



CHAPTER SEVEN

Life Expectancy and Mortality for Manitoba Women

In this chapter, we look at the end of women's lives. This chapter examines life expectancy for Manitoba women and premature mortality, before considering the causes of women's deaths.

In this chapter you will find:

1. Life Expectancy at Birth
2. Life Expectancy at Age 65
3. Health Adjusted Life Expectancy
4. Premature Mortality
5. Women's Mortality and Causes of Death in Manitoba





Women’s Life Expectancy in Manitoba

Introduction

Life expectancy is used in Canada and internationally as a basic measure of the health of a population. There are typically two measures used. Life expectancy at birth describes the experience of all people for all ages [1]. It can describe the greater likelihood that children and infants die before the age of 5 in many countries. Life expectancy at 65 is an indicator of the health of elderly people, and in many ways is a measure of how well societies look after their older citizens.

Worldwide, women typically live longer than men [2]. This is also the case in Manitoba and Canada. Women live longer than men but also, as we have seen, have higher rates of some chronic diseases and are more likely to live with disabilities and mobility restrictions as they age (see Chapter Five on women’s experience of disease). To truly understand the health status of older women, measures of life expectancy, then, should be considered in the context of measures of self-rated health (Chapter Five) as well as the quality of life, as we do in this chapter with the indicator Health Adjusted Life Expectancy.

Life Expectancy at Birth

Canadians still enjoy long lives compared to people in most other countries in the world. Canada ranks ninth for life expectancy among 30 countries considered by the OECD¹ in 2007 [2].

Life expectancy at birth in Manitoba is also high, and has not changed in over 10 years [1]. In 2005 Manitoba females had an average life expectancy of 81.3 years, and males had a life expectancy of 75.8 years, very similar to life expectancy for Canada as a whole (average 81.4 for females and 75.9 years for males in Canada)[3].

Life Expectancy at Birth is the number of years a person would be expected to live from the time of birth, if the age- and sex-specific mortality rates for a given year were held constant over the estimated life span [4].

Figure 1 shows life expectancy at birth for females and males in Manitoba, by Regional Health Authority (RHA). Although life expectancy differences may appear to be slight between the sexes, and between and among RHAs, even a couple of years’ difference can be noteworthy.

Manitoba females in the southern RHAs, including Brandon and Winnipeg, have longer life expectancies at birth, than women in the north who have life expectancies that are shorter by as much as 7 years. Fransoo et al note that there is considerable variation within RHAs (and between districts in some

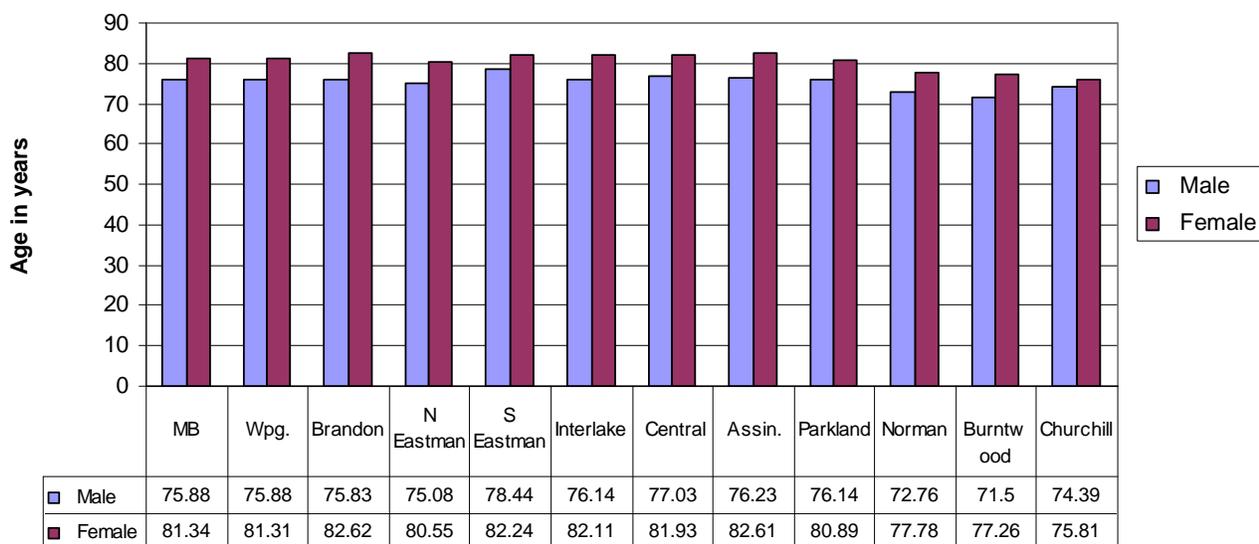
¹ OECD is the Organisation for Economic Cooperation and Development. The OECD member countries are: Australia, Austria, Belgium, Canada, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Korea, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, the Slovak Republic, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States. The Commission of the European Communities takes part in the work of the OECD [2].





RHAs), even in RHAs where the population overall is “healthy”² [1]. These geographical differences are important and may illustrate where health programs and prevention and promotion initiatives should be directed [1].

Figure 1. Life Expectancy at Birth for Manitoba Males and Females, 1999-2003



Source: Manitoba Centre for Health Policy 2005. Life expectancy is not age-standardized [1].

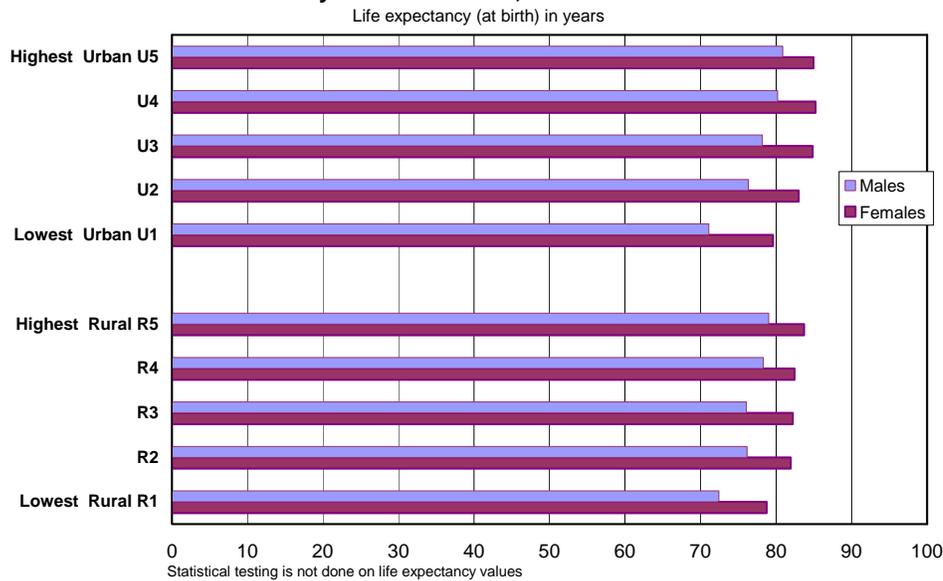
A closer investigation of life expectancy at birth by income quintile, not surprisingly, found that living with lower income shortens women’s and men’s lives (Figure 2) [1]. Furthermore, the difference in life expectancy between the sexes became larger with reduced income. That is, although both females and males with lower incomes have shorter life expectancies than those who live in higher income areas, females with low income have a life expectancy at birth that is as much as 8.5 years longer than the life expectancy at birth for low income males.

² See Figure 2.1.2 Life Expectancy by District, 1999-2003, in Fransoo et al [1].





Figure 2: Life Expectancy at Birth for Manitoba Males and Females by Income Quintile, 1990 – 2003



Source: Manitoba Centre for Health Policy 2005.

These findings are consistent with what we know about the health of low income women and men in the province, the incidence and prevalence of disease and complications they live with, and the interaction of social conditions with diet, smoking and other lifestyle choices and opportunities (Chapters Two and Five). Low income women, for instance, consistently have higher rates of diabetes, heart disease and cancers, compared with women with more income. This greater burden of disease and poor health ultimately leads to shorter life expectancies for the women with low income.

The actual mechanisms explaining sex differences in life expectancy are not entirely understood [5]. A Canadian exploration of national data did find that “external” and preventable causes were responsible for a large portion of the gap in life expectancy in males and females [5]. Young men, for example, are more likely to engage in dangerous behaviours, and in fact are more likely to die from their risky endeavours [5, 6]. Women may not have a biological advantage over men, but are at lower risk of preventable death [5].

First Nation Women³

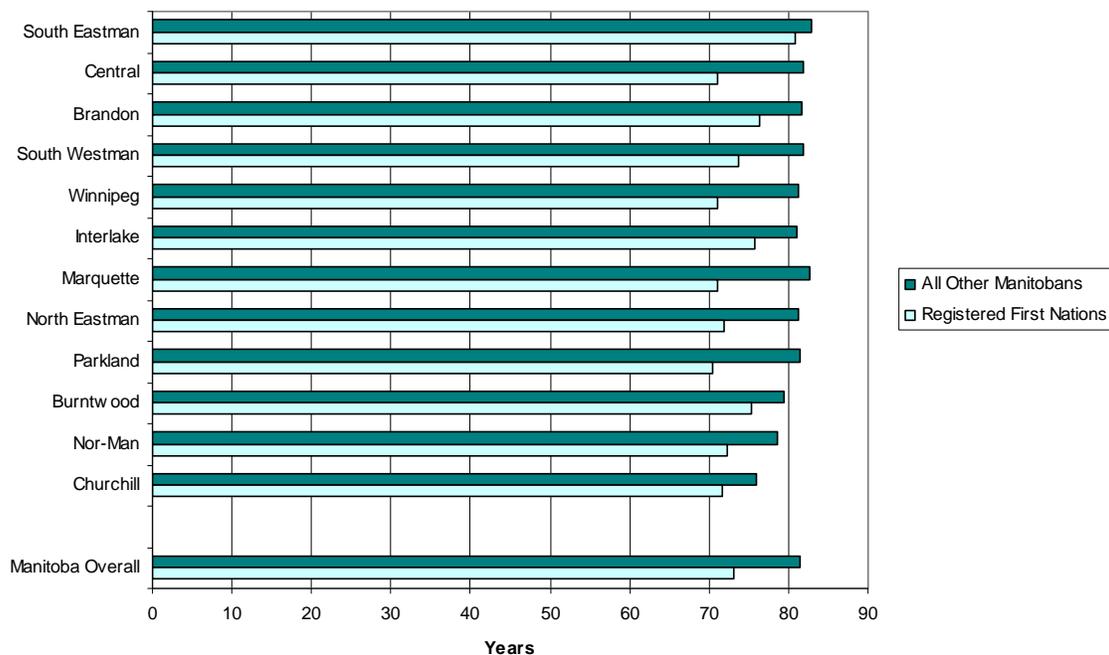
Manitoba First Nations women have, in general, shorter life expectancies than the non-First Nations population (73.2 years compared with 81.4 years in 1999). However Martens et al found that life expectancy among First Nations women varies widely across the province, with no discernable patterns [7], as illustrated in Figure 3.

³ The 2002 Manitoba Centre for Health Policy report *The Health and Health Care Use of Registered First Nations People Living in Manitoba: A Population-Based Study*, cited in this section, used special data runs that linked Manitoba health care-use data with the Status Verification System (SVS), in consultation with the Assembly of Manitoba Chiefs. Linking the Manitoba health data to the SVS was done strictly for this one report [7]. This makes the findings here different from, and not fully comparable to, other data used to describe First Nations women’s health in this *Profile*.





Figure 3. Life Expectancy at Birth (years) for Females Registered First Nations vs All Other Manitobans by RHA 1995 - 1999



Source: Manitoba Centre for Health Policy 2002

First Nations women live, on average, 8 fewer years than all other Manitoban women, an alarming difference⁴. This reflects a history and current conditions of disadvantage and discrimination faced by many First Nations women. Martens et al found, for instance, that the reasons for First Nations women's shorter lives are not easily explained by how close they live to health care resources. Two of the more northerly and remote communities (Keewatin and Island Lakes) had the highest life expectancies among First Nations, but the lowest life expectancies were among residents of First Nations communities that are close to Brandon and Winnipeg (communities that are part of Dakota Ojibway Tribal Council and Southeast Resource Development Council) [8]. Furthermore, "on reserve" women had a life expectancy that, on average, was one year longer (73.8 years) than those who lived "off reserve" (72.8 years) [7]. The authors note that access to health care alone will not resolve the great discrepancy in health or life expectancy seen between First Nation and non-First Nation women in Manitoba [8], or even among First Nations communities. This is in keeping with what Aboriginal women have said in qualitative studies: that their health and the health of their communities will improve when systemic problems are addressed, primarily poverty, discrimination, violence and poor housing, among others [9, 10].

⁴ No test of statistical significance was done on life expectancies [7].





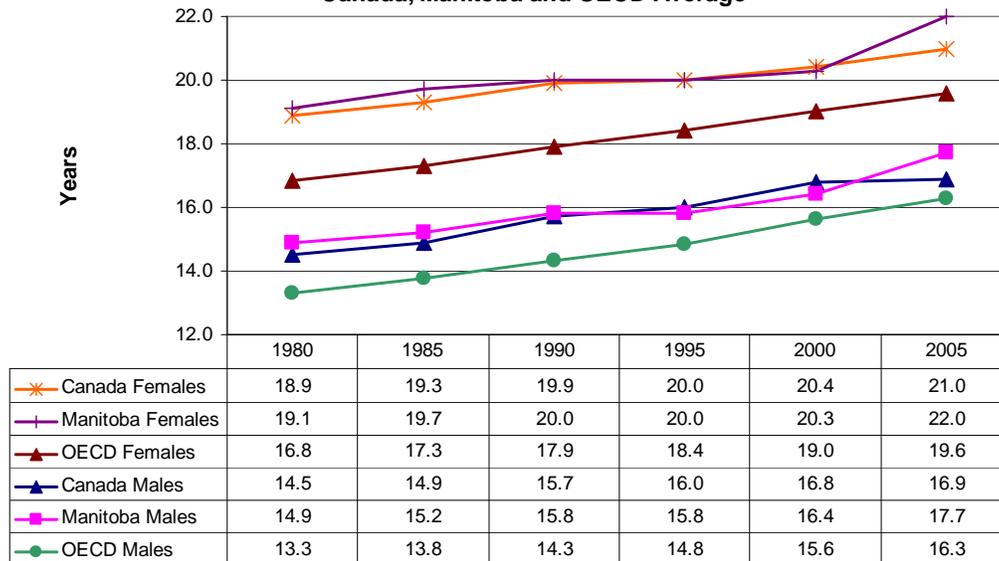
Life Expectancy at Age 65⁵

Life expectancy at age 65 is used as a population health measure of quality of life, social and economic conditions for seniors, and may point to inequalities between sub-populations.

Life expectancy at age 65 has increased for both men and women over the past few decades in Canada [4]. In 1980, the average life expectancy for Canadian women at age 65 was 18.9 years (that is, living to age 83.9) and 14.5 years for men (that is, living to age 79.5). By 2005, the average life expectancy for women at age 65 had increased to 21.0 years and for men it had increased to 16.9 years. Currently, Manitoba women and men live slightly longer than the Canadian average. In 2005, the life expectancy for Manitoba women at age 65 was 22.0 years (living to 87 years of age) and for men it was 17.7 years (living to 82.7 years) [3, 11].

Life Expectancy at Age 65 is the number of years a person would be expected to live, starting at age 65, if the age- and sex-specific mortality rates for a given year were held constant over the estimated life span [3].

**Figure 4. Life Expectancy at Age 65
- Canada, Manitoba and OECD Average**



Sources: Statistics Canada CANSIM Tables 102-0025 and 102-0511 and OECD *Health at a Glance* 2007

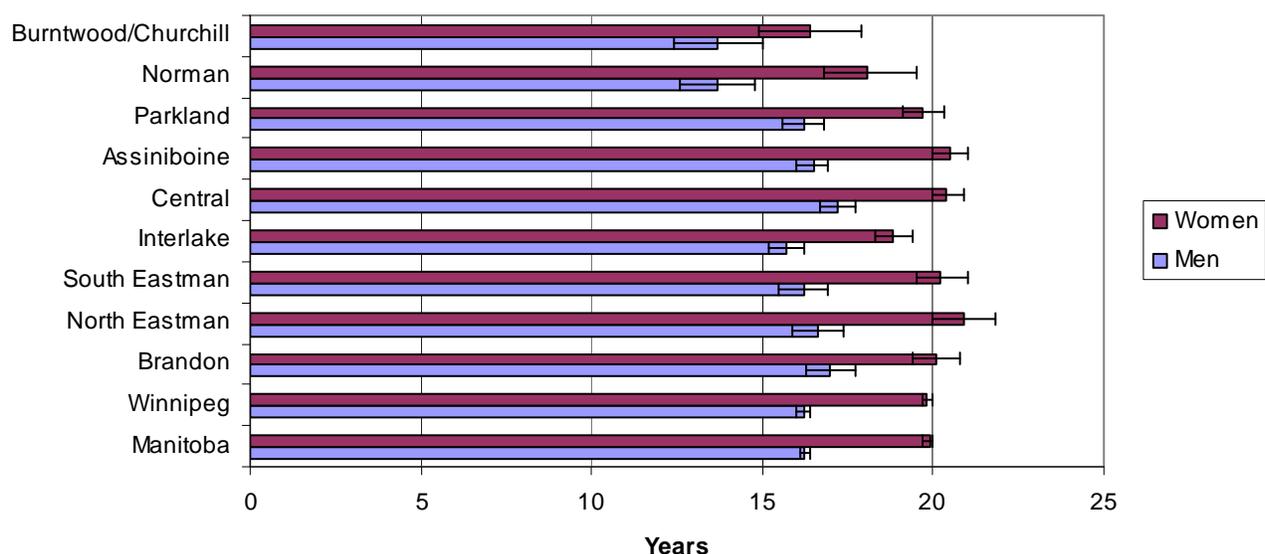
Both Manitoba women and men fared better than the average for their counterparts in OECD countries as illustrated in Figure 4 [2].

⁵ Material in this section was previously produced in *Manitoba Field Testing of Gender-Sensitive Core Set of Leading Health Indicators*, by Donner, Haworth-Brockman and Isfeld (2006). The authors are grateful to the WHO Kobe Centre for technical assistance.





Figure 5. Life Expectancy at Age 65 for Manitoba Women and Men by RHA, 1997



Source: Statistics Canada, Health Indicators, November 2003

Within Manitoba, there are wide variations in life expectancy at 65⁶ among Manitoba's Regional Health Authorities (RHAs) as there are for life expectancy at birth (Figure 5). Generally, women and men in rural and southern Manitoba have longer life expectancies at age 65 than those in northern Manitoba. The exception to the general trend is the longer life expectancy of women in the North Eastman RHA [12].

The gap in life expectancy between men and women at age 65 has been decreasing over the past 25 years. In 1980, Manitoba men aged 65 lived, on average, 4.2 years less than their female counterparts. By 2002, this difference had decreased to 3.9 years [13], although as Figure 4 shows, the gap increased again to 4.3 in 2005. In Canada as a whole, the gap between the sexes decreased from 4.4 years to 4.1 years over this period [3, 11]. Among all OECD countries, the gap in life expectancy has remained relatively unchanged, from 3.5 to 3.3 years during this time [1]. The shrinking gap in life expectancy between men and women has been attributed to better health of men in general and better treatments for diseases and conditions in both men and women [14, 15].

Both indicators of life expectancy – at birth, and from age 65 – show that women live longer than men in Manitoba. Manitoba women also live longer now than they ever have before. The narrowing gap between the sexes is attributed to smaller differences between the sexes in rates of tobacco smoking and other high risk lifestyle habits, as well as decreased mortality for men from cardio-vascular diseases [2]. Lower mortality from heart disease, stroke and cancers (particularly breast cancer) also accounts for more women living longer than ever before. On the other hand, increases in diabetes and overweight in women

⁶ The 95 % confidence interval (CI) illustrates the degree of variability associated with a number. Wide confidence intervals indicate high variability, thus, these numbers should be interpreted and compared with due caution.





may soon be seen to reduce women's life expectancies, and although fewer women now smoke tobacco, women's past smoking habits and past exposures, are currently leading to some reduction in life expectancy because of increasing lung cancer and other smoking-related diseases in women [14, 15].

Living longer, however, is not the same as living with good health, as an examination of Health Adjusted Life Expectancy demonstrates.

Health Adjusted Life Expectancy⁷

Increased life expectancy at age 65 is not necessarily accompanied by additional years of good health and functional status. "Health Adjusted Life Expectancy" (HALE) was developed to address this issue [16] and HALE is included in *Healthy Canadians: A Federal Report on Comparable Health Indicators* 2006 and in the corresponding provincial reports, as it is one of the Comparable Health Indicators mandated for reporting by the First Ministers [17].

Statistics Canada describes HALE as follows:

Health-adjusted life expectancy is a more comprehensive indicator than that of life expectancy because it introduces the concept of quality of life. Health-adjusted life expectancy is the number of years in perfect health that an individual can expect to live given the current morbidity and mortality conditions. Health-adjusted life expectancy uses the Health Utility Index⁸ (HUI) to weigh years lived in good health higher than years lived in poor health. Thus, health-adjusted life expectancy is not only a measure of quantity of life but also a measure of quality of life. [16]

Figure 6 shows the differences in Health Adjusted Life Expectancy at age 65 among Canadian and Manitoban women and men in 2001. It is important to note that the gender gap in HALE is much smaller than the gender gap in life expectancy. That is, even though women live longer than men, they have a higher incidence of chronic diseases, and so their last years are not necessarily healthy. This was illustrated in the measure of self-rated health which found that older women (aged 65 years and more) were more likely to rate their health as poor or fair (Chapter Five). Fifty percent or more of women with heart disease, arthritis or diabetes in 2001, for instance, living in the lower two of five income quintiles, reported their health to be only fair to poor, and worse than the year before [18].

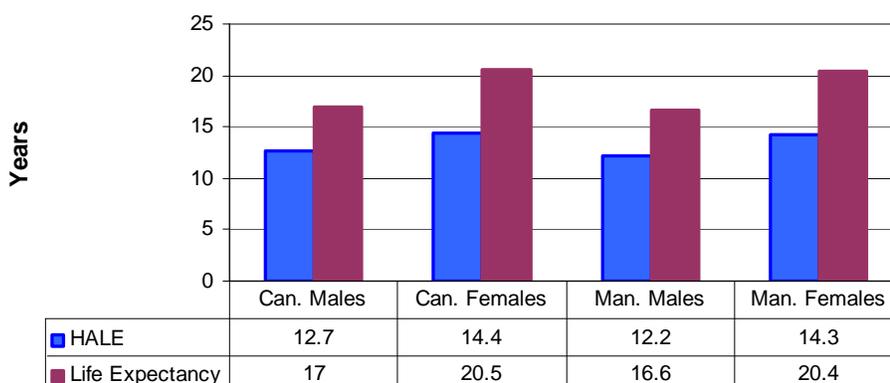
⁷ See footnote 5.

⁸ The Health Utility Index is a summary measure of an individual's overall health. It is a single index based on functional capacity: vision, hearing, speech, mobility, dexterity, emotion, cognition and pain. The HUI score range is 0 (death) to 1 (perfect health). A score equal to or less than 0.8 is considered poor health [18]. The HUI does not recognize that persons living with long term disabilities may consider their own health to be excellent.





Figure 6. Life Expectancy and Health Adjusted Life Expectancy - Canada & Manitoba 2000-2001



Source: Statistics Canada, CANSIM Table 102-0121
 Note: HALE is at age 65.

Discussion – Life Expectancy & Health Adjusted Life Expectancy

The long lives Manitoba women enjoy overall bear more scrutiny, particularly for some sub-populations, since women’s longevity is closely related to the socio-economic conditions in which they live [4]. Poor women have considerably shorter lives, whether they live in urban or rural areas. (Rural living is linked to a somewhat reduced life expectancy for the Canadian population as a whole [5].) Life expectancies for First Nations women in Manitoba are considerably lower than for the non-First Nations women. As income disparities in Canada are growing – the gap between the wealthiest and poorest is widening– we cannot hope that poor women’s life expectancies will increase just by allocating more funds to acute health care treatments.

A number of studies have found that life-expectancy and health-adjusted life expectancy⁹ are affected by women’s experience of chronic pain [19, 20], chronic disease such as diabetes [21], smoking [5, 22] and asthma [21]. Some authors also found links between life expectancy and non-clinical factors such as migration [23] and sexual orientation (when marginalized) [24]. In Canada, more women than men (4 million compared to 3 million) report having two or more chronic conditions and 500,000 more women than men report having disabilities that affect their daily functioning [5, also 18]. The data available for HALE do not yet allow for investigation of the overall health of elderly women who are poor, Aboriginal women, women with disabilities or other sub-populations. As Aboriginal women, for instance, cope with more chronic diseases, it would be valuable to establish HALE for Aboriginal women, and then to use this information to monitor Aboriginal women’s health if improvements are made for other indicators of health.

⁹ Some health indicator research examines Disability-Free Life Expectancy, which is similar to, but not an exact equivalent of HALE. For an in-depth discussion of HALE and similar measurements, see Mathers et al [25].





Increases in life expectancies in developed countries are attributed, as noted, to better overall nutrition, good health care where available and affordable, and better treatment and survival of cardio-vascular disease and cancer, but the correlation between income and life expectancy remains. A study in the UK noted that women in the highest of five status categories, with well paid jobs and good control over their work and lives, lived longest. Women with less income had poor diets, and were more likely to drink and smoke tobacco, and had much less decision-making power in their jobs, which contributed to their lower life expectancies, but were not the exclusive causes [15]. Twenty previous years of improved life expectancies in the U.S. began to reverse from 1983 to 1991, attributed to “increased mortality from lung cancer, chronic obstructive pulmonary disease, diabetes and a range of other non-communicable diseases, which were no longer compensated for by the decline in cardiovascular mortality.” Declines in life expectancy were most notable among the worst-off portions of the American population, and life expectancies in women declined primarily because of chronic diseases related to smoking, overweight and high blood pressure [14].

Chapter Five of this *Profile* documented that women are more likely to have high blood pressure, hypertension and arthritis, particularly as they age (with considerably higher rates seen for First Nations women). Women in Manitoba are more likely to be treated for hip fractures, which are associated with considerable pain for women. As our provincial population continues to age, life expectancy and HALE remain important measures of how well Manitoba social and health systems care for the women who live here. Whether longer life expectancy is accompanied by good health and independent functioning among seniors has important implications for health care and social services systems, and for women, who overwhelmingly bear the burden of informal care to seniors. It is therefore important to monitor both life expectancy and HALE. Programs, plans and services designed for seniors need to include consideration of women’s quality of life, not just the duration of their lives.

Premature Mortality

Premature mortality is a measure of women’s (and men’s) rate of death before reaching their life expectancy and is considered a robust measure of health status [33].

The Manitoba Centre for Health Policy *Sex Differences* report provides information about women’s mortality and premature mortality¹⁰. Figure 7 illustrates the rate at which Manitoba women and men died prematurely (per 1,000) in the 10 years 1994 – 2003. Women were much less likely to die prematurely than men (2.6 versus 4.4 premature deaths per 1,000 residents). This was true for

Premature Mortality Rate is the number of deaths per 1,000 residents, aged 0 to 74 years [1]. That is, death before age 75.

¹⁰ The Manitoba Centre for Health Policy more recently released new analyses of premature mortality rates. See Martens et al (2008) [33].

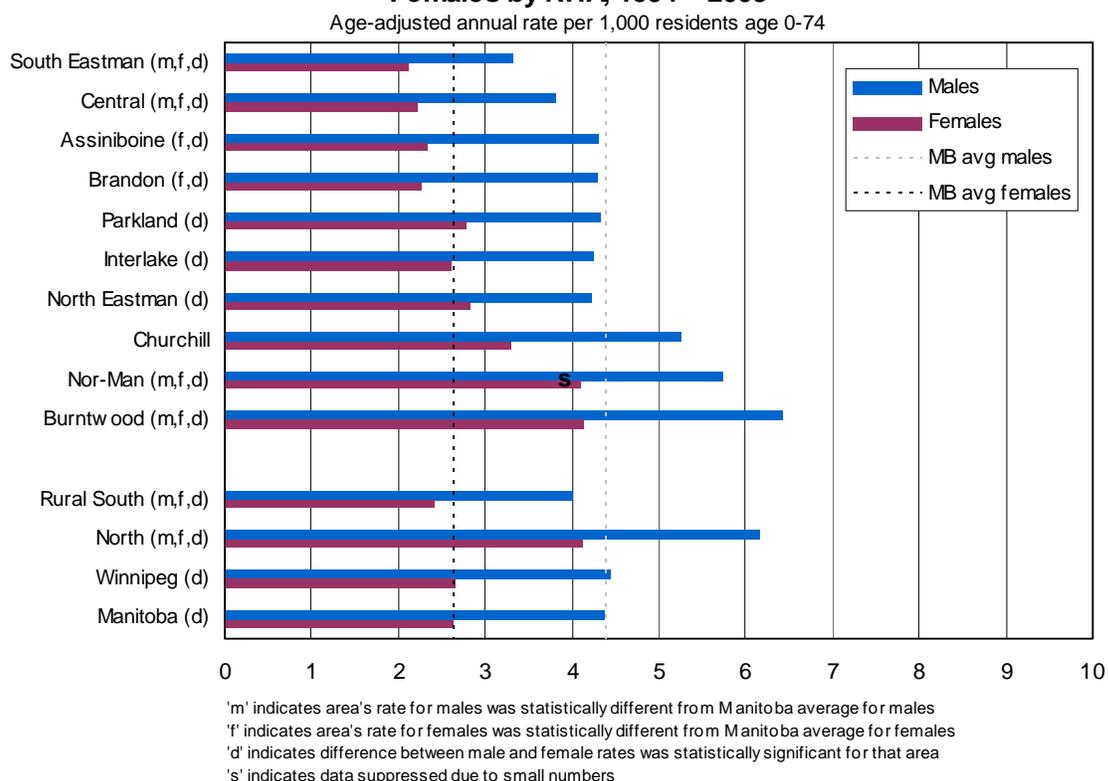




all RHAs and for all districts within RHAs [1]. That is, men are more likely than women to die before the age of 75. Premature mortality rates have declined over time, in keeping with increases in life expectancies from birth and at age 65 [1].

There was however considerable variability among RHAs and even within RHAs¹¹ in Manitoba [1]. Women in the north were significantly more likely to die before the age of 75 than women in the rural southern regions, Brandon or Winnipeg [1].

Figure 7: Premature Mortality Rates for Manitoba Males and Females by RHA, 1994 – 2003



Source: Manitoba Centre for Health Policy 2005.

Women were progressively more likely to die prematurely as income declined in both rural and urban Manitoba (Figure 8). While differences for women are not as large as for men, both rural and urban women were nearly twice as likely to die prematurely in the lowest income groups than in the next highest quintile.

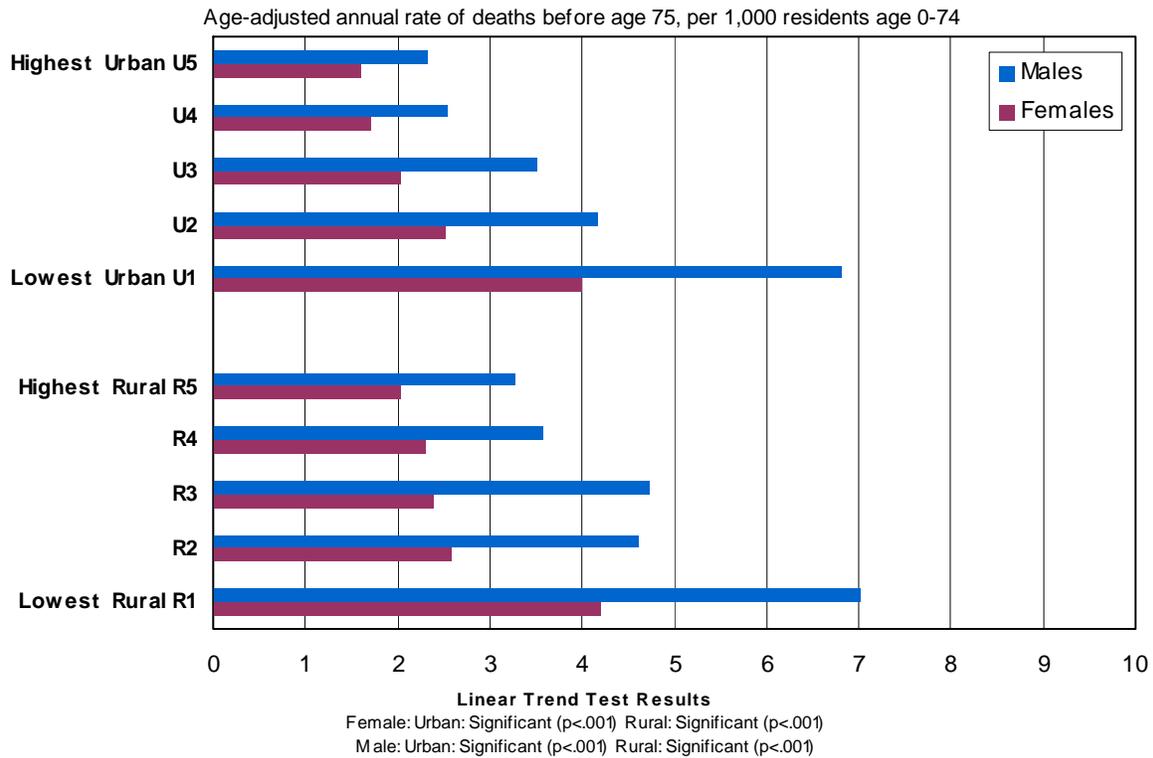
¹¹ See Figure 2.4.2 Premature Mortality Rates by District 1994-2003 in Fransoo et al [2], and also Figure 2.2 Premature Mortality Rates for Females by District in Martens et al [33].





In a meta-analysis of U.S. data from 1960 to 2002, Krieger measured premature mortality by income quintile (here premature mortality was measured as death before age 65). Premature mortality declined in all quintiles and across ethnic categories between 1966 and 1980. However relative health inequities widened after 1980, a factor the authors link to American rollbacks of federally-funded social programs [26]. Given that premature mortality is demonstrably higher for low income women in this province, and as low income women are receiving health care treatment proportional to rates of illness in Manitoba, health care access alone is not the only issue at play. In a number of qualitative studies published and supported by Prairie Women’s Health Centre of Excellence, women have pointed out that they need their basic and structural needs met in order for their health to improve, since their health is tied to non-clinical issues such as bad housing, low income, limited availability of child care and their need for improved education and employment [27, 28 for instance].

Figure 8: Premature Mortality Rates for Manitoba Women and Men by Income Quintile, 1994 – 2003



Source: Manitoba Centre for Health Policy 2005.





Women’s Mortality & Causes of Death in Manitoba

Introduction

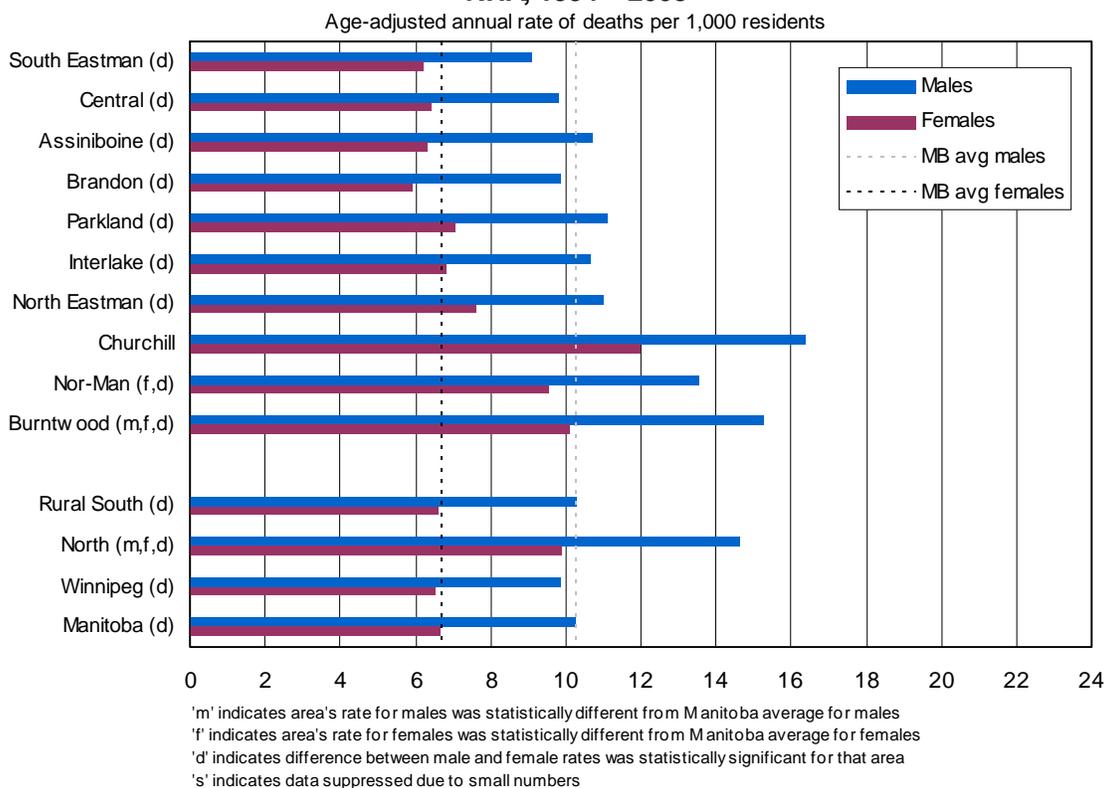
Women’s increasing life expectancies means that women do not die as young as they did in previous generations, and this is for a number of reasons. Infant and child mortality rates have dropped dramatically, particularly since the first half of the 20th century; maternal mortality in Manitoba is also very low (Chapter Four). In general Manitoba women enjoy safer working conditions and better nutrition and hygiene than ever before¹². Screening programs and prevention of disease, treatments, and surgeries all contribute to longer lives for Manitoba women and lower mortality rates than in the past.

Total Mortality Rates

Figure 9 shows the total mortality rates (per 1,000) residents for Manitoba residents by RHA. Manitoba women have considerably lower mortality rates overall and in all RHAs than their male counterparts.

Total Mortality Rate is “the total number of deaths in a population, divided by the total number of residents” (including those deceased) [1].

Figure 9: Total Mortality Rates for Manitoba Males and Females by RHA, 1994 – 2003



Source: Manitoba Centre for Health Policy 2005.

¹² However not all women have all the same advantages, and these are indicators that must be monitored.





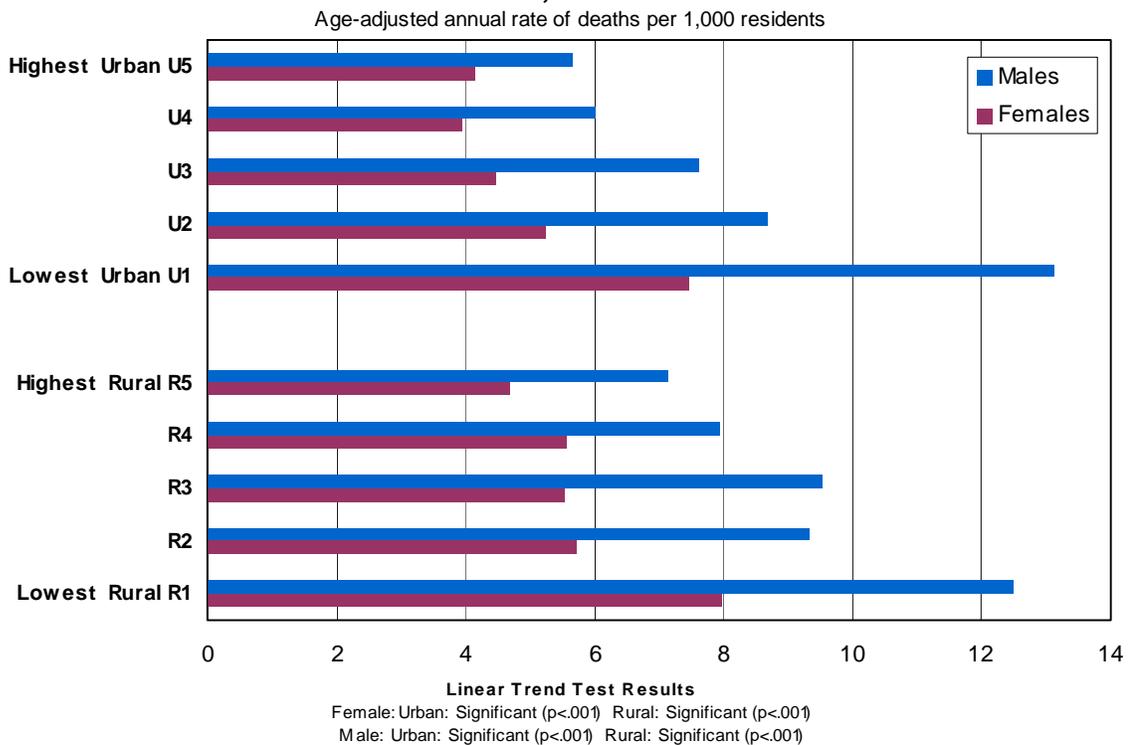
Although there is some variation among the RHAs, the difference between men and women remains fairly constant, with age-adjusted female mortality 60 – 70% of that for males [1]. As mentioned, child and infant mortality in Manitoba is quite rare and deaths increase with age, particularly among elderly women and men. Annual mortality is increasing slightly in the province, a reflection of our older population [1].

Figure 9 also illustrates that women’s mortality rates in northern Manitoba are statistically higher than for southern residents. The Canadian Women’s Health Surveillance project similarly found that women in northern Canada had higher mortality rates, a trend that had not been observed in earlier studies. The authors note:

“The mortality burden of biologically-based, sex-specific cases is actually greater among women in terms of mortality rates and potential years of life lost (for northern Canadian women)” [5].

Total mortality rates by income quintile, reproduced here in Figure 10, continue to illustrate the strong relationship between area-level income and mortality. As was seen in life expectancy and premature mortality data, women have higher mortality rates in the lowest income quintiles, for both rural and urban residents. As seen in Figure 10 although mortality does not evenly decline with greater incomes in either setting, there are statistical differences in the mortality rates from the highest income areas to the lowest.

Figure 10 Total Mortality Rates by Income Quintile for Males and Females, 1994 – 2003



Source: Manitoba Centre for Health Policy 2005.

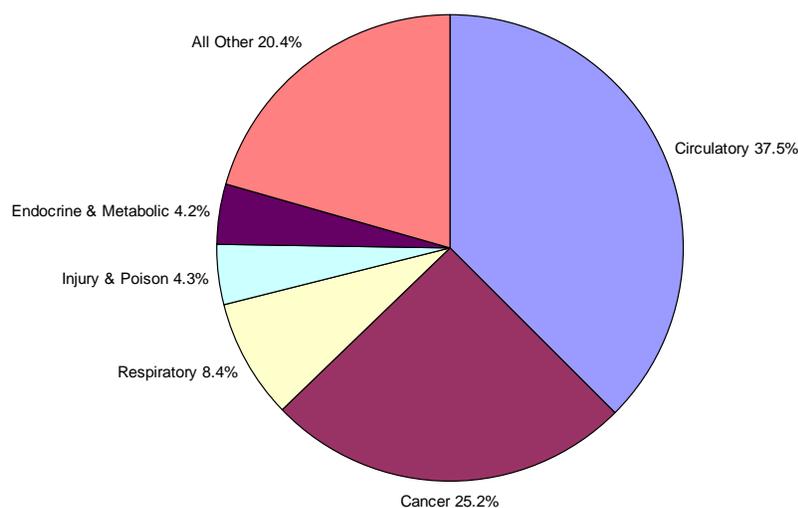




Causes of Women’s Deaths in Manitoba

Manitoba women die for many different reasons, but the leading causes of death are circulatory diseases, cancer, respiratory diseases, injury and poisoning and endocrine and metabolic disorders (this would include diabetes, for instance) (Figure 11) [1]. Although men die for the same list of reasons, with the same five primary causes [1], we have seen throughout this *Profile* that diseases affect women and men in different ways, at different ages and have gendered influences and implications.

Figure 11. Mortality by Cause (ICD-9-CM) for Manitoba Females, 1994 -2003



Source: Manitoba Centre for Health Policy 2005.

For women who live in the north, the leading causes of death are circulatory disease, cancer, injury and poisoning, and respiratory illnesses, followed by endocrine and metabolic causes, confirming that women in the north are more likely to die of injuries than their southern counterparts [1].

A study of Canadian women found more women die of heart disease and related causes, including COPD than any other cause. DesMeules et al found that death due to cardiovascular disease was declining, whereas deaths attributable to accidents (injuries), poisoning and violence were the second largest category in their study [5]. The authors also found a more than 50% decrease in the female age-adjusted mortality rate, from all causes, compared with males (39% decrease) since the 1950s, particularly with the decline in mortality of older people since the 1980s [5]. In this *Profile*, we have documented that although women are less likely to die of cancer than men, women’s deaths due to lung cancer are increasing (Chapter Five), and more women than men are likely to die of cancer in the 35-54 year age range.

There may be other ways in which gender influences cause and time of death. One study found that women over age 50 were less likely to receive life-supporting treatments or be admitted to intensive care





units. The authors found that women's symptoms of critical illnesses may be factors, and decisions made by providers may contribute, but there are likely other confounding factors [29].

Other research examined the interactions of personal life choices and found that people who smoke, drink alcohol, are physically inactive and do not eat enough fruits and vegetable (measured as Vitamin C intake), have a four-fold likelihood of reducing their life spans by as much as 14 years [30]. In a different vein, a study from the UK found a causal interaction between advanced diabetes and material deprivation, leading to increased mortality [31]. These studies and others thus exemplify the complex interactions of personal choices, social standing and income, and disease on overall health and mortality.

Summary

Women in Manitoba have life expectancies that continue to increase. Women have benefited, as have men, from better recognition of, and treatment for, heart disease, heart attacks and stroke – particularly in the case of heart attacks, where better understanding of women's specific symptoms has led to improved outcomes. There is evidence however that the effects of women's smoking habits in the past 40 years may lead to decreases in life expectancy and increased mortality, somewhat later than was observed for men.

But as this *Profile of Women's Health in Manitoba* has demonstrated across the many indicators examined, the patterns seen for the province as a whole include different trends and patterns that bear examination by income, geography and other variables. Low income women consistently have higher rates of diabetes, heart disease and cancers, compared with women with more income, leading ultimately to shorter life expectancies for women with low income. Similarly, First Nations women have life expectancies on average, that fall considerably short of the Manitoba average [22, also 32]. Better understanding of how the determinants of health interact and their effects on life expectancy for other sub-populations of women is needed and could lead to improved health care and programs. Allocating health care funds only to treatment of acute conditions will not bridge the health inequities.

Policy Recommendations

Life expectancies and mortality rates and causes should be monitored in conjunction with health adjusted life expectancy or some equivalent. A study of life expectancies world-wide concluded that:

“Despite the fact that people live longer in the richer, more developed countries, and have greater opportunity to acquire non-fatal disabilities in older age, disability has a greater absolute (and relative) impact on healthy life expectancy in poorer countries. Separating life expectancy into equivalent years of good health and years lost to sub-optimal health thus widens rather than narrows the difference in health status between the rich and the poor countries.” [25].

Considering the evidence in this *Profile*, and in similar reports on the health of Manitoba women, it is reasonable to expect that Manitoba women will also show such differences in their health and life expectancies until the gaps between the advantaged and disadvantaged in our society are reduced and health disparities can be reduced.





References

1. Fransoo R, Martens P & The Need To Know Team. 2005. Sex Differences in Health Status, Health Care Use and Quality of Care: A Population Based Analysis for Manitoba's Regional Health Authorities. Winnipeg, Manitoba: Manitoba Centre for Health Policy. 437 p.
2. Organisation for Economic Co-operation and Development. 2007. Health at a Glance: OECD Indicators 2007. Paris: OECD. 198 p.
3. Table 102-0511 Life expectancy, abridged life table, at birth and at age 65, by sex, Canada, provinces and territories, annual (years). [Internet]. Ottawa: Statistics Canada.; c2005 [cited 2005 Dec 14]. Available from <http://www.statcan.ca/english/freepub/82-221-XIE/00604/hlthstatus/deaths2.htm#le>
4. Colman R. 2003. A Profile of Women's Health Indicators in Canada. Ottawa: Health Canada. 241 p.
5. DesMeules M, Manuel D, Cho R. 2003. Mortality, life and health expectancy of Canadian women. In: DesMeules , Stewart , editors. Women's Health Surveillance Report. Ottawa (ON): Health Canada. p 1-18.
6. Manitoba Health. Injuries in Manitoba: A Ten Year Review. Winnipeg: Province of Manitoba, 2004. See also: <http://www.gov.mb.ca/healthyliving/injuryreview.html>
7. Martens PJ, Bond R, Jebamani L, Burchill C, Roos NP, Derksen S, Beaulieu M, Steinbach C, MacWilliam L, Walld R, Dik N, Sanderson D, Health Information and Research Committee AMC, Tanner-Spence M, Leader A, Elias B, O'Neil J. 2002. The Health and Health Care Use of Registered First Nations People Living in Manitoba: A Population -Based Study. Winnipeg: Manitoba Centre for Health Policy 203 p.
8. Currie RJ 2002. Health and health care: Manitoba's First Nations. Winnipeg: Manitoba Centre for Health Policy. 4p.
9. Deiter C, Otway L. 2001. Sharing Our Stories On Promoting Health and Community Healing: An Aboriginal Women's Health Project. Winnipeg: Prairie Women's Health Centre of Excellence. 33 p.
10. Wilson A. 2004. Living Well: Aboriginal Women, Cultural Identity and Wellness. Winnipeg: Prairie Women's Health Centre of Excellence. 38 p.
11. Table 102-0025 Life expectancy abridged life table, at birth, and at age 65, by sex, Canada, provinces and territories (Comparable Indicators), annual (years), TERMINATED. Available from <http://www.statcan.ca/english/freepub/82-221-XIE/00604/hlthstatus/deaths2.htm#le>
12. Life expectancy - abridged life table, at age 65 and confidence interval, by sex, Canada, provinces, territories, health regions and peer groups, 1997. [Internet]. Ottawa: Statistics Canada, ; c2004 [cited 2005 Dec 15]. Available from http://www.statcan.ca/english/freepub/82-221-XIE/00604/tables/html/1431_97.htm:
13. Donner L, Isfeld H, Haworth-Brockman M. 2006. Manitoba Field Testing of Gender-Sensitive Core Set of Leading Health Indicators. Kobe and Winnipeg: World Health Organization and Prairie Women's Health Centre of Excellence. 242p.
14. Ezzati M, Friedman AB, Kulkarni SC, Murray CJ. The reversal of fortunes: Trends in county mortality and cross-county mortality disparities in the United States. PLOS Medicine 5(4): 2008. [Internet] [cited July 2008]. <http://medicine.plosjournals.org/perlserv/?request=get-document&doi=10.1371/journal.pmed.0050066&sid=ST2008042102630&ct=1>
15. Health: Life expectancy continues to rise. [Internet]. London: National Statistics Online.; c2008 [cited 2008 Jul 11]. Available from http://www.statistics.gov.uk/cci/nugget_print.asp?id_168
16. 37-HLT: Health adjusted life expectancy (HALE). [Internet]. Ottawa: Statistics Canada.; c2005 [cited 2005 Dec 16]. Available from <http://www.statcan.ca/english/freepub/82-401-XIE/2002000/considerations/hlt/37ahl.htm#1>
17. Health Canada. 2006. Healthy Canadians: A report on comparable health indicators 2006. Ottawa: Health Canada. 102 p.
18. Bierman A. 2008. Equity and Women's Health. Measuring Health Inequalities Among Canadian Women: Developing a Basket of Indicators. Toronto, ON: University of Toronto. 85 p.
19. Meana M, Cho R, DesMeules M. 2004. Chronic Pain: The extra burden on Canadian women. BMC Women's Health 4(Su(S17)).
20. Nusselder WJ, Looman CW, Mackenbach JP, Huisman M, van Oyen H, Deboosere P, Gadeyne S, Kunst AE. 2005. The contribution of specific diseases to educational disparities in disability-free life expectancy. American Journal of Public Health 95(11):2035-41.
21. Manuel DG, Schultz SE. 2004. Using linked data to calculate summary measures of population health: Health adjusted life expectancy of people with Diabetes Mellitus. Popul Health Metr 2(4):14.





22. Van Baal PH, Hoogenveen RT, De Wit GA, Boshuizen HC. 2007. Estimating health-adjusted life expectancy condition on risk factors: Results for smoking and obesity. *Population Health Metrics* 4(14):00.
23. Koochek A, Montazeri A, Johansson S, Sundquist J. 2007. Health-related quality of life and migration: A cross-sectional study on elderly Iranians in Sweden. *Health Quality Life Outcome* 5:60.
24. Mays VM, Yancey AK, Chochran SD, Weber M, Fielding JE. 2002. Heterogeneity of health disparities among African American, Hispanic and Asian American women: unrecognized influences of sexual orientation. *American Journal of Public Health* 92(4): 632-639
25. Mathers CD, Moesgaard Iburg KM, Salomon JA, Tandon A, Chatterji S, Ustun B, Murray CJL. 2004. Global patterns of health life expectancy in the year 2002. *BMC Public Health* 4:6
26. Krieger ND, Rehkopf DH, Chen JT, Waterman PD, Marcelli E, Kennedy, M. 2008. The fall and rise of US inequities in premature mortality: 1960-2002. *PLoS Medicine* 5(2):e46. [Internet] [cited July 2008]. PMID: PMC2253609
27. Savarese J. 2003. Exploring the intersections between women's health and poverty. Winnipeg: Prairie Women's Health Centre of Excellence. 37 p
28. McCracken M, Dykman K, Parent F, Lopez I. 2004. Young Women Work: Community Economic Development to Reduce Women's Poverty and Improve Income. Winnipeg: Prairie Women's Health Centre of Excellence. 89p.
29. Fowler RA, Sabur N, Li P, Juurlink DN, Pinto R, Hladunewich MA, Adhikari NKJ, Sibbald WJ, Martin CM. 2007. Sex- and age-based differences in the delivery and outcomes of critical care. *Canadian Medical Association Journal* 177(12):1513-9.
30. Khaw K, Wareham N, Bingham S, Welch A, Luben R, Day N. 2008. Combined impact of health behaviours and mortality in men and women. *PLoS Med* 2008 March 25 5(3):e70.
31. Roper NA, Bilous RW, Kelly WF, Unwin NC, Connolly VM. 2001. Excess mortality in a population with diabetes and the impact of material deprivation: Longitudinal, population based study. *British Medical Journal* 322(7299):1389-93.
32. Statistics Canada. 2005. Health Indicators. The Daily, Tuesday February 1, 2005. <http://www.statcan.ca/Daily/English/050201/050201a.htm>
33. Martens P, Fransoo R, *Need To Know Team*, Burland E, Prior H, Burchill C, Romphf L, Chateau D, Bailly A, Ouelette C. 2008. What works? A first look at evaluating Manitoba's Regional health programs and policies at the population level. Winnipeg: Manitoba Centre for Health Policy. 386 p.

