate waste.*

A number of studies have investigated the relationship between urban form and health. Research has consistently found that sprawling land use patterns are correlated with increased time spent in cars and a higher likelihood of sedentary, overweight and obese residents, so urban form not only has an impact on the environment but also on health and lifestyle choices.[32]

A Closer Sub-Regional Look

Distance, weather and access to public transportation greatly influence commuting patterns. Based on the 2006 Census, the median distance to work in Saskatoon was five kilometres. Compared to urban SHR residents, rural residents have longer travel distances.

There is almost always a quieter, safer route available. People are intimidated to bike to work because they always feel they can only use the busy car-oriented routes.

Public Health Services staff member, SHR

Table 6.2 shows that 86.2% of Saskatoon residents who work outside home travelled to work by motor vehicle, with 49.6% of workers travelling five kilometres or less. Abbotsford B.C. has the highest proportion of car users at 93% while the Canadian average is 80%. While important initiatives like Roadmap 2020 have established car-pooling programs with participation by City of Saskatoon and SHR employees, most urban residents still travel to work in personal vehicles, many as sole passengers.

Table 6.2: Proportion of Workers Using a Car to get to Work and Median One Way Commuting Distance Travelled, 2006

	Percent of Workers Using Car to get to Work	*Commuting Distance (percent of workers)*		
		5 km or less	*5 to 25 km*	*> 25 km*
Abbotsford, BC	93.2	40.3	35.3	24.4
Saskatoon, SK	86.2	49.6	43.1	7.3
Regina, SK	87.7	55.4	39.8	4.8
Canada	80	35.3	54.3	10.4

Source: Statistics Canada Census.

Active Transportation

Active transportation - walking, cycling or taking public transit - is most likely to contribute to positive health outcomes for individuals and populations as a whole. Most transit use promotes physical activity as most involve some walking. Active transportation also plays a role in mitigating traffic congestion, energy consumption, and meeting environmental goals.

I am rewarded with travel reimbursements if I use my car, however, when I ride my bike I am not reimbursed for its wear and tear.

Public Health Services staff member, SHR

As noted in Chapter 7, Health-Related Behaviours, obesity is a major concern in SHR and across Canada. It is estimated that only 46% of adults in SHR are moderately or physically active. Chapter 3, Morbidity and Mortality, highlights that diseases associated with sedentary lifestyles are among the leading causes of disability and death. Up to 10% of deaths among 20 to 64 year olds may be attributed to overweight and obesity.[33] Heart disease hypertension, stroke, diabetes, and depression are chronic diseases associated with inadequate physical activity. Walking or cycling to and from work, a store or the bus can help achieve the 30 minutes of moderate activity per day recommended by the Heart and Stroke Foundation to help prevent heart disease. At the same time walking and cycling contribute to a reduction in GHGs.

A Closer Sub-Regional Look

Table 6.3 shows percentages of the employed labour force taking an active mode of transportation to work. In 2006, 2.7% of Saskatoon employees cycled, while 6.3% walked and 4.2% took the bus. For rural SHR residents, a higher percentage of people walked to work, and fewer cycled. The percentage of each active mode has changed very little since 2001. It is important to note that while percentages have remained virtually the same, the absolute numbers of cyclists have increased by 8%. Saskatoon has the second-highest cycling rate per capita in Canada with about 2,860 people out of more than 117,000 commuters cycling to work.[34]

To change the trend many things must simultaneously work together. Active transportation suffers due to a lack of infrastructure, poor attitudes towards physical activity and our hectic lifestyles.

Public Health Services staff member, SHR

Table 6.3: Percent of Residents Using Active Transportation, Saskatoon Health Region, 2001 and 2006

	2001			2006		
	Transit	Walked	Biked	Transit	Walked	Biked
Saskatoon	4.7%	5.9%	2.8%	4.2%	6.3%	2.7%
Rural SHR	0.3%	9.1%	1.0%	0.3%	8.6%	1.2%

Source: Statistics Canada Census

In 2004, the City of Saskatoon conducted a citywide telephone survey of 500 residents. Of all respondents 55% strongly agreed and 32% somewhat agreed that public transit is important in the community because using transit improves the environment. For those who do take the bus, the transit system is well-utilized. A survey distributed to Saskatoon Transit riders in late 2004 indicated that 75% of those surveyed used the transit five to seven days per week See the Progress on Recommendations Since 2004 section of this report on our website for more details.[35] (www.saskatoonhealthregion.ca)

A Final "Foot-Note" - Our Ecological Footprint

Land use patterns and urban form influence the ecological footprint (EF) which is a measure of the demands people place on nature. The EF is one of the best indicators of sustainability as it accounts for and compares human consumption with nature's limited productivity.

EF analysis converts the consumption of food, energy and other materials to the equivalent area of biologically productive land and water that would be required to meet human consumption demands.

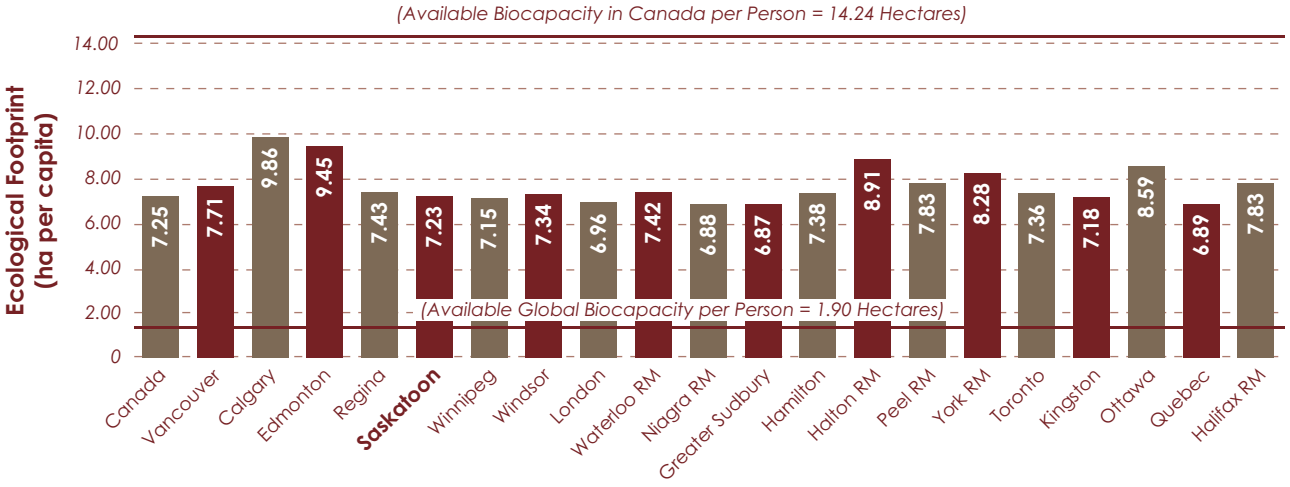
Canadians Ecological Footprint

> According to 2002 international comparisons, the average Canadian has the third largest ecological footprint in the world.[36]

A Closer Sub-Regional Look

Using data from household personal consumption, income per capita, household size, population density and energy consumption, the Federation of Canadian Municipalities studied the EF of 20 municipalities in 2004.[36] Figure 6.5 shows the average Canadian consumed 7.25 hectares of land and sea to sustain current needs. Saskatoon used 7.23 hectares, slightly below the average Canadian and much lower than Calgary or Edmonton residents. While we may think this is good news, in fact, Canadians consume a disproportionately large share of the Earth's natural capital capacity. The planet has only 1.9 hectares of nature to meet the needs of each person.

Figure 6.5: Canadian Municipal Ecological Footprints, 2005



Source: Canadian Federation of Canadian Municipalities

The City of Saskatoon's Development Plan contains policies which address urban form. A more compact urban form helps to curtail sprawling land use and reduce the EF. One opportunity for increasing urban density is brownfield development. A brownfield site is one that has a history of commercial or industrial activities and uses. Abandoned or under used industrial and commercial facilities are available for reuse, however development may be complicated by real or perceived environmental contamination.[37] Many brownfield sites are not necessarily contaminated. There are economic, social and environmental benefits of developing many of these vacant sites. Currently the biggest disincentive to brownfield redevelopment in Canada is the lack of any liability protection for subsequent purchasers who take on redevelopment. In Ontario, for example, a bill was passed to provide some liability relief to brownfield developers. Similar Saskatchewan legislation is lacking. See the Progress on Recommendations Since 2004 section of this report on our website for more details. (www.saskatoonhealthregion.ca)

Saskatoon Health Region's contribution to the EF of Saskatchewan is not insignificant. With more than 12,000 employees, the Region has an important role to play in protecting the environment. "From biohazard waste to faxing and photocopying, leftover cups of Jell-O and disposable gowns, hospitals can be among the worst offenders."[38] When it comes to disposable supplies patient safety is paramount, however contributions in other areas, such as motion-sensor light fixtures, programmable thermostats, solar paneling and other energy solutions need to be considered. See the Progress on Recommendations Since 2004 section of this report on our website for more details. (www.saskatoonhealthregion.ca)

So What's the Bottom Line?

Our physical environment poses many challenges from both a 'here and now' perspective and from a 'future impact due to climate change' perspective.

Urban Form and Sustainability: can play a key role in influencing both climate change and health. Saskatoon has more individuals travelling to work by motor vehicle compared to the Canadian average, though Saskatoon also has the second highest cycling rate in Canada. It can be argued that the national rate for active commuting modes is too low. Saskatoon seems to be on the right track for active transportation and needs to keep moving in this direction.

Saskatoon's Ecological Footprint: is similar to that of the Canadian average and represents a disproportionately large share of the earth's natural capital. As one of the largest employers in the province, Saskatoon Health Region has started some of the work that will be necessary for the greening of the Region. The importance of this work cannot be underestimated given the impacts on health.

References for Chapter 6

1 *Environment Canada .The nature of water-groundwater [online] 2008 [2009 Feb 20]. Available from: URL: http:///www.ec.gc.ca/water/en/nature/grdwtr/e_gdwtr.htm*

2 *Government of Saskatchewan. 2007-2008 Saskatchewan provincial budget. Performance plan. Saskatchewan Watershed Authority. Regina: Government of Saskatchewan; 2007. Available from: URL: http://www.swa.ca/Publications/Documents/SwaPerformancePlan2007to2008.pdf*

3 *City of Saskatoon. Saskatoon's water: 2007 annual water report [online]. 2007 [2009 Feb 20]. Available from: URL: http://www.city.saskatoon.sk.ca/org/water_treatment/water_treatment/water_treatment_home.asp*

4 *City of Saskatoon. Lead pipes and drinking water [online]. 2008 [2009 Feb 27]. Available from: URL: http://www.city.saskatoon.sk.ca/org/water_treatment/water_treatment/lead_pipes.asp*

5 *Saskatchewan Environment. 2006/07 annual report . Regina; Saskatchewan Environment; 2007. p.12.*

6 *Boychuk L, Saigeon L, Kornder M. Habitat loss in the Upper Qu'Appelle Basin: Implications for integrated watershed management planning. Proceedings of the Plain as the Eye Can See Conference on Managing Changing Prairie Landscapes; 2003 May 15-17; Regina, Saskatchewan. Available from: URL: http://uregina.ca/~radenbat/plainforum/PECSpresent/*

7 *Sauchyn D, Kulshreshtha S. Prairies. In: Lemmen D, Warren F, Bush E, Lacroix J, editors. From impacts to adaptation: Canada in a changing climate 2007. Ottawa: Government of Canada; 2008. Available from: URL: http://www.adaptation.nrcan.gc.ca/assess/2007/pdf/ch7_e.pdf*

8 *Hansen L, McLean L. Dental health screening program. Saskatoon: Saskatoon Health Region; 2006.*

9 *Dental Health Coordinators of Saskatchewan. Saskatchewan community fluoride data 2005. See report in I:\PopHealth\Reports\HSR 2008\Chapter 3 PhysicalEnvironment\Water Quality*

10 *Health Canada. Findings and recommendations of the fluoride expert panel (January 2007) [online]. 2008 [2009 Feb 27]. Available from: URL: http://www.hc-sc.gc.ca/ewh-semt/alt_formats/hecs-sesc/pdf/pubs/water-eau/2008-fluoride-fluorure/2008-fluoride-fluorure-eng.pdf*

11 *Statistics Canada. Households and the environment. Catalogue no. 11-526-XIE. Ottawa: Statistics Canada; 2006. p.23.*

12 *Sanborn M, Cole D, Kerr K, Vakil C. Pesticides literature review. Toronto: Ontario College of Family Physicians Report; 2004.*

13 *Canadian Cancer Society. Environmental carcinogens [online]. 2009 [2009 Feb 11]. Available from: URL: http://www.cancer.ca/canada-wide/how%20you%20can%20help/take%20action/advocacy%20what%20were%20doing/environmental%20carcinogens.aspx*

14 *David Suzuki Foundation. Lesson from Québec on how to ban lawn and garden pesticides [online]. 2008 [2009 Mar 10]. Available from: URL: http://www.rachel.org/en/node/6904 and http://thegreenpages.ca/portal/ca/2008/03/ontario_can_learn_from_quebecs.html*

15 *Développment Durable Environnement et Parcs Government du Québec. The pesticides management code [online]. 2006 [2009 Feb 17]. Available from: URL: http://www.mddep.gouv.qc.ca/pesticides/permis-en/code-gestion-en/index.htm*

16 *Forman G, Khan F. Ontario pesticide ban to be strongest in North America. Toronto: Canadian Association of Physicians for the Environment news release; 2008. Available from: URL: http://cape.ca//uploads/NewFolder/ontario_ban_press_release.doc*

17 *Environment Canada. Canada's 2006 greenhouse gas inventory: summary of trends [online]. 2009 [2009 Feb 11]. Available from: URL: http://www.ec.gc.ca/pdb/GHG/inventory_report/2006/som-sum_eng.cfm*

18 *Environment Canada. Provincial and territorial GHG emissions. Canada's greenhouse gas inventory overview 1990-2003 [online]. 2009 [2009 Feb 11]. Available from: URL: http://www.ec.gc.ca/pdb/ghg/inventory_report/2003_factsheet/2003Factsheet_e.cfm#s4*

19 *Environnent Canada. The power of methane gas. Environzine 2006 Jan 19. Available from :URL:http://www.ec.gc.ca/EnviroZine/english/issues/61/feature3_e.cfm*

20 *City of Saskatoon. City of Saskatoon waste and recycling plan. Saskatoon: City of Saskatoon; 2007. p.15.*

21 *Canadian Medical Association. No breathing room, national illness costs of air pollution [online]. 2008 [2009 Feb 17]. Available from: URL: http://www.cma.ca/multimedia/cma/content_Images/Inside_cma/Office_Public_Health/ICAP/CMAICAPTec_e-29aug.pdf*

22 *Government of Saskatchewan. 2008 annual report of Ministry of Environment. Regina: Government of Saskatchewan; 2008. Available from: URL: http://www.finance.gov.sk.ca/annreport/EnvrionmentAnnualReport200708.pdf*

[23] *Gray C. 2009 annual report of Ministry of Environment. Regina: Government of Saskatchewan; unpublished data.*

[24] *Environment Canada. Five year progress report, Canada-wide standards for particulate matter and ozone [online]. 2009 [2009 Feb 5]. Available from: URL: http://www.ec.gc.ca/cleanair-airpur/caol/pollution_issues/cws/toc_e.cfm*

[25] *Bernstein L, Bosh P, Canziani O, Chen Z, Renate C, Ogunlade D, et al.. Climate change 2007: synthesis report summary for policymakers. An assessment of the Intergovernmental Panel on Climate Change. Valencia, Spain: IPCC Plenary XXVII ; 2007.*

[26] *Government of Saskatchewan. Climate change [online]. 2007 [2009 Feb 5]. Available from: URL: http://www.environment.gov.sk.ca/Default.aspx?DN=9192fbe8-23fe-4077-ac7d-30b7b269bdbf*

[27] *CanadaOnLine. The Kyoto protocol issue in Canada [online]. 2006 [2009 Feb 5]. Available from: URL: http://canadaonline.about.com/od/environment/i/kyotoprotocol.htm*

[28] *CBC. Kyoto protocol FAQs [online]. 2007 [2009 Feb 3]. Available from: URL: http://www.cbc.ca/news/background/kyoto/#s7*

[29] *Wood J. Saskatchewan party government may miss climate target. The StarPhoenix 2008 Oct 23.*

[30] *City of Saskatoon. Energy and greenhouse gas management plan. Saskatoon: City of Saskatoon; 2007. Available from: URL: http://www.city.saskatoon.sk.ca/org/environmental_protection/GHG_Plan.pdf*

[31] *Environment Canada. Canada's 2005 greenhouse gas inventory; A summary of trends [online]. 2009 [2009 Feb 4]. Available from: URL: http://www.ec.gc.ca/pdb/ghg/inventory_report/2005/2005summary_e.cfm*

[32] *Lopez R. Urban sprawl and risk for being overweight or obese. Am J Public Health 2004; 94(9):1574-1579.*

[33] *Katzmarzyk PT, Mason C. Prevalence of class I, II and III obesity in Canada. Can Med Assoc J 2006;174(2):156-157. As cited in: Frank L, Kavage S, Litman T. Promoting public health through Smart Growth: Building healthier communities through transportation and land use policies and practices. Vancouver: SmartGrowth B.C.; 2006.*

[34] *Nickel R. Get moving, Saskatoon. The StarPhoenix 2008 Jun 14. Available from: URL: http://www.canada.com/saskatoonstarphoenix/news/story.html?id=e3cbac6c-6e60-455c-bde0-c0e98e1d30e2*

[35] *City of Saskatoon. Saskatoon transit strategic plan study. Saskatoon: City of Saskatoon; 2005.*

[36] *Wilson J, Anielski M. Ecological footprints of Canadian municipalities and regions. Edmonton: The Canadian Federation of Canadian Municipalities; 2005.*

[37] *Wikipedia. Brownfield land [online]. 2009 [2009 Feb 3]. Available from: URL: http://en.wikipedia.org/wiki/Brownfield_land*

[38] *Farquharson V. Code green, stat! The National Post 2008. Available from: URL: http://www.nationalpost.com/story.html?id-874376*

CHAPTER 7

Health-Related Behaviours

Children prepare nutritious food before a sharing circle, as part of a Saskatoon Health Region Building Health Equity clinic.

HIGHLIGHTS

Health-Related Behaviours

Smoking Rates Climb

- Saskatoon Health Region (SHR) smoking rates increased from 23.4% in 2005 to 26.2% in 2007. This is now significantly higher than the national rate of 21.9%.
- Second hand smoke exposure in public places in SHR and Saskatchewan decreased significantly since 2005.

Physical Inactivity a Concern

- SHR's physically active or moderately active population has decreased since 2003 from 51% to 46%.
- 2001-2005 data show that only 40% of SHR rural residents are physically active or moderately active, compared with almost 50% for urban residents.

Weight and Obesity Still a Major Issue

- Roughly half of the SHR population (49%) was overweight or obese in 2007, similar to Canada's rate (48%).

Healthy Eating Rates Low, Especially in Rural SHR

- In 2007, 36% of SHR residents ate five or more servings of vegetables and fruit per day; significantly lower than the Canadian average of 41%.
- 2001-2005 data show that only one in five rural SHR residents ate five or more servings of vegetables and fruit per day compared to one in three urban residents.

Alcohol Use a Hidden Public Health Problem

- About a quarter of SHR residents over the age of 12 reported binge drinking activity; about the same as the national average.
- Alcohol use is still the main cause of fatal motor vehicle collisions in Saskatchewan.
- 39% of children grades 5 to 8 in Saskatoon's core neighbourhoods[a] schools reported having tried alcohol compared to 15% across the city.

Factors Influencing Health Behaviours

Evidence shows that people's behaviours are a contributor to overall health status. Behaviours like drinking and driving, smoking and drug use can all have negative effects on health. On the flip side, eating nutritious foods, being physically active, feeling positive and getting enough sleep can all contribute positively to overall health and well-being.

While health behaviours do have an important role to play in overall health, previous chapters in this report emphasize that social and physical environments - the physical and social conditions within which we live - strongly influence health and in turn, individual choices related to healthy behaviours.

Impact of Social and Physical Environments on Health

It has been estimated that 60% of individual health outcomes are dependent on social and physical environments.[1]

[a] *See Technical Appendix for a definition of "core neighbourhoods"*

Socio-economic status, including income, education and employment, can affect behaviour. There are well known relationships between self-rated health and lower income levels so that the poorer an individual is, the less likely he or she is to feel in excellent health.[2] The more highly educated a person is, the less likely they are to smoke or drink to excess. The point here is that socio-economics and all of the social determinants of health examined in Chapter 5 have a real impact on health behaviours.

Choosing to live a healthy life becomes more challenging as individuals struggle with feeling isolated from other people, when they don't know how to read well enough, or have enough money to pay for food or shelter. Every day can be an uphill battle and each of the lifestyle "choices" become an additional weight.[3]

Many public health interventions can be implemented population wide to affect individual behaviours, like smoke free public place bylaws. While these interventions are useful for changing societal norms, they typically work best for those that need it the least, such as higher socio-economic groups, as they have the supports to more easily make new lifestyle choices. The greater challenge is to affect change in those most disadvantaged, so that health inequalities do not increase and the gap begins to narrow.

Much of the data in the following sections comes from the Canadian Community Health Survey (CCHS) and is only available at the regional level, except where indicated.

Source: Public Health Services, Saskatoon Health Region, 2009

We can't solve all problems by providing access to health-care, we often need to go even more upstream i.e. income affects motivation and health behaviours, leading to increased life expectancy.

Public Health Services staff member, SHR

Self-Reported Health

Self-reported health is an indicator of an individual's perceived health and complements other health status indicators by accounting for factors such as the existence of disease and its severity.[4]

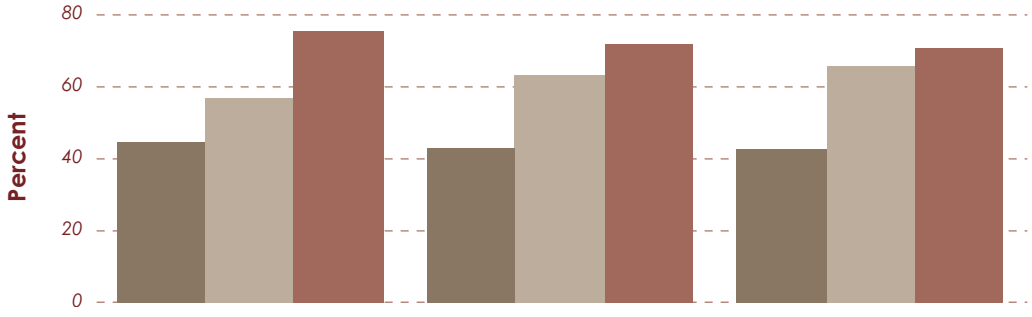
In 2007, 59.1% of SHR residents reported their health as excellent or very good. These rates are about the same as national (59.6%) and provincial (56.2%) rates (see Appendix 9) and are consistent with a 2007 Saskatoon Quality of Life survey.[5]

Similar to provincial and national rates, SHR males reported slightly higher self-perceived health than females in 2007 (61.3% vs. 56.9%). In 2005, a higher percentage of younger persons in SHR rated their health as excellent or very good than older respondents (69.9% of 12 to 20 year olds compared to 33.4% of 65 and over).

A Closer Sub-Regional Look

Lower income SHR residents were less likely to report excellent or very good health compared with those in middle and high income groups (see Figure 7.1). In 2005, 43% of low income respondents rated their health as excellent or very good compared to 66% and 71% in middle and high income groups respectively. Middle income respondents have improved the most out of any of the income groups in terms of self report health. There was no significant difference between self report health among the middle or high income respondents in 2005. Further, the gap between SHR's low and high income groups has not changed substantially between 2001 and 2005.

Figure 7.1: Percent of Individuals Aged 12 and Older, Self Reporting Excellent or Very Good Health by Income, Saskatoon Health Region, 2001-2005



	2001	2003	2005
Low Income	44.9	43.4	43
Middle Income	57.1	63.6	66
High Income	75.9	72.2	71

Source: Canadian Community Health Survey.

Self-Reported Mental Health

Both physical and mental health contribute to a person's overall health. Self-reported mental health provides an indication of the possible presence of a mental disorder, mental or emotional problems and distress.[6] Aspects of mental health are also reported in Chapter 3, Major Causes of Mortality and Morbidity and in Chapter 5, Social Environment.

In 2007, SHR residents reported a relatively high level of excellent or very good mental health (71.6%), similar to national (72.7%) and provincial (70.7%) rates (see Appendix 9). Rates were consistent across all age groups.

Life Stress

Stress is a part of daily life but too much stress, especially stress that people have little control over, can contribute to serious health problems. Stress can cause biochemical changes in the body which affect the immune system and increase vulnerability to disease. Stress is a risk factor contributing to many types of chronic disease, like heart disease, some types of bowel disease and mental illness (see Chapter 3 Major Causes of Mortality and Morbidity for more information about the rates of disease in SHR). Stress is also a risk factor in alcohol and substance abuse, which can lead to a variety of other health problems.[7]

Regional Trend

In 2007, 20.4% of SHR respondents reported "quite a bit" or "extremely high" life stress levels, similar to Saskatchewan (18.6%) and national averages (22.4%). While rates of life stress among SHR residents decreased significantly from 2001 to 2003, they have remained consistent since 2003 (see Appendix 9).

Similarly, data from 2005 found that 26.9% of SHR respondents self reported "quite a bit" or "extremely high" work stress levels.

So What's the Bottom Line?

Self Reported Health: On important population health status indicators of self-reported health, mental health, and stress levels, SHR residents fare about the same as their provincial and national counterparts. Disparities exist for low income residents where a much lower percentage reported very good to excellent health. The mental health indicators are examined in more detail in Chapter 3 Major Causes of Mortality and Morbidity.

Smoking

Smoking is the most important cause of preventable illness, disability and premature death in Canada. More than 37,000 people die each year in Canada as a result of smoking.[8, 9] That is more than five times the number of Canadians who die from traffic injuries, alcohol abuse, murder and suicide combined.[9] In Saskatchewan, more than 1,000 residents die each year because of tobacco-related diseases.[10]

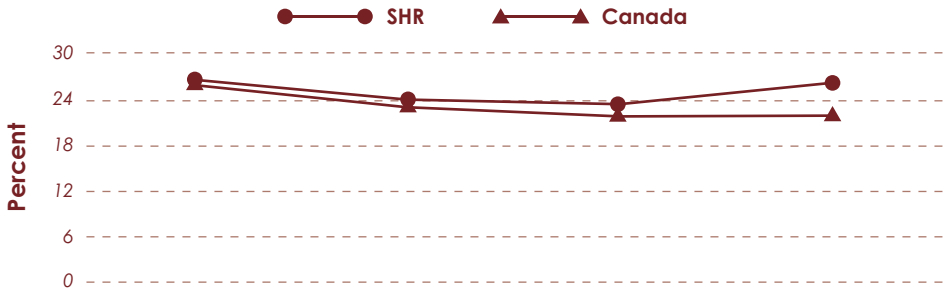
Economic Burden of Smoking

The total annual impact of tobacco use in Saskatchewan was reported to be $600 million. This includes direct health costs and indirect costs such as higher insurance and increased employee absenteeism.[10] Tobacco tax revenue is estimated to be $183 million in 2008/09.[11]

Regional Trend

Smoking rates in SHR have increased slightly since 2005. Figure 7.2 shows that in 2007, SHR rates are now statistically higher than the national average (26.2% compared to 21.9%). Contributing factors to high smoking rates are the high prevalence of tobacco use among those in low SES, the availability of tax free tobacco on First Nations reserves, and lack of a provincial workplace smoking ban (however a Saskatchewan workplace smoking ban takes effect May 2009).[10]

Figure 7.2: Percent of Individuals Daily or Occasional Smokers, Aged 12 and Older, Saskatoon Health Region, Canada, 2001-2007



	2001	2003	2005	2007
SHR	26.6	24	23.4	26.2
Canada	25.9	23	21.8	21.9

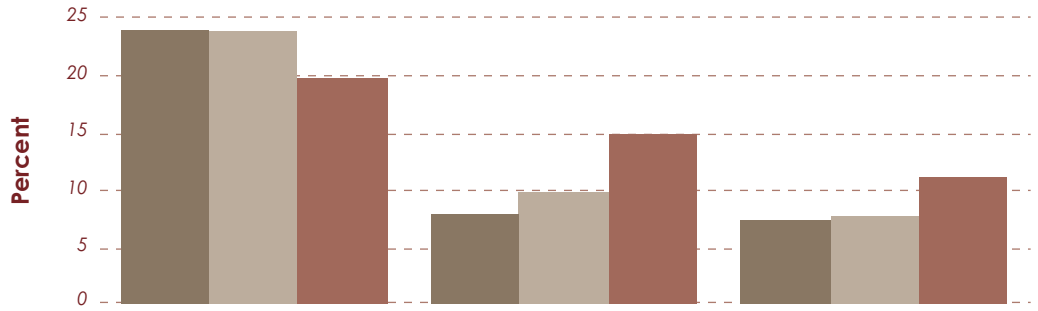
Source: Canadian Community Health Survey, 2001-2007.

Second Hand Smoke Exposure

Many efforts have been focused on reducing exposure to second hand smoke including implementing public smoking bans. Figure 7.3 shows that the provincial and municipal public place smoking bans have

likely succeeded in reducing exposure to second hand smoke amongst non-smokers. Prior to the public place smoking bans in 2003, almost 24% of SHR non-smokers were exposed regularly to second hand smoke in public places. In 2005 and 2007, the values are less than 8%. Similar trends are seen in Saskatchewan and Canada. See the Progress on Recommendations Since 2004 section of this report on our website for more details. (www.saskatoonhealthregion.ca)

Figure 7.3: Percent of Non-Smokers Regularly Exposed to Second-Hand Smoke in Public Places, Aged 12 and Older, Saskatoon Health Region, Saskatchewan, Canada, 2003-2007



	2003	2005	2007*
SHR	23.9	7.9	7.4
Saskatchewan	23.8	9.8	7.7
Canada	19.7	14.8	11.1

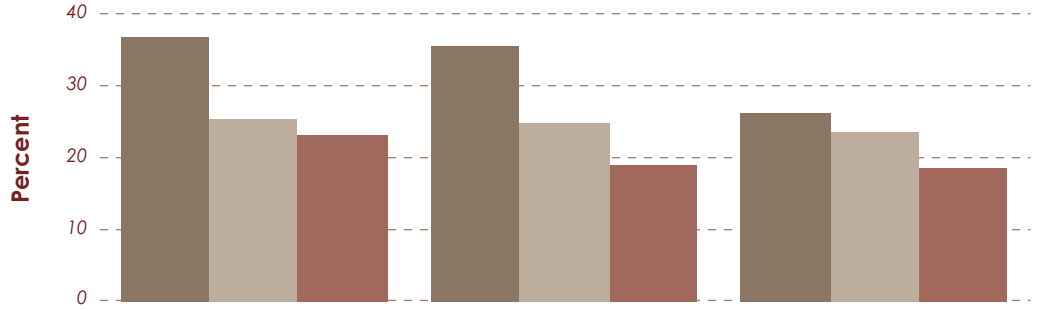
** 2007 values for SHR have high sampling variability, use with caution.*
Source: Canadian Community Health Survey.

A Closer Sub-Regional Look

Smoking and Income

Data from 2001 to 2005 show that as income increases, the percent of individuals who smoke decreases (see Figure 7.4). However, rates between and within income groups are not statistically different. Recent evidence suggests that the smoking rate in the core neighbourhoods is 44.1% compared to 18.5% in the rest of Saskatoon.[12]

Figure 7.4: Percent of Individuals Daily or Occasional Smokers by Income, Saskatoon Health Region, 2001-2005.



	2001	2003	2005
Low Income	36.9	35.7	26.4
Middle Income	25.6	25.0	23.7
High Income	23.3	19.2	18.7

Source: Canadian Community Health Survey.

Smoking in Children and Youth

In Saskatoon 3.6% of students surveyed in grades 5 to 8 had tried smoking, with significantly higher percentages seen for students in core neighbourhood schools (28.6%).[13]

A 2006/07 survey conducted among 934 rural youth grades 7 to 12 in the Humboldt and Lanigan areas found that 73% had never tried smoking more than one or two puffs. In this study of rural youth, 14.1% had smoked in the past 30 days.[14]

Smoking is used as a coping mechanism, especially for populations with weak social networks.

Kim Durham, Public Health Nurse, SHR

So What's the Bottom Line?

- Smoking rates in SHR are now higher than the Canadian average, however second-hand smoke exposure has gone down, thanks to provincial and municipal smoke free bylaws.
- Among children and youth in Saskatoon, smoking rates are much higher in core neighbourhoods.

Alcohol Use

While some studies have linked moderate alcohol consumption with some health benefits,[15] other research has challenged this assumption.[16] What is known is that binge drinking causes harm. Binge or high risk drinking is linked to motor vehicle collisions, Fetal Alcohol Spectrum Disorder, liver cirrhosis, diabetes, cardiovascular and gastrointestinal diseases, various forms of cancer, family problems, crime, and violence.[17]

Economic Burden of Alcohol Abuse

Alcohol abuse is a significant public health problem and in 2002, the costs in Canada were estimated at $14.6 billion in additional health care, law enforcement, and lost productivity in the workplace or at home.[17]

Regional Trend

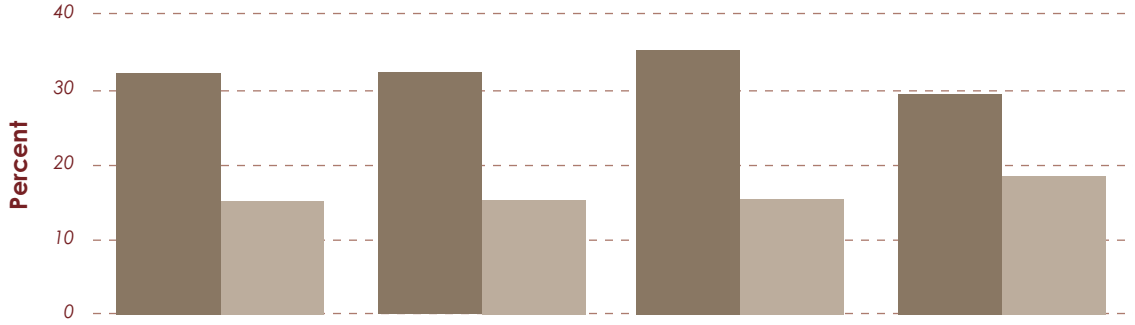
In 2007, almost one quarter of SHR respondents reported having five or more drinks on one occasion at least once a month in the past year. This is the criteria generally used to define problem or binge drinking. The frequency of binge drinking for SHR residents (24.4%) is almost identical to the provincial frequency (24.2%) and slightly higher than the national average (21.8%) although this difference is not statistically significant (See Appendix 9).

In SHR in 2005, the frequency of having five or more drinks on one occasion at least once a month was highest among those between the ages of 12 to 44, (about 34%) and 45 to 64 (16.5%) compared to those aged 65 and older (5.1%). Since 2001, significantly more males than females reported drinking five or more drinks on one occasion at least once a month, though in 2007 the gap was closing slightly (Figure 7.5).

Messaging regarding not smoking is there. Are there any messages regarding no alcohol use?

Public Health Services staff member, SHR

Figure 7.5: Frequency of Having Five or More Drinks on One Occasion at Least Once a Month in Saskatoon Health Region by Sex, Aged 12 and Older, 2001-2007



	2001	2003	2005	2007
Male	32.2	32.3	35.3	29.4
Female	15.2	15.4	15.5	18.5

Source: Canadian Community Health Survey.

Alcohol Related Injuries

Alcohol and motor vehicle use is a lethal combination. While there is a long-term decreasing trend in the number of alcohol-related traffic injuries and deaths in Saskatchewan, alcohol use continues to be the number one factor in fatal collisions.[18] In 2007, alcohol was a factor in 42 fatal collisions and the number of injuries resulting from alcohol-related crashes was 454 in Saskatchewan.[19] (See Chapter 3 Major Causes of Mortality and Morbidity for more information on injury.)

While injury collisions involving alcohol in Saskatchewan are more frequent on urban roadways than on highways and rural roads, fatal collisions involving alcohol are more frequent on highways and rural roads.[19]

Illicit Drug Use

Illegal drug use is associated with negative health outcomes such as deaths from overdose, suicide, hepatitis C and HIV infections.

In 2003, 10% of SHR respondents reported using illicit drugs at least once in the past twelve months, excluding one time use of cannabis. This is not significantly different than the provincial (7.8%) or Canadian (11.9%) rates. Of those who reported using illicit drugs more than once in the past twelve months, 10.8% stated it had significantly interfered with their normal routine, occupational functioning, social activities or relationships.

Economic Burden of Illicit Drug Use

- Productivity losses related to disability, law enforcement and health-care costs from hospitalizations are some of the main costs to society from illegal drugs.
- In 2002, illicit or illegal drugs were estimated at $8.2 billion in societal costs to Canadians.
- Illegal drugs make up about 20% of all substance abuse costs compared to 42% for tobacco and 37% for alcohol.[20]

Alcohol and Illicit Drug Use in Children and Youth

In Saskatoon, 15.4% of students in grades 5 to 8 reported that they had tried alcohol.[13] A significantly higher percentage of children in core neighbourhood schools reported having tried alcohol (38.8%) compared to the city average. Of the 15.4% of children who reported that they had already tried alcohol, 6.4% said they had enough alcohol to be intoxicated with significantly higher percentages reported in the core neighbourhood schools (30.1%).

In rural SHR, more than 75% of youth aged 12 to 18 have tried alcohol more than just a few sips. Further, 34% of rural youth reported binge drinking (defined in this survey as more than five drinks in a two-hour period).[14]

In 2007, 4.6% of students in grades 5 to 8 in Saskatoon reported they had tried marijuana, with significantly higher rates for students in core neighbourhood schools (35.7%).[13]

More than 17% of rural SHR youth aged 12 to 18 reported using marijuana at least once in their life.[14]

> *Kids do what they see - if the parents drink lots during difficult times, they will follow.*
>
> *Public Health Services staff member, SHR*

Injection Drug Use

Injection drug use (IDU) is the leading risk factor for blood-borne pathogens in SHR. Since 2005, between 700 and 900 needle exchange clients annually accessed Street Outreach services. The year 2008 saw a 30% increase in the total number of registered clients from 2007. The profile of Saskatoon IDU in 2006 showed the majority of outreach clients were between 20 and 39 years. Among clients under 39 years, a greater proportion were female. A greater proportion of males were represented among clients 40 years and older.

A Closer Sub-Regional Look

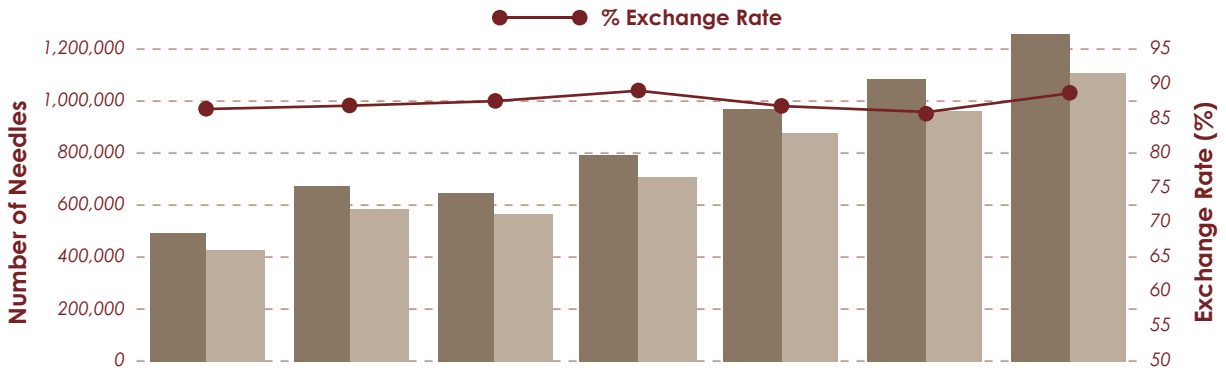
In a survey conducted in Saskatoon in 2006, the most commonly injected drugs were cocaine (80%;52 of 65) and morphine (74%; 48 of 65).[21] The implications of drug choice are important in understanding frequency of injection behaviour. Cocaine, in particular, may require frequent daily injection, increasing the risk of needle sharing and infection.

The HIV cluster investigation conducted in 2006/07 found that the average age of initiation of injection drug use for females (28 years) was slightly younger than males (35 years) with a range of 12 to 48 years.[22] Among survey respondents, 75% had shared needle gear, while 45% had shared within the past six months. A greater proportion of females had shared compared to males. The majority of injection drug users were aware of the risk of sharing needles and the most common reason for sharing was that they could not get new needles when they were needed. Only slightly more than half the respondents indicated they could get as many needles as were required.

A survey exploring harm reduction needs was conducted by SHR's Street Health Program in 2008. Almost 25% of participants reported a history of testing positive for HIV and 83% reported testing positive for hepatitis C. Findings indicate that harm reduction services are meeting some identified needs, but missing others. For example, even with conservative estimates, the average number of needles distributed through exchange services meets only 54% of identified needs highlighting a number of service shortages. Although crack pipes are not available through harm reduction services, 38% of participants identify these as necessary safer drug use equipment.

Needle exchange programs are intended to reduce transmission of HIV, hepatitis C and other blood-borne pathogens by reducing needle sharing among injection drug users. The number of needles issued has increased annually, however the number distributed is believed to represent just a fraction of the number needed to provide clean needles for each injection. Needle exchange rates have been between 86% and 89% since 2002 (see Figure 7.6).

Figure 7.6: Needle Exchange Rate, Saskatoon Street Outreach Clients, 2002-2008



	2002	2003	2004	2005	2006	2007	2008
Needles Issued	482,262	656,963	630,142	773,428	951,133	1,085,214	1,282,252
Needles Returned	417,481	572,028	553,026	691,055	827,727	928,429	1,135,508
% Exchange Rate	86.6	87.1	87.8	89.3	87.0	85.6	88.6

Source: Public Health Services, Saskatoon Health Region, 2009.

Used Needles Collected in Saskatoon

The number of needles collected in the community has increased annually since 2000. In 2007, 21,008 needles were collected, a 62% increase in the number collected the previous year, not including needles deposited in the 12 needle drop boxes located around Saskatoon. This number, while sizeable, is a fraction of the total number of medical needles used in the community (for both illicit and legitimate uses) that are disposed of appropriately through needle drop boxes, garbage or other disposal means.

The majority of needles were collected between Avenue P and downtown Saskatoon, however collection also occurs in spots on the east side of the city. In 2007 the majority of needles were recovered from alleys and parking lots (23%), private dwellings (21%), yards (18%) and apartments (16%). The proportion collected from schools and parks is under 1% and has been stable for the last five years. Surveillance for needle stick injuries using administrative data indicates less than 30 needle stick injuries in the community annually; however even one needle stick injury results in costly follow-up in terms of resources and emotional duress. Of these needle stick injuries none have resulted in subsequent report of disease.

Gambling

Moderate risk gambling refers to a level of gambling involvement that is starting to have a negative impact on the gambler and their family. Problem gambling is more difficult to define as it varies among individuals, but can generally be defined as gambling behaviour that adversely affects a person's physical or psychological health.[23] It has an impact on significant areas of their life such as employment, family relationships or financial stability,

Gambling Affects Health

Problem and moderate risk gamblers are more likely than non-problem gamblers to experience: [24]

- Emotional illness, stress, anxiety and depression.
- Irritability and restlessness, including difficulty sleeping.
- Learning disabilities.
- Suicide ideation.
- Problems with alcohol, including weekly or more frequent drinking and consuming more drinks per occasion.
- Weekly or more frequent illegal drug use.

and contributes to involvement in illegal activities to finance gambling. Other negative consequences include difficultly paying household expenses, problems with family and friends, and difficulty maintaining relationships, jobs or schooling.[24]

In 2003, 69.1% of SHR respondents reported participating in at least one gambling activity in the past year (see Table 7.1) with 0.1% as problem gamblers. This was not statistically significantly lower than the national rate (0.4%). These rates are lower than those found in another study where 1.2% of Saskatchewan residents and 2.1% of Saskatoon residents were problem gamblers.[24]

Table 7.1: Type of Gambler, Aged 12 and Older, Saskatoon Health Region, 2003

Total SHR		*Gambler*			
Non-gambler	**Gambler**	**Non-problem Gamblers**	**Low Risk Gambler**	**Moderate Risk Gambler**	**Problem Gambler**
30.9%	69.1%	65.4%	2.5%	1.2%	0.1%

Source: Canadian Community Health Survey.

So What's the Bottom Line?

Alcohol Use: Binge drinking rates for SHR residents are about the same as the national average, but alcohol abuse remains a costly societal problem. Alcohol is still the number one contributing factor in motor vehicle collision fatalities. Students in core neighbourhood schools have significantly higher alcohol and drug experimentation rates than students in affluent neighbourhood schools.

Injection Drug Use: Is the leading risk factor blood borne pathogens in SHR. Needle exchange programs are designed to reduce the transmission of communicable disease and SHR exchange rates in 2008 were 89%.

Problem Gambling: Problem gambling rates in SHR are relatively low and similar to national averages. A Saskatoon decision not to have a casino within city limits may have some bearing on the relatively low problem gambling rates.

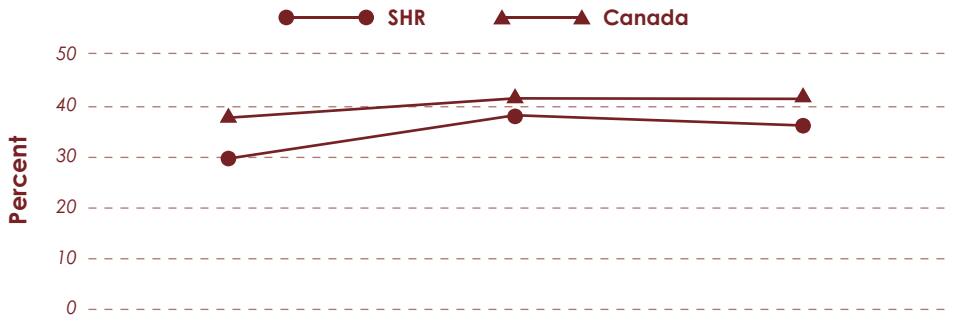
Healthy Eating

A healthy diet rich in a variety of vegetables and fruit may help reduce the risk of some types of cancer and heart disease.[25] In the 2007 Canada Food Guide, the recommended servings of vegetables and fruit were between seven and ten servings per day up from the five to ten servings recommended in 1992.

Regional Trend

In 2007 in SHR, only 36.1% of respondents reported eating vegetables and fruit five or more times per day, significantly lower than the national average of 41.3% (see Figure 7.7). Females were significantly more likely than males to eat vegetables and fruit five or more times per day, in 2007 (43.7% compared to 28.1%).

Figure 7.7: Percent of Individuals Reporting Eating Vegetables and Fruit Five or More Times per Day, Aged 12 and Older, Saskatoon Health Region and Canada, 2001, 2003 and 2007



	2001	2003	2007
SHR	29.6	38.1	36.1
Canada	37.6	41.4	41.3

Source: Canadian Community Health Survey.

A Closer Sub-Regional Look

Data from the combined 2001 and 2003 Canadian Community Health Survey provides a look at rural residents' health behaviour in more detail. The results suggest that vegetable and fruit consumption was found to be significantly lower for rural SHR residents compared to urban. Only one in five residents outside the Saskatoon Census Metropolitan Area (19.8%) ate vegetables and fruit five or more times per day, compared to one in three urban residents (33.0%).[b]

Milk Product Consumption

Dairy products are an important part of Canada's Food Guide. Children four to eight years old need at least two servings of milk products per day. In Canada, more than a third (37%) of children four to nine years of age did not get the minimum servings of milk products per day, and this was lower in prairie regions at 33%.[26]

Physical Activity

Research shows that participating in at least 30 to 60 minutes of physical activity a day, most days of the week, can dramatically lower the risk of heart disease and stroke, prevent and control risk factors such as high blood pressure, high cholesterol and obesity, reduce stress levels, increase energy and improve sleep and digestion.[27] Regular physical activity can reduce the risk of coronary heart disease by as much as 50%.[28]

Regional Trend

The physical activity index measures leisure time physical activity and takes into account total daily energy expenditure (EE) values. An adult is considered moderately active if their EE value is 1.5 or greater, and physically active if their EE value is 3.0 or greater. In 2007, less than half of SHR respondents (46.4%), 12 years of age and older, fit the criteria of moderately or physically active. While physical activity rates in SHR decreased slightly between 2003 and 2007, there is no significant difference in these rates. The 2007 rates are consistent with provincial physical activity levels (46.1%) and the national average (49.0%) (See Appendix 9).

[b] *Source: CCHS 2001 and 2003 combined, share file. CMA refers to Census Metropolitan Area. Outside Saskatoon CMA should be interpreted with caution because of high sampling variability.*

In motion is a program that aims to increase physical activity levels among Saskatoon and area residents. Results from SHR's 2008 *in motion* Physical Activity Survey show that 33% of adults age 20 or older were considered physically active enough to receive health benefits (i.e. an EE value of 3.0 or greater). The 2008 values are about the same as the 34% reported in 2002.[29]

A Closer Sub-Regional Look

Data from the combined 2001 to 2005 Canadian Community Health Survey, suggests that physical activity rates were significantly lower for rural SHR residents compared to urban. Almost half (49.7%) of urban residents were moderately or physically active, compared to 39.7% of residents living outside Saskatoon and area.

Physical Activity in Children

Physical activity is particularly important in children to aid in healthy growth and development. Among children, regular physical activity is also associated with higher self-esteem, greater self-efficacy, improved academic and cognitive performance and greater self-perceived well-being in adolescents. Young people who are physically active are also less likely to use tobacco, alcohol or other drugs and are more likely to be physically active in adulthood.[30-33]

Physical activity guidelines for children are more stringent than for adults (i.e., an EE value of 8.0 or greater is needed in order to have enough physical activity for health benefits). SHR's *in motion* surveys have reported a general increasing trend for physical activity attainment in children from 24% to 30% and youth from 23% to 30% between 2002 and 2008. While this is good news, the bad news is that these values are lower than for adults.[29] National surveys have reported widely varying physical activity rates for children and youth, anywhere between nine and 52% depending on the measure used and the age groups measured.[34]

Body Weight

Two out of every three adults in Canada are reported as overweight or obese and the number has increased dramatically over the past 25 years.

People who are overweight or obese are at risk for a wide range of serious diseases and conditions such as hypertension or high blood pressure, coronary heart disease, type 2 diabetes, stroke, gallbladder disease, osteoarthritis, sleep apnea and other breathing problems, some cancers and mental health problems.[35]

Regional Trend

In 2007, almost half (49%) of the SHR population was overweight or obese similar to the Canadian average of 48.5% (see Appendix 9). This trend has been relatively stable since 2003. There is a large difference between sexes, where males (59.6%) were more likely to be overweight or obese than females (38.9%).

While SHR's overweight population fell to 29.5% in 2007 from almost 35% in 2005, the Region's obesity percentages increased slightly between 2003 and 2007 so that 19.5% of residents in 2007 were considered obese. This is slightly higher, but not statistically different than the Canadian average of 16%.

Overweight and Obesity in Children

The proportion of obese children in Canada has nearly tripled in the last 25 years. The increases were seen for both boys and girls and across all age groups except pre-schoolers.[35] A CIHR environmental scan of obesity research found that the likelihood of losing weight diminishes with increasing age and therefore, prevention at a younger age is essential.[36] However, many children and youth have fewer opportunities to be physically active at school since time spent in physical education classes has been reduced during this time period. As well, studies have found a correlation between the amount of time youth spent watching television and

playing video games, and their likelihood of being overweight or obese, suggesting that opportunities for physical activity outside the school have also decreased.[35, 38]

Economic Burden of Obesity

Obesity costs Canadians about $1.6 billion annually in direct health-care costs, and another $2.7 billion in indirect costs as a result of lost productivity, disability insurance, reduced quality of life and mental health problems.[37]

A Closer Sub-Regional Look

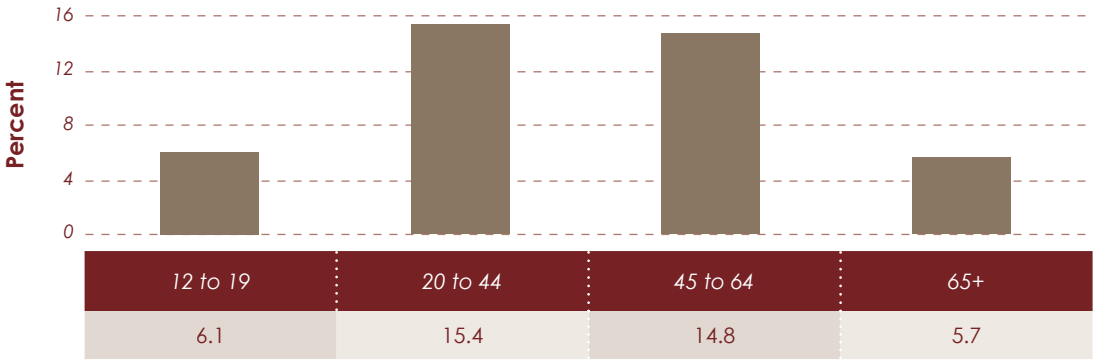
In Saskatoon, 18.2% of children were overweight or obese using self-reported heights and weights.[13] A higher percentage of children were overweight or obese from schools in the core neighbourhoods (23.4%), though these are not statistically significant differences.

Multiple Risk Behaviours

Risk behaviours generally start in adolescence and have important short-term and long-term health consequences. Individuals who engage in multiple-risk behaviours are of special public health concern because they are likely to develop immediate (e.g., driving while intoxicated) and long-term (e.g., alcoholism) health problems.[39] Also, there may be exponential negative impacts as the risk for certain diseases such as heart disease increase with each risk behaviour added.

In 2005, 12.5% of SHR respondents met the criteria for multiple risk behaviour: those reporting at least three of four negative health behaviours including physical inactivity, overweight or obese weights, daily or occasional smoker, and having five or more drinks on one occasion, 12 or more times a year. Multiple risk behaviour was higher among males (15.8%) than females (9.5%), though these were not statistically significant differences. It was also highest among respondents aged 20 to 44 years compared to other age groups, although again, these were not statistically significant differences (see Figure 7.8). No differences were seen between residents with low income (13.6%) and high income (13.6%)

Figure 7.8: Percent of Population with Multiple Risk Behaviour, Aged 12 and Older, Saskatoon Health Region, 2005



Source: Canadian Community Health Survey.

A Closer Sub-Regional Look

In Saskatoon, 1.8% of grades 5 to 8 students surveyed met the criteria for multiple risk behaviour.[c, 13] As the sample of multiple risk behaviour was small, no further analysis could be done.

So What's the Bottom Line?

Healthy Eating: Low consumption of fruit and vegetables in SHR, especially rural, could be linked to affordability issues.[40] As Canada's Food Guide recommended number of servings increased in 2007 to seven to ten (depending on age and sex), the percentage of the population that will be able to achieve these new recommendations in future will be even lower.

Physical Activity: The proportion of individuals at least physically active have levelled off for adults and seem to be increasing for children and youth in Saskatoon Health Region.

Overweight and Obesity: Body weight in adults remains an important health issue as almost half the adult population is overweight or obese. Screen time for youth (hours spent in front of the television or computer) directly influences not only physical activity, but also body weight.[38]

Multiple Risk Behaviour: This is highest in males and those between the ages of 20 to 44, but little else is known about this phenomenon in SHR because of small sample numbers.

[c] *In the school health survey, multiple risk behavior was defined as having three of four negative health behaviours including physical inactivity, over weight or obese, having ever been drunk, and having at least one cigarette in the past year.*

References for Chapter 7

1. *Keon WJ. Population health policy: Issues and options. Fourth report of the subcommittee on population health of the Standing Senate Committee on Social Affairs, Science and Technology. Ottawa: Senate; 2008. Available from: URL: http://www.nccdh.ca/downloads/_rep10apr08-e_may7.pdf*
2. *Saskatoon Health Region. 2004 Health status report. Saskatoon: Public Health Services; 2004.*
3. *Public Health Services. Health promotion: A strategy for change: Creating the social conditions for all people in the Saskatoon Health Region to thrive. Saskatoon: SHR; 2009.*
4. *Human Resources and Social Development Canada. Indicators of well-being in Canada. Health – Self-rated health [online]. 2008 [cited 2008 Oct 24]. Available from: URL: http://www4.hrsdc.gc.ca/indicator.jsp?lang=en&indicatorid=10*
5. *Community University Institute for Social Research. Tracking Quality of Life in Saskatoon: 2001-2004-2007. Saskatoon: CUISR; 2007.*
6. *Human Resources and Social Development Canada. Indicators of well-being in Canada. Health – Self-rated mental health [online]. 2008 [cited 2008 Oct 24]. Available from: URL: http://www4.hrsdc.gc.ca/indicator.jsp?lang=eng&indicatorid=11*
7. *Health Canada. Mental health – Coping with stress. Ottawa: Health Canada and Public Health Agency of Canada; 2008. Available from: URL: http://www.hc-sc.gc.ca/hl-vs/alt_formats/pacrb-dgapcr/pdf/iyh-vsv/life-vie/stress-eng.pdf*
8. *Saskatchewan Ministry of Health. Smoking and your health: Health effects of tobacco. Regina: Government of Saskatchewan; 2007. Available from: URL: http://www.health.gov.sk.ca/health-effects-tobacco*
9. *Health Canada. Healthy living. About tobacco control [online]. 2008 [cited 2008 Oct 24]. Available from: URL: http://www.hc-sc.gc.ca/hl-vs/tobac-tabac/about-apropos/index-eng.php*
10. *Saskatchewan Coalition for Tobacco Reduction. Building on success: Reducing tobacco use in Saskatchewan 2008-2010. Regina: Saskatchewan Coalition for Tobacco Reduction; 2008. Available from: URL: http://www.sctr.sk.ca/pdf/2008_BPReport.pdf*
11. *Saskatchewan Ministry of Finance. 2009. Saskatchewan provincial budget 2008/09 estimates [online]. 2008 [cited 2009 Feb 24]. Available from: URL: http://www.finance.gov.sk.ca/budget2008-09/2008-09Estimates.pdf*
12. *Lemstra M, Mackenback J, Neudorf C, Nannapaneni U, Kunst A. Daily smoking in Saskatoon: The independent effect of income and cultural status. Can J Public Health 2009;100(1):51-54.*

[13] *Saskatoon Health Region, Public Health Services. School health survey. Saskatoon; SHR; 2007. Custom tabulations.*

[14] *Martz D, Wagner A. Saskatchewan rural youth healthy lifestyles and risk behaviour project fact sheet. Health Canada DSCIF Study #6558-08-2005/3480566. Saskatoon: University of Saskatchewan; 2008.*

[15] *National Alcohol Strategy Working Group. Reducing alcohol-related harm in Canada: Toward a culture of moderation. Ottawa: Alberta Alcohol and Drug Abuse Commission, Canadian Centre on Substance Abuse, Health Canada; 2007.*

[16] *Fillmore KM, et al. Moderate alcohol use and reduced mortality risk: Systematic error in prospective studies. Addict Res Theory 2006;14(2):101-132.*

[17] *Collin C. Substance abuse issues and public policy in Canada: V. Alcohol and related harms. Ottawa: Library of Parliament; 2006. Available from: URL: http://www.parl.gc.ca/information/library/PRBpubs/prb0620-e.pdf*

[18] *SGI. Drinking and driving. Quick facts [online]. 2007 [cited 2008 Aug 28]. Available from: URL; http://www.sgi.sk.ca/sgi_pub/road_safety/drinking_and_driving/quickfacts.htm*

[19] *SGI. 2007 casualty collisions. Regina: SGI; 2008. Available from: URL: http://www.sgi.sk.ca/sgi_pub/road_safety/trafficcollisionstats/pdf/2006/TAIS%202007%20casualty%20collisions.pdf*

[20] *Rehm J, Baliunas D, Brochu S, Fischer B, Gnam W, Patra J, et al. (2006). The costs of substance abuse in Canada 2002. Ottawa: Canadian Centre for Substance Abuse; 2006. Available from: URL: http://www.ccsa.ca/2006%20CCSA%20Documents/ccsa-011332-2006.pdf*

[21] *Plamondon K, Opondo J, Ross T, Grauer K, Lindberg B de Bruin P. Building partnerships for health: a strategic planning framework for injection drug use in Saskatoon. Saskatoon: SHR; 2007.*

[22] *Hansen L, de Bruin P, Grauer K, Wright J, Dunlop T, Opondo J. Investigation of an HIV cluster among injection drug users in Saskatoon, Saskatchewan. Saskatoon: SHR; 2006.*

[23] *Government of Saskatchewan. Gambling: Problem gambling 101[online]. 2007 [cited 2008 Nov 12]. Available from: URL: http://www.health.gov.sk.ca/problem-gambling101*

[24] *Wynne HJ. Gambling and problem gambling in Saskatchewan. Ottawa: Canadian Centre on Substance Abuse; 2002.*

[25] *Health Canada. Canada's food guide [online]. 2008 [cited 2008 Oct 24]. Available from: URL: http://www.hc-sc.gc.ca/fn-an/food-guide-aliment/choose-choix/fruit/index-eng.php*

[26] *Garriguet, D. Overview of Canadians' eating habits. Catalogue no. 82-620-MIE. Ottawa: Statistics Canada; 2006.*

[27] *Heart and Stroke Foundation. Basic principles of physical activity [online]. 2006 [cited 2008 Oct 24]. Available from: URL: http://www.heartandstroke.com/site/c.ikIQLcMWJtE/b.3484253/k.9B4C/Physical_Activity.htm*

[28] *Public Health Agency of Canada. Why physical activity is important for you [online]. 2003 [cited 2008 Oct 24]. Available from: URL: http://www.phac-aspc.gc.ca/pau-uap/paguide/why.html*

[29] *Fast Consulting. Saskatoon in motion physical activity survey. Saskatoon: Fast Consulting; 2008.*

[30] *Malina R. Benefits of activity from a lifetime perspective. In: Quinney A, Gauvin L, Wall AE (Eds). Toward active living: proceedings of an international conference on physical activity, fitness and health. Champaign, Illinois: Human Kinetics; 1994.*

[31] *Hallal PC, Victora CG, Azevedo MR, Wells JC. (2006). Adolescent physical activity and health: A systematic review. Sports Med;36:1019-1030.*

[32] *Sibley BA, Etnier J. The relationship between physical activity and cognition in children: A meta-analysis. Pediatr Exerc Sci 2003;15:243-256.*

[33] *King AJ, Coles B. The health of Canada's youth: Views and behaviours of 11-, 13- and 15-year-olds from 11 countries. Ottawa: Minister of Supply and Services; 2003.*

[34] *Janssen I. Physical activity guidelines for children and youth. Appl Physiol Nutr Metab 2007;32: S109-S121.*

[35] *Health Canada. It's your health: Obesity [online]. 2006 [cited 2008 Oct 24]. Available from: URL: http://www.hc-sc.gc.ca/hl-vs/iyh-vsv/life-vie/obes-eng.phc*

[36] *Canadian Institutes for Health Research. Environmental scan of obesity research funding and trends. Ottawa: Canadian Institutes for Health Research; 2006.*

[37] *Katzmarzyk PT, Janssen I. The economic costs associated with physical inactivity and obesity in Canada: an update. Can J Appl Physiol 2004;29:90-115.*

[38] *Active Healthy Kids Canada. It's time to unplug our kids: Canada's report card on physical activity for children and youth. Toronto: Active Healthy Kids Canada; 2008.*

[39] *Galambos NL, Tilton-Weaver LC. Multiple-risk behaviour in adolescents and young adults. Health Rep 1998;10(2), 9-20.*

[40] *Lints A, Keenan TA, Vance L, Veregin J, Woods F. The cost of healthy eating in Saskatchewan. Saskatoon: Public Health Nutritionists of Saskatchewan; 2006.*

CHAPTER 8

Recommendations

A community member attends a Student Wellness Initiative Toward Community Health (SWITCH) program at a clinic in Saskatoon.

This chapter contains a number of recommendations from the Chief Medical Health Officer. Departments across the Region now have an opportunity to review this report and these recommendations, and may choose to develop more specific program level recommendations in their departments at a later time. These will be located at www.saskatoonhealthregion.ca as they become available.

Progress on these recommendations is optimally achieved when partners, agencies and communities work together to address population health concerns and health disparities, and create strategies and conditions that improve the social determinants of health. For more information on progress since the 2004 report recommendations, please refer to the end of this chapter and our website for complete details.

Plan Proactively for a Larger, Changing and Aging Population

1. Saskatoon Health Region should plan for increased service demand from a growing population.

Given the projected growth in Saskatoon's population, the Region should plan appropriately for future growth including a young, urban Aboriginal population.

2. The Region should work together with partners to support employment for youth in health careers.

An aging population in the Region means our health-care workforce is also aging. In order to fill these future gaps in our workforce and link youth to health careers, the Region should work in collaboration with education, post-secondary institutions, Aboriginal communities and inner city community partners to create a Health Specific Career Academy. For example, the Health Region could provide information to students about health careers, on-site education sessions and mentoring.

3. The Region should plan to meet the health needs of a slowly diversifying immigrant population.

The recent economic boom in Saskatchewan is resulting in an increase in overall immigration from within Canada and internationally. While the number of immigrants is low compared to the rest of Canada, a majority of Saskatchewan immigrants move to Saskatoon. This will create new demands for broader cultural and language access to health services.

4. Saskatoon Health Region planning and services should support healthy aging.

A growing seniors population signals a need for more preventive health services to keep seniors healthy longer and to prepare for potentially rising demands on health-care services. A seniors health strategy remains a goal in the Region's 2007-2010 Strategic Plan. Urban, rural and core neighbourhood issues need to be considered in this work to prepare for the unique needs of seniors in these areas.

5. Planning and budgeting for tertiary services should be based on a continuum of services.

It is well known that spending more money on hospital services alone will not improve overall health. Simply spending more in the system "downstream" will never address the issues that could be prevented or better managed "upstream" before they become critical. When planning for tertiary programs and services (e.g., renal dialysis services for diabetics with end stage renal disease), consideration should be given to building in a 10 per cent premium for health promotion and chronic disease prevention and management activities for the same condition, in order to avoid later costly interventions and to better integrate our services and programs.

Improve the Social Determinants of Health and Reduce Gaps in Health Inequities Through Priority Actions

1. The Region should actively support the development and release of a Community Action Plan to reduce health inequities for Saskatoon and area.

Building on its work on health disparity research in Saskatoon, the Region should continue to play an active role with Saskatoon Regional Intersectoral Committee (SRIC) partners to develop and release a Community Action Plan on reducing inequities.

Key priority areas include:

a) a reduction of child poverty,

b) an increase in Aboriginal employment, including integration of the Region's Representative Workforce policy, and

c) an increase in affordable housing options, including integration of the City of Saskatoon's Housing Business Plan.[1]

2. Saskatoon Health Region should do its part to reduce inequities in health care.

The fact that a measurable decrease in life expectancy is occurring in Saskatoon's core neighbourhoods is startling. The data show that these residents generally suffer poorer health outcomes across most measures of population health status. While progress has been made in the Region in recent years, the health sector can do much more to address these issues, specifically:

- An in-depth review of health conditions contributing to the life expectancy gap should be undertaken identifying health service interventions that could prevent and treat these conditions.
- A health care equity audit should be carried out focussing on priority conditions and identifying inequities in access and uptake of effective services.
- A health equity gauge should be developed and routinely applied in order to better understand health policy and service impacts on health.

3. The Region and its partners should advocate for improved food security in both rural SHR and Saskatoon's core neighbourhoods.

Rural areas and core neighbourhoods in Saskatoon are in need of greater access to fresh fruit and vegetables. While options such as good food boxes and a regular farmers market exist in Saskatoon, the lack of a grocery store in the city centre is a barrier to healthy eating. There are many possible options to improve food security. Food subsidies for vegetables, fruit and milk, should be explored, as should good food boxes in rural areas of the Region. Other options could include the adoption of a food subsidy program targeted at low income families similar to that being proposed in Ontario.[2] Closing the gap in the number of supermarkets between low and high income communities should also be explored.

Create the Social and Physical Environments to Optimize Health and Healthy Lifestyles

1. The Province of Saskatchewan should take action to reduce addictions in tobacco and alcohol use.

Tobacco use is linked to many chronic conditions. To help combat its use, the province should implement a comprehensive tobacco control strategy, ensuring we keep pace or surpass strategies in other jurisdictions. Specifically, the plan should address the recommendations of the Saskatchewan Coalition for Tobacco Reduction 2008 - 2010[3] which call for the development and implementation of a coordinated provincial strategy for tobacco control in Saskatchewan including:

- Enhanced tobacco tax measures;
- Greater protection from second hand smoke;
- Expanded restrictions on tobacco promotion and sales;
- A mass media/counter-advertising campaign to support young adults and at-risk populations;
- Expansion and promotion for a 'quit line' for smoking cessation;
- Increased funding for tobacco control aimed at strategic priorities.

Alcohol use is a 'hidden' public health issue - similar to tobacco 50 years ago. Misuse of alcohol is a major concern as it contributes to chronic disease and injuries. Further initiatives aimed at curtailing alcohol misuse and abuse are needed including:

- Continued monitoring of alcohol use and support for mental health and addictions related programs;
- Tax increases and/or elimination of provincial subsidies on alcohol that might be contributing to increased access to alcohol;
- De-normalization of the misuse of alcohol (e.g., underage drinking, drinking and driving, binge drinking, getting drunk as a coping mechanism);
- Provide more information on the effects of alcoholism on the individual and the family.

2. Saskatoon Health Region and its partners should continue to advocate for environments that support active communities and target improved outcomes for rural communities, children and youth.

Physical activity is one of the best ways to improve overall health. Multi-agency initiatives are needed such as:

- An active transportation strategy that includes: the promotion of human-powered transport (e.g., cycling, walking, in-line skating), a municipal infrastructure to support physical activity across Saskatoon (especially in disadvantaged areas) and the rest of the region, and incentives for using bus transit and cycling;
- Agility programs, such as the collaboration between inner-city schools, the College of Kinesiology and the Region, to better fulfill or surpass curriculum goals for daily physical activity.

3. The Region and its partners should promote the reduction of high-risk behaviours to protect individuals against sexually transmitted infections (STIs) and human immunodeficiency virus (HIV).

With some of the highest national rates for chlamydia, gonorrhea and hepatitis C, and a rise in HIV cases in recent years, an action plan should be developed that includes:

- a region-wide adolescent and youth multiple risk assessment study with implementation of interventions found to be effective;
- increased community-level research into HIV to better understand local transmission dynamics and opportunities for prevention;
- improved contact tracing and referral (partner notification and referral services) of new HIV cases using a social networking approach;
- implementation of the findings of the recent provincial needle exchange program review.[4]

4. The Region should implement positive mental health promotion programming according to Canadian best practice to increase the percentage of residents who report good holistic health status (physical, mental, emotional and spiritual).

The Public Health Agency of Canada defines mental health as "the capacity of each and all of us to feel, think, and act in ways that enhance our ability to enjoy life and deal with the challenges we face. It is a positive sense of emotional and spiritual well-being that respects the importance of culture, equity, social justice, interconnections and personal dignity." A recent report by the Canadian Population Health Initiative[5] outlines a number of potential strategies for promoting positive mental health which should be examined for possible adoption in Saskatoon Health Region.

5. Saskatoon Health Region and its partners should implement a 'health promoting schools approach'.

The school is often referred to as the hub of the community. A 'health promoting schools' approach includes creating the social environments, policies, community partnerships, and curriculum to support healthy decision-making and healthy behaviours and should be implemented in schools across the region for students, their families, and others living in the surrounding community.

6. The Region and its partners should focus on programs and services that encourage healthy relationships.

While children are resilient, and support programs and early intervention can minimize the negative impacts of higher risk environments (single parent families, dysfunctional families, violent or abusive environments, etc), a consistent prevention approach suggests we should promote optimal environments for more children throughout their childhood. While the Region does a good job at mitigating problems once they reach a crisis, less attention has been given to programs and services to assist families in crisis at an earlier stage to prevent family unit breakups and increase the proportion of children who grow up in a stable, nurturing environment. Approaches could include:

- Improving access to services that are preventive in nature which support optimizing the family environment, regardless of family structure. This would include family planning, marital or family restitution counseling where possible, parenting programs, subsidized daycare and early childhood development and after school programs. A focus in Saskatoon's core neighbourhoods should be a priority given disparities in health outcomes.
- Increased healthy relationships education in middle and high school according to best practice (e.g., small group discussions, peer leadership, incorporate drama and role playing) not only for prevention of unintended pregnancy and STIs, but also to educate teens about healthy relationships to prevent abuse and future marital and relational problems.

7. The Region and partners should improve services for pregnancy planning to help ensure a healthy mother, healthy baby and healthy families to include:

- Interventions aimed at improving the overall health of childbearing women, especially in core neighbourhoods;
- Addressing pre-conception care from a population health perspective;
- Implementing evidence-based interventions that reduce pre-term births and low birth weight babies;
- Enhanced, comprehensive social and prenatal services including family planning and counselling targeted to Saskatoon's core neighbourhoods due to the higher rates of infant mortality (as noted above in recommendation #6);
- Better coordination of existing SHR and community programs and resources throughout the peri-partum continuum of services and care;
- Ensuring HIV testing protocols are universally applied for pregnant women, and also address barriers to prenatal care among women with addictions.

8. Saskatoon Health Region should develop prevention strategies to reduce unintended teen pregnancies and better support teen mothers and their babies.

Teen pregnancy places the mother and her infant at increased risk for socioeconomic disadvantages potentially perpetuating a cycle of poor health and poverty. Infants of teen mothers are more likely to be born

low birth weight, increasing the risk of adverse health outcomes including death. Teens require a number of supports including:

- Guidance to ensure that informed decision-making occurs for healthy relationships;
- Access to teen-friendly reproductive health services, adequate counseling, and a full range of preventive reproductive health programs and services.

Priority should be focused on lower socio-economic youth with higher rates of teen pregnancy and sexually transmitted infections.

Enhance Efforts in Health Protection and Illness and Injury Prevention in Key Risk Areas

1. Saskatoon Health Region should place increased emphasis on immunization in key vaccine preventable communicable disease areas including:

- In keeping with the 2006 Regional report on immunization, innovative strategies and multifaceted approaches to increase coverage rates for routine childhood immunizations should be implemented throughout the Region focusing on areas with low coverage rates to ensure the protection of the whole community;
- A focus on achieving the following minimum target coverage rates:
  - 85 per cent[a] for routine childhood immunizations for any neighborhood or regional municipality;[6]
  - 80 per cent for SHR influenza staff coverage to protect SHR patients, residents, clients and staff;
  - 80 per cent coverage of influenza and pneumococcal vaccine for high risk groups including infants and pregnant women.

2. The Region should reduce the risks of spreading infection by enhancing infection control practice in both community and institutional settings.

There are notable increases in Saskatoon Health Region in methicillin-resistant *Staphylococcus aureus* (MRSA), norovirus and campylobacteriosis rates. These infections can result in considerable resources devoted to addressing these preventable health problems. Building capacity and adequately funding the Region's infection control committee to develop protocols and implement findings from provincial and regional infection control reviews will be important.

3. The Region and partners should continue to work to protect residents from West Nile Virus (WNV).

While WNV severity will continue to be variable from year to year due to changes in climactic conditions and virus prevalence in birds and mosquitoes, it is important to keep taking precautions to reduce the risk of exposure to the virus. These include:

- increased use of targeted public risk communication to groups with low level of concern and/or during times when increased exposure is anticipated (e.g., community events, long weekends, especially when monitoring indicates that WNV is likely to be circulating);
- development of the adult mosquito control contingency plan;
- ongoing investigation of WNV to better understand the burden of disease, risk factors for infection and severe outcomes, and long term implications for the population;
- exploration of the potential development and adoption of a vaccine for humans.

[a] *A 2008 Manitoba Centre for Health Study recommends 85% coverage for most vaccine-preventable diseases based on CDC and WHO estimates for population immunity.*

4. The Region should collaborate with relevant agencies to coordinate initiatives to reduce injuries, particularly those due to falls and motor vehicle injuries (especially in rural areas). Key initiatives should include:

- development and ongoing monitoring of an injury profile for the Region;
- improved public policy and legislative changes according to evidence and best practice (e.g., ban on cell phone use while driving a motor vehicle and introduction of bicycle helmet bylaws across the province);
- implementation of the key actions identified in the 2007 Seniors' Falls Injury Prevention Strategy developed by Safe Saskatchewan and the Seniors' Falls Provincial Steering Committee.[7]

Take Action to Ensure a Healthy, Sustainable Environment

1. The Region should advocate for increases in optimal fluoride levels in water to best protect dental health in urban and rural communities.

Levels of fluoride in drinking water should be increased to the optimal level defined by Health Canada in order to best protect the dental health of residents. In Saskatoon and in some rural communities, current levels are below the most effective level for preventing tooth decay. Health Canada is currently reassessing the level it defines as optimal after a report by an expert group. As an interim step, areas that do not meet optimal levels could increase the level to the proposed standard recommended by the expert group.[8]

2. The Region should demonstrate leadership in environmental stewardship.

As the largest employer in the province, Saskatoon Health Region should play a leadership role in environmental stewardship in recycling and waste management, energy efficiency and decreasing its environmental footprint. Initiatives could include the development of a waste management and recycling plan, incentives for employees to use bus transit and bicycles, development of an energy audit and an energy management plan that includes reduction targets, and support for the development of a city-wide anti-idling by-law to name a few.

3. The Region and its partners should seek alternatives to ensure safe drinking water in the region.

Saskatoon Health Region and others involved in management of drinking water safety in the province should focus on alternatives other than deregulation of small drinking water systems to meet the needs of rural populations for safe drinking water. Deregulation often means that people may continue to use a system as a drinking water source with no testing protocols in place to ensure safety. Alternatives could include adequate funding for treatment infrastructure renewal, better supports for communities to meet regulatory standards, a more sensitive surveillance system and a more comprehensive treatment and control plan. Education of rural residents on water issues should also be actively pursued.

4. Provincial legislation should be developed for responsible use of pesticides to better protect health.

Evidence has shown that some substances used as pesticides may increase risks of developing cancer. The Saskatchewan Association of Health Organizations has called for a ban on pesticides in public places such as school grounds, playgrounds and parks. The Canadian Cancer Society has advocated for "Right to Know" (product labeling) legislation so that Saskatchewan residents know if they are being exposed to products that contain carcinogens . As such, the Saskatchewan Ministry of Environment should develop provincial legislation restricting the use of these pesticides in situations where they are used solely for cosmetic reasons and examine the introduction of product labeling.[9] The approach needs to work in the Saskatchewan context, but can be modeled on legislation already established elsewhere.

References for Chapter 8

1 *City of Saskatoon. Housing Business Plan – 2009. Saskatoon, SK: City of Saskatoon; December 2008. Available from: URL: http://www.city.saskatoon.sk.ca/org/city_planning/affordable_housing/resources/2009_Housing_Business_Plan.pdf*

2 *Rishma G. Put Food in the Budget campaign sets the table at Queen's Park [news release]. Toronto: Toronto Public Health; 2009 Mar 16. Available from: URL: http://wx.toronto.ca/inter/it/newsrel.nsf/b9bbb1226cba0ff485256dde005a662d/c3315ac04ea41b4e8525757b00670d0a?OpenDocument*

3 *Saskatchewan Coalition for Tobacco Reduction. Building on success: Reducing tobacco use in Saskatchewan 2008-2010. Regina: Saskatchewan Coalition for Tobacco Reduction; 2008. Available from: URL: http://www.sctr.sk.ca/pdf/2008_BPReport.pdf*

4 *Laurence Thomspon Strategic Consulting. A review of needle exchange programs in Saskatchewan - Final report. Saskatchewan: Saskatchewan Ministry of Health, Population Health Branch; 2008. Available from: URL: http://www.health.gov.sk.ca/needle-exchange-review-report*

5 *Canadian Institute for Health Information. Improving the Health of Canadians: Exploring Positive Mental Health. Ottawa: Canadian Institute for Health Information; 2009.*

6 *Martens P, Fransoo R, Burland E et al. What Works? A first look at evaluating Manitoba's regional health programs and policies at the population level. Manitoba: Manitoba Centre for Health Policy; 2008.*

7 *Safe Saskatchewan and the Seniors' Falls Provincial Steering Committee. Seniors' falls injury prevention strategy: A five-year strategic framework (2008-2013) towards a vision of seniors living fall free lives. Regina, Saskatchewan: Safe Saskatchewan; 2007. Available from: URL: http://www.safesask.com/images/File/Seniors_Falls_Strategic_Framework_Jan_2008(2).pdf*

8 *Health Canada. Findings and recommendations of the fluoride expert panel (January 2007) [online]. 2008 [2009 Feb 27]. Available from: URL: http://www.hc-sc.gc.ca/ewh-semt/alt_formats/hecs-sesc/pdf/pubs/water-eau/2008-fluoride-fluorure/2008-fluoride-fluorure-eng.pdf*

9 *Canadian Cancer Society. Putting Health First – Recommendations to reduce environmental carcinogens. Ontario: Canadian Cancer Society; March 2009.*

Progress on Recommendations Since 2004

This section provides an overview of the progress that has been made on the 2004 Health Status Report recommendations. This 2008 report marks the third time that such recommendations have been included in the report and it will be important to continue to track progress to determine what impact, if any, these efforts have on our overall health. Every attempt at including progress made by external organizations, Saskatoon Health Region, and its partners was made, though we acknowledge that some initiatives may have been missed. A more detailed account of progress since 2004 is available on our website: http://www.saskatoonhealthregion.ca/your_health/ps_public_health_pho_reports_publications_and_presentations.htm.

Significant progress made *Some progress made* *Limited progress made* *No progress made*

Overarching Recommendations from 2004
Human services agencies, including the health sector, should strive to work in partnership to address these overarching issues and look at their own policies and programs to see if there are healthier public policy decisions they can make systematically to reduce health inequities.
Ensure that programs and services are culturally sensitive for both aboriginals and recent immigrants, to make it easier for these groups to benefit from these services, and to decrease racism and discrimination that indirectly affect levels of service uptake.
That the Saskatoon Regional Health Authority (SRHA) and senior management lobby government and partner agencies to make healthy public policy choices, especially in relation to decreasing inequities among aboriginals, immigrants, and the poor (e.g., indexing of Social Assistance Program and housing allowances, supporting programs that increase employment opportunities).
That the Health Authority/Board continue to support and encourage intersectoral partnerships between their programs and services, and with other community agencies and service providers.
That Saskatoon Regional Health Authority strengthen their tangible support of effective and efficient health promotion, disease prevention, and health protection programming in the face of increasing pressures for more treatment services.
That Saskatoon Health Region re-evaluate programs and services to ensure an appropriate level and quality of service is being provided to high-risk groups identified in this report as experiencing inequity due to geography, age-group, ethnicity, poverty, gender, and the like.
That the Health Region use the Community University Institute for Social Research (CUISR) Quality of Life research, recommendations and actions in connection with this Health Status Report as one way to incorporate community needs in service planning.

Chapter-Based Recommendations from 2004					
Population of SHR	*Social Environment*	*The Environment and Health*	*Health-Related Behaviour*	*Major Causes of Death & Disability*	*Infectious Diseases*
SHR to develop a Regional plan for decreasing preventable causes of infant mortality.	SRHA continue to advocate with inter-agency partners: For an increase in minimum wage, For continued support for tax polices that redistribute wealth, For pay equity between men and women, For increased funding for Early Childhood Development initiatives.	Municipalities in the Region to look at other municipalities re: use of integrated pest mgt. policies and review which approaches are based on the best evidence regarding impacts on human and environmental health. Work with agencies including SHR to develop a plan for the effective and safe use of pest management programs and policies.	SRHA advocate for: Funding to assist people to pay for smoking cessation aides.	SHR should increase support for new chronic disease management, health promotion and disease prevention strategies before investing in more treatment options. This is especially for conditions of high incidence and include primary and secondary prevention programming at population, group and individual levels according to best practice.	SHR Public Health Services work with other partners within health care and other sectors to come up with ways to increase immunization coverage rates in areas with lower than average coverage rates.
Demographic trends be taken into account when planning the future needs of various SHR services & HR needs.	To support the core neighbourhood proposals for local access to nutritious food.	Explore increased opportunities for waste reduction & recycling.	SRHA to advocate for: Legislation to ban smoking in the workplace.	SHR should produce an injury prevention action plan including priorities for public education and advocacy for legislative or policy change.	SHR implement expected new vaccine programs quickly paying attention to those groups most at risk first.
Develop & implement an action plan to further reduce teen pregnancy.	To support intersectoral work on initiatives such as Children Not in School and other programs for Saskatoon youth.	Develop renewal and upgrade plans for water/ sewage treatment infrastructure.	SHR to provide access to smoking cessation services to tobacco users who want to quit.	SHR should participate in an interagency approach to falls prevention to decrease falls, specifically hip fractures in seniors.	SHR promote importance of notification to Public Health Services of infectious disease by health care workers including importance of verifying diagnosis with lab tests for notifiable diseases under the Public Health Act.
Review the causes of High birth weight and measures taken to reduce rate. Link to recommendations on diabetes, nutrition, physical activity, and obesity. Develop pre/post natal continuum of care plan.	SRHA consider passing a Food Charter.	SHR to advocate for: Efforts to reduce greenhouse emissions;	SHR lead the development of an intersectoral plan to address responsible use of alcohol.	SHR should advocate for an interagency approach in young driver education as well as specific programs targeting young rural drivers.	SHR to continue support pandemic influenza planning and to act on the plan's recommendations.

Continued . . .

Chapter-Based Recommendations from 2004					
Population of SHR	*Social Environment*	*The Environment and Health*	*Health-Related Behaviour*	*Major Causes of Death & Disability*	*Infectious Diseases*
	SHR lead by example in areas such as employment equity for First Nations people.	Increase resources to respond to recommendations of the Laing Inquiry to address water quality concerns.	SHR continue to support physical activity promotion work and strengthen its nutrition promotion content in accordance with provincial population health promotion plan.	SHR should undertake a detailed analysis of self-injury with focus being on the rural part of SHR.	SHR to review policies and procedures to increase the uptake of influenza vaccine in health-care workers.
	SHR continue to support intersectoral work through such groups as the Regional Intersectoral Committee.	Increase supply of affordable housing through development.	SHR to produce an obesity prevention strategy.	SHR should undertake research into the mental well-being of SHR's residents to improve mental well-being and decreasing depression.	SHR to review its approach to infection control in its facilities and community and implement any identified recommendations.
	SHR to promote healthy communities/cities concept.	Increase in shelter allowance.	SHR to: Emphasize healthy relationship training for young adults.		SHR support and implement national and provincial measures being developed to improve health surveillance in Public Health including Saskatchewan Immunization Management System (SIMS) and the Public Health Information System (iPHIS).
	SHR be encouraged to work with multi-disciplinary and multi-sectoral partners to address issues facing food system.	Public Health Services should support incentives to improve supply of affordable housing.	Encourage physicians to submit STI contact information, act on recommendations from provincial Chlamydia Reduction Strategy.		SHR with the Province, implement recommendations to improve public health capacity in the wake of SARS and national reports from Naylor, Kirby and others.
			SHR to develop a plan to address gaps for a coordinated and integrated response to reduce drug related harm.		

Appendix 1

Key Population and Birth Related Indicators

	Child Dependency Ratio 2008	*Aged Dependency Ratio 2008*	*Total Dependency Ratio 2008*	*Crude Birth Rates 2006 (per 1,000 live births)*	*Total Fertility Rate 2005 (average # of children)*	*Teen Pregnancy Rates 2004-2006 (per 1,000 live births)*	*Low Birth Weight 2004-2006 (% live births < 2500 g)*	*High Birth Weight 2004-2006 (% live births > 4000 g)*	*Infant Mortality 2004-2006 (per 1,000 live births)*
SHR	26.4%	19.1%	45.5%	11.9	1.6	32.4	5.8%	13.6%	6.3
Saskatoon	25.4%	17.9%	43.3%	12.3	1.6	37.1	6.1%	13.3%	7.1
Rural SHR	29.2%	22.7%	51.9%	11.1	1.8	20.1	4.9%	14.6%	4.0
Core Neighbourhoods	30.5%	11.5%	42.0%	19.3	2.4	122.9	9.1%	12.2%	14.3
Non-core Neighbourhoods	25.0%	18.4%	43.4%	11.7	1.5	29.6	5.7%	13.5%	6.1
Registered Indian Status (RIS)	54.1%	2.8%	56.9%	32.1	3.2	144.4	7.3%	17.4%	6.3
Not RIS within SHR	24.7%	20.1%	44.9%	10.7	1.5	22.0	5.5%	12.9%	6.3
Saskatchewan	28.2%	21.7%	49.9%	12.3	NA	43.4	5.6%	15.8%	6.9
Canada	24.2%	19.7%	43.9%	10.6*	1.5	30.5^	6.0%	11.9%	5.3~

Sources: Saskatchewan Ministry of Health, Vital Statistics. Saskatchewan and Canadian data from CANSIM table 102-4509 for birth weights and 102-4502 for numbers of live births.

*~ 2003-2005 value. * 2005 value. ^ 2004 value.*

Appendix 2

Mortality by Specific Cause, Saskatoon Health Region

		2006		Male			Female			3 year comparison				
		Male	Female	2001	2006	% Change	2001	2006	% Change	99-01	04-06	Trend Since 99-01	SK	Canada
Cause of Death	ICD-10 Code	# of Deaths	# of Deaths	Age Standardized Rate per 100,000			Age Standardized Rate per 100,000			Age Standardized Rate Both Sexes			2004	2004
Coronary Heart Disease	I20-I25	225	199	140.1	140.2	0.1	70.9	69.7	-1.7	104.6	88.9	↓	94.5	96.2
Stroke	I60-I69	43	91	49.9	26.2	-47.5	33.8	30.2	-10.7	42.3	34.5	↓	34.6	34.9
Mental Disorders	F00-F99	29	76	19.9	18.4	-7.5	9.9	23.1	133.3	14.3	17.5	↑		
Lung Cancer	C34	58	41	61.8	37.1	-40.0	25.5	22.3	-12.5	37.5	30.4	↓	40.1	46.6
Prostate Cancer*	C61	56	–	36.3	33.9	-6.6	–	–	–	38.1	31.6	↓	33.9	23.4
Colorectal Cancer	C18-C21, C26.0	37	30	23.5	24.2	3.0	20.7	13.6	-34.3	19.1	16.8	↓	17.7	18.7
Breast Cancer	C50	0	47	0	0	0	20.7	24.8	19.8	25.0	23.4	↓	22.3	23.1
COPD and Allied Conditions	J40-J47	42	19	32.9	26.2	-20.4	14.5	8.8	-39.3	22.5	18.9	↓	23.9	24.8
Unintentional Injury	V01-V99, W00-W99, X00-X59, Y85-Y86	63	36	35.8	39.7	10.9	14.4	15.9	10.4	27.5	27.1	↓	33.6	24.7
Suicide	X60-X84, Y87.0	25	8	13.4	17.1	27.6	3.9	6.3	61.5	10.2	10.6	↑	11.2	10.8
Diabetes	E10-E14	44	42	24.3	27.7	14.0	14.4	17.6	22.2	17.3	18.8	↑	22.9	19.6
Chronic Liver Disease	K70, K73-K74	12	6	14	7.4	-47.1	8.7	3.6	-58.6	7.7	6.0	↓	6.7	6.0
All Cause		1,177	1,159	768.4	741.1	-3.6	467.6	450.3	-3.7	602.6	558.3	↓	601.7	571.9

Source: Saskatchewan Ministry of Health. Canada from CANSIM Table 102-0552 Deaths by selected grouped causes and sex, Canada, provinces and territories, annual.
Colorectal cancer for SK and Canada=C18-C21. [Lung cancer for SK and Canada = C33 and C34]. (These are not consistent with most recent CCS guidelines.)
Significant decrease or increase based on non-overlapping confidence intervals.
** Male cancer only*

↑ *Not a statistically significant increase*
↓ *Statistically significant decrease*
↓ *Not a statistically significant decrease*

Appendix 3

Hospitalization by Specific Cause, Saskatoon Health Region

		2006/07		Male			Female			3 year comparisons			
		Male	Female	2001/02	2006/07	% Change	2001/02	2006/07	% Change	99/00-01/02	04/05-06/07	Trend Since 99/00	SK
Cause of Hospital Discharge	ICD-10 Code	No. of Hospital Discharges		Age Standardized Rate per 100,000									04/05-06/07
Coronary Heart Disease	I20-I25	867	458	550.5	557.2	1.2	248.9	227.6	-8.6	425.5	378.7	↓	443.0
Stroke	I60-I69	210	234	158.4	135.5	-14.5	109.1	102.4	-6.1	131 [a]	118.1	↓	121.6 [b]
Mental Health	F00-F99	687	797	487.3	393.5	-19.2	552.7	426.5	-22.8	527.1	442.2	↓	
Lung Cancer	C34	100	78	70.8	65.9	-6.9	49.9	42	-15.8	62.3	53.9	↓	56.3 [b]
Prostate Cancer*	C61	87	–	73.7	56.1	-23.9	–	–	–	73.7 [a]	65.7	↓	81.0
Colorectal Cancer	C18-C21, C26.0	102	74	62.5	67.3	7.7	44.7	37.7	-15.7	53.7	54.4	↑	56 [b]
Breast cancer	C50	0	177	0	0	0	117.8	106.8	-9.3	116.4	106.6	↓	103.4
COPD	J40-J47	434	344	245.1	286.5	16.9	174.5	194.7	11.6	214.1	232.4	↑	335.9 [b]
Asthma	J45	46	65	51.4	34.1	-33.7	62	46	-25.8	57.2 [a]	48.3	↓	n/a
Unintentional Injury	V01-V99, W00-W99, X00-X59, Y85-Y86	718	744	553.9	489	-11.7	379	390.8	3.1	471.8 [a]	446.1	↓	764.5
Suicide	X60-X84, Y87.0	29	54	46.5	20.1	-56.8	45.8	38.2	-16.6	51.5	29.6	↓	50.9 [c]
Diabetes	E10-E14	237	182	107.7	163.1	51.4	76.5	108.8	42.2	114.3	124.7	↑	184.3
Chronic Liver Disease	K70, K73-K74	55	28	37.2	35.8	-3.8	15.3	18.1	18.3	22.7	25.4	↑	n/a
All Cause~	ALL ICD-10	11,269	16,372	8,420	7,626	-9.4	11,036	10,657	-3.4	9,802	9,100	↓	11,158

Source: Saskatchewan Ministry of Health.

** Male cancer only. ~ Excludes newborns.*

[a] *Only 2001/02 year used. Previous years ICD-9 coding used.*

[b] *Only 2006/07 year used. Previous years ICD-9 coding used.*

[c] *Only 2004/05 year used, based on X60-X84.*

↑ *Not a statistically significant increase*

↓ *Statistically significant decrease*

↓ *Not a statistically significant decrease*

Appendix 4

Vaccinations Available Through Public Funding to Children and High-risk Populations in Saskatchewan

Early Childhood Primary series	*School-age Children*	*Adult*	*High Risk Populations***
Measles, Mumps & Rubella (MMR)	MMR (Gr 12) Jan/07! MMR (Gr 8) Sept/08!	–	MMR
Diphtheria, tetanus, polio, pertussis (DaPTP-Hib)	Td-Pertussis (Gr 8) Sept/03	Td	–
–	–	–	–
Haemophilus influenzae type b (Hib)	–	–	Haemophilus influenzae type B (Hib)
–	Hepatitis B (Gr 6) 1995	–	Hepatitis B
–		–	Hepatitis A
–	HPV (Gr 6 Female), Sept/08 (Gr 7 Female)/Sept/08 only!	–	–
Influenza (Oct/05)	–	Influenza * Pregnant (Oct/07)	Influenza
Meningococcal C conjugate (Oct/04)	Meningococcal C conjugate Gr 6 (Oct/04)!	–	Meningococcal A,C,V, W-135 (polysaccharide; conjugate)
Pneumococcal 7 conjugate (April/05)		–	Pneumococcal c23 polysaccharide
Varicella (Jan/05) 4 dose (Jan/09) 3 dose	Varicella Gr 6 (Jan/05)!	–	Pneumococcal polysaccharide

Source: Public Health Services, Saskatoon Health Region

* *Pay for vaccine unless meet risk criteria.*

** *Population at risk due to compromised immunological systems and/or age and/or risk behaviour for students who have not had two doses of mumps containing vaccine.*

! *Catchup Program.*

Appendix 5

Schedule of Vaccines Funded by Saskatchewan Ministry of Health for Infants and Children

Routine Immunization Schedule for Infants and Children

Age at Immunization	DTaP-IPV	Hib[1]	Pneu-C-7[2]	Men-C	MMR[13]	Var[13]	Inf	HPV			Tdap	HB	
2 months	●	●	●										
4 months	●	●	●										
6 months	●	●	●				● 9						
12 months[12]				● 3	●	● 7							
18 months[12]	●	●	●		● 6								
4-6 years	● 10			● 4									
Grade Six				● 5		● 8		0 mo ●	2 mo ●	6 mo ●		0 mo ●	6 mo ●
Grade Eight					● 14						● 11		
Grade Twelve					● 14								

D or d - Diptheria
aP or ap - Acellular Pertussis
Hib - Haemophilus influenza type B
Men-C - Meningococcal-C Conjugate
Var - Varicella
Inf - Influenza

T - Tetanus
IPV - Inactivated Polio Vaccine
Pneu-C-7 - Pneumococcal conjugate 7 valent
MMR - Measles, Mumps, Rubella (German Measles)
HB - Hepatitis B
HPV - Human papiloma virus

Source: Adapted from Saskatchewan Immunization Manual, 2008. http://www.health.gov.sk.ca/immunization-full-manual/

1 *Hib schedule depends on age of child at first dose, biological used and also on present age of child. If dose is given at age greater or equal to 15 months, the child is considered up to date.*

2 *Eligible if born on or after February 1, 2005.*

3 *Eligible if born on or after October 1, 2003.*

4 *Catch up program: Eligible if born on or after October 1, 2000. A preschool (age 4) catch up dose, until the children immunized at 12 months are 4 years of age.*

5 *Catch up program: Eligible if in grade 6. An adolescent catch up dose at Grade 6, until the children immunized earlier are in Grade 6. The adolescent catch up will last until 2011.*

6 *Given a minimum of 1 month after first MMR.*

7 *Eligible if born on or after January 1, 2004.*

8 *Catch up program: An adolescent catch up dose for non-immune Grade 6 students. The catch up will last until 2011. If 13 years or over - require 2 doses at least 1 month apart.*

9 *For infants and children 6-23 months of age: 1 or 2 doses depending on child's previous immunization history.*

10 *This dose of DTaP-IPV is not necessary if the 4th dose was given after the 4th birthday. A booster dose is recommended after the fourth dose, most commonly at 4 to 6 years (school entry). The minimum interval is 6 months after last dose of primary series.*

11 *Minimum interval of 1 month between previous doses of Td/Tdap.*

12 *Hepatitis A vaccine – Only for residents aged 1-15 years living in northern health regions or on reserves in Saskatchewan (Creighton, Air Ronge, La Ronge, excluded from the program); series to be completed if started in the north or on reserve and now receiving service in RHA.*

13 *If MMR and Varicella are not administered simultaneously, separate by 1 month interval.*

14 *2nd dose mumps catch-up program: eligible if in grade 8 or grade 12. The catch-up will last until 2012-13.*

Appendix 6

Reportable Disease in Saskatoon Health Region

Communicable Disease	Case Counts by Age Group, 2007				Crude Rate per 100,000 Population by Year				
	0-4 yrs	*5-14 yrs*	*15+ yrs*	*Case Total*	*2007*	*2006*	*2005*	*2004*	*2003*
Aeromonas	<5		14	18	6.2	7.0	5.5	9.7	10.6
Amoebiasis	<5	5	12	18	6.2	5.2	3.8	1.4	2.5
Campylobacteriosis	6	<5	69	79	27.1	38.5	25.5	26.1	24.0
Chlamydia pneumoniae			14	14	4.8	2.4	1.4	1.4	1.8
Clamydia trachomatis (genital chlamydia)		9	1160	1169	401.6	381.1	354.9	288.7	325.8
Cryptosporiodosis	6	<5	5	12	4.1	2.4	2.4	3.1	6.0
Giardiasis	6	16	31	53	18.2	15.4	13.1	17.7	17.0
Gonococcal infection		<5	230	233	80.0	77.3	61.1	34.1	40.6
H Influenzae	<5		<5	<5	1.0	0.7	1.0	1.7	0.4
Hantavirus					0.0	0.7	0.0	0.7	0.0
Hepatitis A					0.0	1.0	2.1	1.7	0.7
Hepatitis B acute			<5	<5	1.0	0.7	0.0	1.4	0.7
Hepatitis B carrier			40	40	13.7	8.4	7.6	8.7	14.5
Hepatitis C acute	<5		6	9	3.1	5.6	6.9	7.3	7.1
HIV			57	57	19.6	18.2	13.5	5.6	7.1
Hepatitis C carrier	<5		202	204	70.1	75.9	69.4	83.8	84.8
Influenza A	17	<5	38	59	20.3	25.5	49.0	6.6	81.3
Influenza B		<5	<5	5	1.7	16.1	4.1	0.0	31.1
Legionellosis					0.0	0.3	0.0	0.0	0.0
Listeriosis			<5	<5	0.7	0.0	0.0	0.0	0.0
Malaria		<5	<5	<5	1.0	1.0	1.0	0.7	0.7
Meningitis aseptic (viral)			<5	<5	0.3	0.3	0.7	0.7	1.4
Meningococcal infection	<5		<5	<5	0.7	0.3	0.7	0.0	0.4
MRSA	38	22	385	445	152.9	67.2	47.3	23.3	26.5
Parvovirus	<5		5	7	2.4	5.2	16.2	36.5	4.9
Penicillin res pnuemo	<5	<5	11	13	4.5	3.1	4.5	1.7	1.8
Pertussis	<5	<5	<5	6	2.1	18.5	36.2	47.7	131.8
Pneumo Invasive Disease	9	<5	47	60	20.6	16.4	10.4	6.3	11.3
Rocky Mountain SF					0.0	0.3	0.0	0.0	0.0
Salmonellosis	<5	<5	21	24	8.2	12.9	4.8	11.5	8.5
Shigellosis			<5	<5	1.0	1.7	2.8	1.0	0.7
Strep Gr A invasive	<5		25	28	9.6	11.9	6.2	4.5	6.0
Syphilis			7	7	2.4	2.4	1.4	0.3	1.8
Strep Gr B invasive			12	12	4.1	2.4	2.4	2.1	2.5
Tuberculosis		<5	6	10	3.4	4.5	6.9	1.7	2.8
Verotoxigenic E coli	<5	<5	10	14	4.8	1.4	1.4	2.4	6.7
VRE			60	60	20.6	1.0	1.0	0.4	1.4
West Nile Fever (non neuro)		<5	319	323	111.0	1.0	1.7	0.0	20.1
West Nile neurological			32	32	11.0	0.0	0.0	0.0	1.4
Yersiniosis		<5	5	6	2.1	3.1	2.1	2.1	2.5
Grand Total	*106*	*81*	*2837*	*3027*	*1039.8*	*359.0*	*339.5*	*315.2*	*514.9*

Appendix 7

Key Social Environment Indicators, 2006

Geography	Lone Parent Families	Individuals Living Below Pre-tax LICO	High School Certificate or Higher Level of Education Attained for Those 25-64 Years of Age	Dwellings Owned/ Rented	Monthly Homeowner Major Payment	Monthly Rental Costs	Average Value of Dwelling	Households Spending More Than 30% of Income on Shelter Owners/ Renters	Dwellings in Need of Major Repair
SHR	16.4%	15.7%	84.9%	69.5/30%	n/a	n/a	$161,935	n/a	7.1%
Saskatoon	19.3%	17.7%	87.5%	63.9/36.1%	$918	$659	$173,904	10.9/44.0%	5.8%
Rural SHR	9.8%	10.7%	78.2%	85.6/12.8%	$738	$503	$131,963	14.7/32.3%	10.8%
Core Neighbourhoods	36.8%	47%	66.2%	44.6/55.3%	$719	$558	$100,217	22.7/55.7%	13.4%
Saskatchewan	16.6%	14.4%	80.6%	71.8/25.6%	n/a	n/a	$132,111	13.1/39.8%	10.5%
Canada	15.9%	15.3%	84.6%	68.4/31.2%	n/a	n/a	$263,369	17.8/40.3%	7.5%

Source: Statistics Canada, Census 2006.

Appendix 8

Water Served by City of Saskatoon Waterworks

Saskatoon East	City of Saskatoon	Town of Allan, Village of Bradwell, Village of Clavet, Village of Elstow, Allan South Rural Water Utility, Cory Park Mobile City, Dundurn Rural Water Utility Board, Eagle Ridge Estates, Eighth Street Waterline Group Inc., Elstow North Rural Water Utility, Jemini 4 Arenas, Potash Corporation of Sask Inc., Allan Division, RM of Corman Park (Casa Rio/Wood Meadows), RM of Corman Park (Grasswood), Saskatoon Stadium Sports Ltd., South Yellowhead Water Corporation, University of Saskatchewan
Saskatoon North	City of Saskatoon	Town of Dalmeny, Town of Hague, Town of Martensville, Town of Osler, Town of Warman, Can-Oat Milling (Saskatoon) Inc., Dalmeny West Water System Ltd., Sask Valley Rural Water Utility, Akzo Chemicals Ltd., ERCO Worldwide
Saskatoon West	City of Saskatoon	Potash Corporation of Saskatchewan Inc. - Cory Division, Royal View Cattle '84 Ltd., United Chemical Company

Appendix 9

Health Behaviour Indicators

		2001	2003	2005	2007
Self perceived health (% who rated health as excellent or very good)	SHR	58.8	62.2	61.7	59.1
	SK	56.8	59.2	58.2	56.2
	Canada	61.4	58.4	60.1	59.6
Self perceived mental health (% who rated mental health as excellent or very good)	SHR		71.8	72.6	71.6
	SK		73	72.2	70.7
	Canada		73.4	74.4	72.7
Self perceived life stress (% who rated life stress as quite a bit or extremely)	SHR	27	19.7	20	20.4
	SK	25.1	20.3	20.9	18.6
	Canada	26.1	24.1	22.9	22.4
Self perceived work stress (% who rated work stress as quite a bit or extremely)	SHR	29	20.7	26.9	
	SK	28.8	30.1	25.5	
	Canada	32.4	30.7	29.9	
Daily or occasional smoker (%)	SHR	26.6	24	23.4	26.2
	SK	27.7	24	23.9	25.9
	Canada	25.9	23	21.8	21.9
Exposure to second hand smoke in public places among non-smokers (%)	SHR		23.9	7.9	7.4
	SK		23.8	9.8	7.7
	Canada		19.7	14.8	11.1
Frequency of drinking five or more drinks on one occasion at least once a month (%)	SHR	23.7	23.8	25.6	24.4
	SK	24.4	23.1	25.4	24.2
	Canada	20.3	21.4	22.3	21.8
Eat vegetables and fruit five or more times per day (%)	SHR	29.6	38.1	NA	36.1
	SK	30.3	37.1	NA	34.4
	Canada	37.6	41.4	NA	41.3
Physical activity index (% who are moderately active or active)	SHR	50.3	51.9	49.5	46.4
	SK	47.5	50.9	50.4	46.1
	Canada	46.6	51.8	52.2	49
Overweight or obese (% 18+ yrs, excluding pregnant women) Based on BMI of 25.0 or higher	SHR		50.3	53.7	49
	SK		55	56.2	53.2
	Canada		48.1	48.9	48.5

TECHNICAL APPENDIX

Methodology

The methodology used in this report includes descriptive and bivariate analysis only.

Most of the chronic disease health outcome data is based on mortality and hospital separations, so it only measures people's contact with one part of the health system. No physician visit or prescription drug data, or other health professional data sets were used, so any health outcome analysis contained here is limited in scope. Communicable disease data is based on Reportable Disease Surveillance which is provincially and nationally prescribed and regulated through the Public Health Act.

Sub-Regional Analysis

The boundaries of rural municipalities (RMs) and regional health authorities are not coterminous. This means that RM populations get apportioned across health regions instead of being assigned to a specific health region, as is done with cities, towns and villages. The RM's population is split between health regions in proportion to the land area. For example, because 22% of the land area in the RM of Harris falls within Saskatoon Health Region (SHR) boundaries, so too does 22% of the population along with birth, death, and hospital separations get apportioned to SHR. The other 78% of the RM of Harris is apportioned to Heartland Health Region.

Saskatoon has been divided into 'core neighbourhood and 'non-core neighbourhood. A list of common geographical areas used in this report are:

Saskatoon	Saskatoon Census Metropolitan Area (CMA)	Rural SHR
Within the city of Saskatoon boundaries.	Saskatoon plus all communities within the rural municipalities of Corman Park, Blucher, Vanscoy, Dundurn, Colonsay.	All communities inside Saskatoon Health Region boundaries not including Saskatoon.

Core Neighbourhoods	Non-core Neighbourhoods
Meadowgreen, King George, Pleasant Hill, Riversdale, Westmount, and Confederation Suburban Centre	All Saskatoon neighbourhoods outside the core neighbourhoods

The geographic identifier for population, hospital discharge, and vital statistics birth and death data was based on residence code, so the non-core neighbourhoods are comprised of every other neighbourhood within the city of Saskatoon residence code 34424.

The geographic identifier for Communicable Disease and Immunization Coverage data was based on postal code. The non-core neighbourhoods are comprised of every other neighbourhood within Saskatoon, plus people that have a P.O. Box as residence. Rural areas and those with post office boxes were grouped together which may not entirely reflect rural residence, since people living in Saskatoon could have a post office box. Residents that had no or missing postal codes were not included in the Saskatoon populations. The numbers for missing or invalid postal codes are relatively small at 253 in 2007. The difference in Saskatoon non-core neighbourhood populations between this data and the Covered population data described earlier is the 253 that have no or missing postal codes.

Standardization of Rates

Age standardized rates were calculated for mortality and hospitalizations using the direct method with age categories of <1, 1 to 4, 5 to 9 then five year age groupings to 90+ years. The 1991 Canadian Census population was used as the standard population, though no sex distributions were available for this population, so the total population distribution was used for both males and females. Standardization allows for more meaningful comparisons to be made over time and between different geographies as it adjusts for age sex distributions.

Age adjusted confidence intervals were calculated according to methods outlined in previous literature.[1, 2]

Statistical Significance

Where differences between two areas are compared in this report, the word significant is used only if it is a statistically significant difference. If the differences are not statistically significant, other language is used (e.g. dramatic, substantial etc.) or else it is explicitly stated (e.g. no statistically significant differences found between the two groups). Confidence intervals at the 95% level were used to test statistical significance, whereby if there were overlapping confidence intervals, the differences could be said to be not statistically significant.

Life Expectancy

Life expectancy calculations were derived from the Association of Public Health Epidemiologists of Ontario.[3] The abridged life table calculates life expectancy based on Chiang (1984)[4], adapted for local area use.[5] Mortality data for five years (2002-2006) was used as the numerator. In some cases, the number of deaths between 2002 and 2006 was 0, in which case, we imputed an average value of 0.2 (1 death divided by 5 years) for each age group where a 0 occurred. Covered population data from 2004 was used as the denominator to calculate age specific life expectancy.

Main Data Sources, Definitions and Limitations

Covered Population

Data Source: Provincial Ministry of Health Covered Population databases.

Definition: a count of all persons who held Saskatchewan Health coverage on June 30 in each year. It is not a census since it only counts persons who are registered for provincial health coverage and not every person who may have been a resident in Saskatchewan on June 30.

Inclusions/Exclusions: All residents of Saskatchewan, except: (a) members of the Canadian Armed Forces, members of the Royal Canadian Mounted Police, and inmates of federal prisons, all of whom are covered by the federal government; and (b) people not yet meeting the residency requirement (coverage begins on the first day of the third calendar month following their move to Saskatchewan).

Saskatchewan residents moving elsewhere remain eligible for coverage for the same period, and anyone whose coverage extends through June (i.e. who left the province April 1 or later) is included in the covered population. In the case of death, people who had coverage any time in June are included (Saskatchewan Ministry of Health, 2008).

1 *Keyfitz N. (1966). Sampling variance of standardized mortality rates. Human Biology, 38:309-317.*

2 *Chiang CL. (1961). Standard error of the age-adjusted rate. Vital Statistics Special Reports. 47(9).*

3 *Association of Public Health Epidemiologists of Ontario. Life table template V 1.2 [online]. 2006 [cited 2007 Oct 22]. Available from: URL: http://www.apheo.ca/indicators/pages/resources/life_tables .html.*

4 *Chiang CL. (1984). The life table and its applications. Malabar, Florida: Robert E. Krieger Publ. Co.*

5 *Manuel DG, Goel V, Williams JI.(1998). The derivation of life tables for local areas. Chronic Diseases in Canada, 19(2):52-6.*

Limitations: Registered Indian Status is the only ethnic identifier available within the Covered Population database. A person of Registered Indian Status means that the person is registered under Section 6 of *The Indian Act* and who has been assigned a ten digit number in the Indian Registry (Saskatchewan Ministry of Health, 2008).

Using Registered Indian Status to estimate the Aboriginal population results in an underestimate of the total number living in SHR because it excludes those that have Aboriginal ancestry but are not registered through *The Indian Act*. It also does not include people of Métis or Inuit heritage and is a wholly different definition than that used by Statistics Canada in the census.

The covered population accounts only for where people prefer to receive their mail, so that if someone lives on a farm in an RM, but elects to receive their mail in a town or village, they will be coded as a resident of the town or village. The Ministry of Health cannot at this time provide estimates as to how large of an issue this is.

Census Data

Data Source: Statistics Canada 2006.

Definition: Between May 1 and May 13, 2006, 13,576,855 households received a Census of Population questionnaire. Eighty percent of these were short answer (8 questions) while 20% received a long form questionnaire (61 questions).

Inclusion/Exclusion: Historical census data for Saskatoon dates back to 1991 and for the Saskatoon Health Region and rural areas to 2001. **Aboriginal identity** is self-reported by persons identifying with at least one Aboriginal group, that is, North American Indian, Métis or Inuit, and/or those who reported being a Treaty Indian or a Registered Indian, as defined by the *Indian Act of Canada*, and/or those who reported they were members of an Indian band or First Nation.

Limitations: Census sub-division boundaries were not apportioned to the exact health region boundaries. This means, for example, that instead of having 22% of the census sub division of Harris, the data includes all people in the census sub division of Harris. As a result, more people are included in the SHR boundary (approximately 3,500) than otherwise should. This pertains specifically to rural SHR.

- Census information is subjected to a confidentiality procedure known as random rounding to prevent associating any census information to a particular individual. This means that totals are rounded up or down to a multiple of 5 and in some cases 10. When averages are reported, both the denominator and numerator values are rounded before the calculation is performed. Random rounding means that small cell counts may suffer from significant distortion, as in the case with core neighbourhoods, where each of the six neighbourhoods rounded totals were added together. Statistics Canada states that imprecision as a result of the random rounding tends to cancel each other out.
- Suppression of census data occurs for any communities that have a population of less than 40. For income information, data is suppressed for communities with less than 250 population or less than 40 private households.

Mortality data

Data Source: Saskatchewan Ministry of Health's Vital Statistics Branch.

Definition: Deaths to SHR residents are aggregated from 1991-2006 from Saskatchewan Vital Statistics, Alberta Vital Statistics, and CIHI hospital separations for deaths occurring in all other provinces.
ICD-9 codes are used for all deaths before calendar year 2000 and after this date ICD-10 codes are used.

Inclusion/Exclusion: includes those persons with Saskatchewan recorded as their province of residence.

Limitations: Conversion between ICD-9 and ICD-10 codes can be problematic for certain disease conditions because the codes are not comparable. Vital Statistics data is based on the underlying cause of death, which is limited to one diagnosis, unless there is an injury, and then there is a separate code for the external cause.

Readers should note that there may be more than one contributing cause of death, but that only the most responsible cause is used.

Birth data

Data Source: Saskatchewan Ministry of Health's Vital Statistics Branch.

Definition: births occurring to SHR residents from 1991 to 2006 using data from Saskatchewan Vital Statistics, Alberta Vital Statistics, and CIHI hospital separations for births occurring in all other provinces.

Inclusion/Exclusion: includes only those mothers who have put Saskatchewan as their province of residence.

Hospital Discharge (Hospitalization) data

Data Source: Saskatchewan Ministry of Health's year-end hospital files.

Definition: Hospital discharges (separations) include all acute care inpatient and psychiatric inpatient discharges for SHR residents. This data is based on total number of hospital discharges, irrespective of how many times the same individual is discharged. For example, one person could present five times in a fiscal year for a mental disorder, and it would be counted as five discharges. As well, a resident may be admitted to one hospital, and be transferred to another hospital which would count as two discharges, even though the individual was hospitalized for the same event.

Limitations: ICD-9 codes are used for all hospital separations prior to 2000/01 fiscal year, and ICD-10 are used after this date. Some 2001-02 data and 1997-98 to 2003-04 are based on converted codes (to ICD-9 to ICD-10-CA). Differences between data coded in ICD-10 and ICD-9 occur for several reasons. The conversion tables are not perfect due to differences in the structure of the two coding systems.

Inclusion/Exclusion: All acute care inpatient and psychiatric inpatient hospitalizations of SHR residents in Saskatchewan and out-of-province/country hospitals.

Canadian Community Health Survey (CCHS)

Data Source: Statistics Canada.

Definition: The CCHS is a cross-sectional survey that collects information related to health status, health care utilization and health determinants for the Canadian population. CCHS has been conducted four times between 2001 and 2007, with the target population being all Canadians aged 12 and over, (approximately 135,000 people per year). For SHR, the sample is approximately 1,200 in each year. Some questions are not asked in each CCHS cycle, as such only the most recent year available is reported.

Inclusions/Exclusions: Excluded from the sampling frame are individuals living on Indian Reserves and on Crown Lands, institutional residents, full-time members of the Canadian Forces, and residents of certain remote regions. Its coverage is in the range of 98% in the provinces.

Limitations: Not available for any area below the health region (i.e. by city neighbourhood or rural municipality).

Merged Canadian Community Health Survey

Data Source: Statistics Canada.

Definition: Three cycles of the CCHS, from 2001 to 2005, were merged together to be used as an exploratory data set to analyze in more detail SHR rural resident health behaviour. A total of 668 rural residents were available in this data set.

Inclusion/Exclusion: Same as above.

Limitations: Statistics Canada has not issued guidelines for merging 3 CCHS cycles together, so caution is needed when interpreting results from this data set. Variance estimates were calculated using the design effect

for a simple random sample method, instead of the bootstrap method as advised by Statistics Canada. The bootstrap method was not utilized due to technological difficulties and methodologic limitations. The potential variances between these two methods are expected to be small.

2007 Student Health Survey

Data Source: Public Health Services, Saskatoon Health Region

Definition: Between February and March 2007, 4,093 youth in grades 5 to 8 (ages 9 to 15) completed a comprehensive health and behaviour survey. The survey instrument used in the study was adapted from the comprehensive National Longitudinal Survey for Children and Youth (NLSCY) developed by Statistics Canada.

Inclusions/Exclusions: The survey was conducted in all Public and Greater Catholic elementary schools in Saskatoon. John Dolan and Sion Middle School did not participate in the survey.

Limitations: Response rate was 41% which is relatively low and can affect the generalizability of the findings.

Communicable Disease Data

Data Source: Public Health Information System (PHIS) and Communicable Disease Control (CDC) database.

Inclusions/Exclusions: All disease reportable under the Public Health Act is reported to the Regional Health Authority's Disease Control department of Public Health Services with the exception of tuberculosis which is monitored by the Saskatchewan Tuberculosis Control Program. Reportable disease is entered in the Public Health Information System (PHIS) and CDC database. Sexually transmitted infection counts are aggregated by confirmed case status and case status date; other reportable disease is aggregated by date reported (CDC database). Communicable diseases with less than five counts per cell are suppressed.

Limitations: HIV is a non-nominal reportable disease; estimates of co-morbidity are done using linkage by first two letters of first and last names and date of birth and result in an underestimate of co-morbid conditions. HIV and Hepatitis C require cross checking with provincial registries to ensure cases have not been previously reported in other jurisdictions. Annual case counts may change over time.

Immunization Coverage Data

Data Source: Saskatchewan Immunization Management System (SIMS), Workplace Safety and Wellness (Parklane), Public Health Services, Saskatoon Health Region (influenza in persons 65 years and older).

Inclusions/Exclusions: Data contained in this report was obtained for the calendar years 2002 to 2008. Children are registered in SIMS at birth. Two year child immunization coverage rates are reported by the year children turn two years; the numerator represents all children with up to date immunization (age appropriate number of doses) and the denominator represents of all children registered in SIMS.

Limitations: Neighbourhood-specific rates are calculated by postal code; individuals without accurate postal code information are unmatched to a neighbourhood or rural grouping and are not included in geographic-specific rates (estimated less than 4%). However, they will be included in SHR rates. Postal code information is not collected during adult influenza immunization drives so sub-regional comparisons cannot be made.

Coverage rates for clients 6 to 23 months old: the numerator consists of all clients 6 to 23 months old between the specified 2008/2009 immunization dates who received at least one dose of influenza vaccine prior to their second birthday LESS the number of clients with invalid doses. If a client had one valid dose, and one invalid dose, they will be counted in both the "all doses", and the "invalid doses" and therefore will still be covered in the coverage rate report. If a client had no "valid" doses, they will be removed from the coverage. The SIMS population denominator consists of all clients registered in SIMS who were 6 months to 23 months old between the specified immunization start and end dates. This includes all persons in the Saskatchewan Health Person Registry System who were 6 to 23 months old, and held active coverage, as of the run date (March 2, 2009).

Staff Consultations

Data Source: Public Health Services staff and managers within Community Services Division, Saskatoon Health Region, reviewed preliminary results from this report in September and October 2008. This qualitative feedback helped inform content and recommendations contained herein. Staff comments are included in this report.

Other Data Limitations

- Small populations within certain areas (namely the core neighbourhoods of Saskatoon) coupled with the fact that many health events are relatively rare, means that there can be instability in yearly rates. Where possible, years have been combined to provide more certainty to trends over time.
- Any analysis focused on comparing health status of residents in different geographies is limited as we do not know how long residents have lived in certain areas. There is no way to tell from our data how long residents have actually lived in their area, therefore any health impacts from living in that area may be confounded.

International Classification of Disease Codes

ICD-9 Code Name (Chapter Titles in all caps)	ICD-9-CM Code Range	ICD-10	ICD-10 Code Name (Chapter Titles in all caps)
INFECTIOUS AND PARASITIC DISEASES	001-139	A00-B99	INFECTIOUS AND PARASITIC DISEASES
NEOPLASMS	140-239	C00-D49	NEOPLASMS
Lung	162.1-162.9	C34	Lung
Breast	174	C50	Breast
Prostate	185	C61	Prostate
Colorectal	153-154, 159.0	C18-C21, C26.0	Colorectal
Bladder		C67	Bladder
Leukemia		C90.1, C91-C95	Leukemia
ENDOCRINE, NUTRITIONAL AND METABOLIC DISEASES	240-279	E00-E90	ENDOCRINE, NUTRITIONAL AND METABOLIC DISEASES
Diabetes	250	E10-E14	Diabetes
DISEASES OF BLOOD AND BLOOD FORMING ORGANS	280-289	D50-D99	DISEASES OF BLOOD AND BLOOD FORMING ORGANS
MENTAL DISORDERS	290-318	F00-F99	MENTAL & BEHAVIOURAL DISORDERS
		F00-F09	Organic mental disorders
		F10-F19	Substance use disorders
		F20-F29	Schizophrenia and related
		F30-F39	Mood affective disorders
		F40-F48	Stress related and somatoform disorders
		F50-F99	Other
DISEASES OF THE NERVOUS SYSTEM	320-388	G00-G99	DISEASES OF THE NERVOUS SYSTEM
EYE AND ADNEXA DISORDERS	360-379	H00-H59	EYE AND ADNEXA DISORDERS

Continued . . .

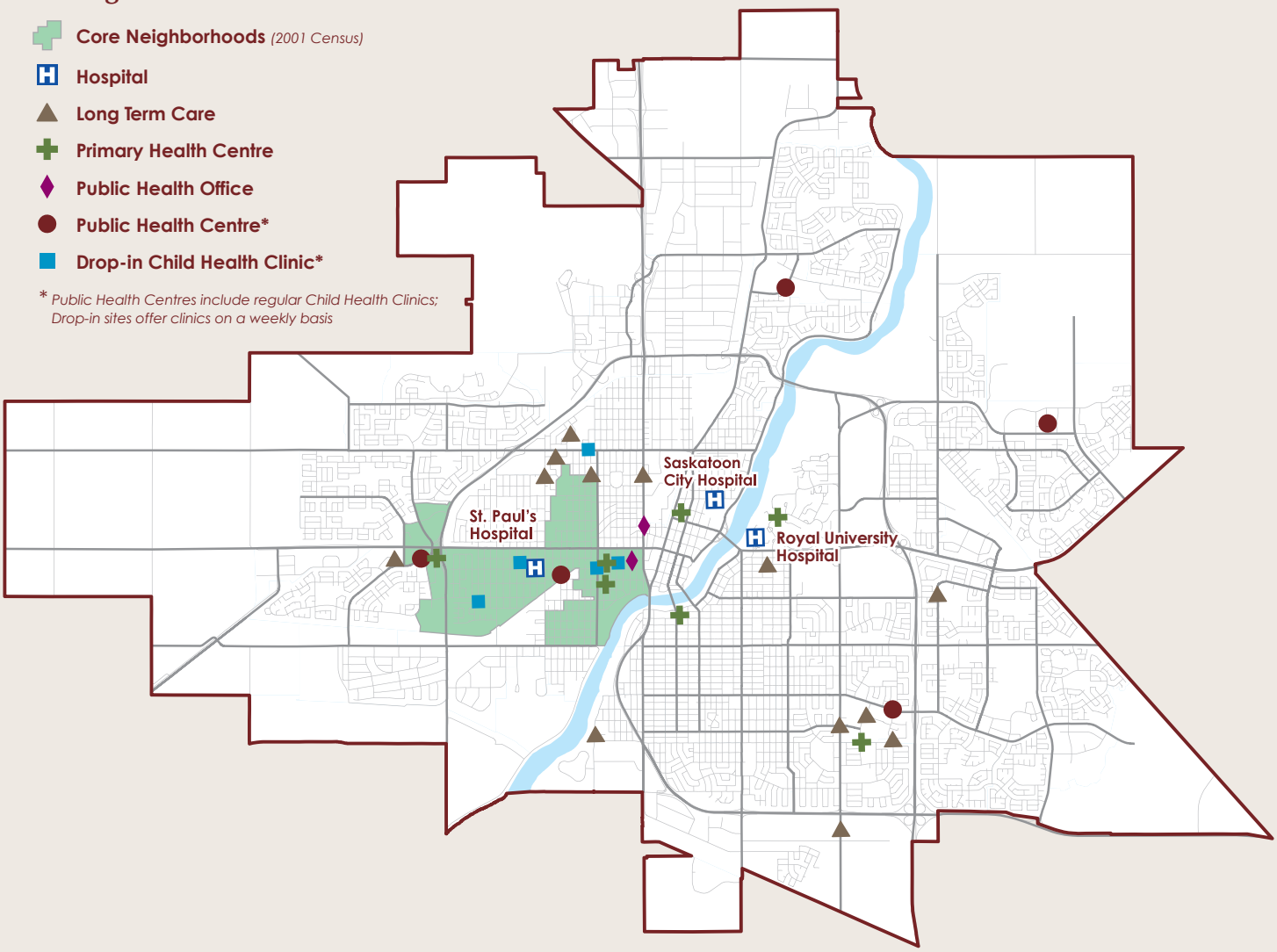
ICD-9 Code Name (Chapter Titles in all caps)	ICD-9-CM Code Range	ICD-10	ICD-10 Code Name (Chapter Titles in all caps)
EAR AND MASTOID DISORDERS	380-389	H60-H95	EAR AND MASTOID DISORDERS
CIRCULATORY DISEASE	390-459	I00-I99	CIRCULATORY DISEASE
Ischemic heart disease (coronary)	410-414	I20-I25	Ischemic heart disease (coronary)
Acute myocardial infarction	410	I21-I22	Acute myocardial infarction
Cerebrovascular disease (stroke)	430-438	I60-I69	Cerebrovascular disease (stroke)
RESPIRATORY DISEASE	460-519	J00-J99	RESPIRATORY DISEASE
Chronic obstructive pulmonary disease and allied conditions	490-496	J40-J47	Chronic obstructive pulmonary disease and allied conditions
Asthma	493	J45	Asthma
DIGESTIVE SYSTEM DISEASE	520-579	K00-K93	DIGESTIVE SYSTEM DISEASE
Chronic liver disease	571	K70, K73, K74	Chronic liver disease
DISEASES OF THE GENITOURINARY SYSTEM	580-629	N00-N99	DISEASES OF THE GENITOURINARY SYSTEM
COMPLICATIONS OF PREGNANCY, CHILDBIRTH AND THE PUERPERIUM	630-676	O00-O99	COMPLICATIONS OF PREGNANCY, CHILDBIRTH AND THE PUERPERIUM
DISEASES OF THE SKIN AND SUBCUTANEOUS TISSUE	680-709	L00-L99	DISEASES OF THE SKIN AND SUBCUTANEOUS TISSUE
DISEASES OF THE MUSCULOSKELETAL SYSTEM AND CONNECTIVE TISSUE	710-739	M00-M99	DISEASES OF THE MUSCULOSKELETAL SYSTEM AND CONNECTIVE TISSUE
CONGENITAL ANOMALIES	740-759	Q00-Q99	CONGENITAL ANOMALIES
CERTAIN CONDITIONS ORIGINATING IN THE PERINATAL PERIOD	760-779	P00-P96	CERTAIN CONDITIONS ORIGINATING IN THE PERINATAL PERIOD
SYMPTOMS, SIGNS AND ILL-DEFINED CONDITIONS	780-799	R00-R99	SYMPTOMS, SIGNS AND ILL-DEFINED CONDITIONS
SUPPLEMENTARY CLASSIFICATION OF FACTORS INFLUENCING HEALTH STATUS AND CONTACT WITH HEALTH SERVICES	V01-V82	Z00-Z99	SUPPLEMENTARY CLASSIFICATION OF FACTORS INFLUENCING HEALTH STATUS AND CONTACT WITH HEALTH SERVICES
Detailed Injury Coding			
EXTERNAL CAUSES OF MORBIDITY AND MORTALITY	E800-E999	V00-Y98	EXTERNAL CAUSES OF MORBIDITY AND MORTALITY
All unintentional injury	E800-E869, E880-E929	V01-V99, W00-W99, X00-X59, Y85-Y86	All unintentional injury
Falls	E880-E886, E888	W00-W19	Falls
Land transport (motor vehicle, pedestrian, cyclist, rail and other)	E800-E829	V01-V89	Land transport (motor vehicle, pedestrian, cyclist, rail and other)
All intentional injury	E950-E978, E990-E999	X60-X99, Y00-Y09, Y35-Y36, Y87.0, Y87.1, Y89.0, Y89.1	All intentional injury
Suicide & self-inflicted injury	E950-E959	X60-X84, Y87.0	Suicide & self-inflicted injury

City of Saskatoon

Legend

- Core Neighborhoods *(2001 Census)*
- Hospital
- Long Term Care
- Primary Health Centre
- Public Health Office
- Public Health Centre*
- Drop-in Child Health Clinic*

* *Public Health Centres include regular Child Health Clinics; Drop-in sites offer clinics on a weekly basis*



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