HEALTH INEQUITIES IN MANITOBA:

Is the Socioeconomic Gap in Health Widening or Narrowing over Time?

September 2010 (3rd Edition)

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About the Manitoba Centre For Health Policy

The Manitoba Centre for Health Policy (MCHP) is located within the Department of Community Health Sciences, Faculty of Medicine, University of Manitoba. The mission of MCHP is to provide accurate and timely information to health care decision-makers, analysts and providers, so they can offer services which are effective and efficient in maintaining and improving the health of Manitobans. Our researchers rely upon the unique Population Health Research Data Repository (Repository) to describe and explain patterns of care and profiles of illness, and to explore other factors that influence health, including income, education, employment and social status. This Repository is unique in terms of its comprehensiveness, degree of integration, and orientation around an anonymized population registry.

Members of MCHP consult extensively with government officials, health care administrators, and clinicians to develop a research agenda that is topical and relevant. This strength, along with its rigorous academic standards, enables MCHP to contribute to the health policy process. MCHP undertakes several major research projects, such as this one, every year under contract to Manitoba Health (MB Health). In addition, our researchers secure external funding by competing for research grants. We are widely published and internationally recognized. Further, our researchers collaborate with a number of highly respected scientists from Canada, the United States, Europe and Australia.

We thank the University of Manitoba, Faculty of Medicine, Health Research Ethics Board for their review of this project. MCHP complies with all legislative acts and regulations governing the protection and use of sensitive information. We implement strict policies and procedures to protect the privacy and security of anonymized data used to produce this report and we keep the provincial Health Information Privacy Committee informed of all work undertaken for MB Health.

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Executive Summary

Health status and the use of health and social services are key indicators for studying patterns in population health. However, it is not only the actual rate or prevalence that is important, but the distribution of health or health services within the population itself. Are there inequities in health status or the use of services by socioeconomic groups within Manitoba? Many previous MCHP reports have looked at disparity in health outcomes by neighbourhood income and by geographical areas, both cross–sectional and over time. But no report has focused on inequalities so specifically, nor has analysed how to measure these gaps in the most methodologically rigorous way. This report, called *Health Inequities in Manitoba: Is the socioeconomic gap in health widening or narrowing over time?*, is designed to focus on inequality, both the methodology used to quantify inequality and the analysis of existing inequality within Manitoba's socioeconomic groups.

It has long been recognized that health outcomes vary according to social factors, such as income level and ethnicity. Life expectancy is shorter and illness levels are higher for those with lower socioeconomic status. In 2009, the 62nd World Health Assembly (Resolution A62/52) called upon the international community to "take note of the final report of the Commission on Social Determinants of Health (2008) and its recommendations"; "to consider health equity in working towards achievement of the core global development goals and to develop indicators to monitor progress"; "to develop and implement goals and strategies to improve public health with a focus on health inequities"; and "to ensure dialogue and cooperation among relevant sectors with the aim of integrating a consideration of health equity into relevant public policies and enhancing intersectoral action." This current health inequities project is one initiative to both collect evidence and to develop a methodology for ongoing monitoring and evaluation of socioeconomic inequality in health outcomes for Manitobans.

For purposes of this report, we need to distinguish between the terms inequity and inequality. Health inequity is usually defined as unfair differences in health amongst social groups, and presumably these differences could be avoided or remediated through policies or programs (Culyer, 1993). Thus the term inequity carries with it a value judgment. Health inequality is what we can measure—gaps or differences in outcomes amongst social groups. Indeed, one would suppose that if a socioeconomic group experiences a greater burden of illness, that this inequality should be considered "unfair" by the planners and decision–makers, thus making it inequitable. On the other hand, there are possibly instances where disparity or inequality may be fair. If, for example, a less healthy group receives a greater proportion of healthcare services, this may be considered inequality while at the same time considered fair (hence, "equity" may have been achieved). Fairness may occasionally mean that one group "has" more than another if whatever being measured (such as health services) is in proportion to need.

Objectives of this Report

The specific objectives of this report are

a. to provide up–to–date information on several key indicators of health and social outcomes to see if there are differences in outcomes by neighbourhood income group;
b. to determine whether the socioeconomic gaps (inequalities) for these indicators have changed over time, and if so, in what direction the change has occurred; and
c. to provide detailed information on the population characteristics of the rural and urban neighbourhood income quintiles.

The focus of this report is to give insight to policy–makers, decision–makers, and planners on socioeconomic inequities in health status, healthcare use, and social services outcome indicators. The 18 indicators carefully chosen by the Advisory Group of this report represent a wide range of health status, healthcare use, and educational outcomes and a wide range of indicators affecting various age groups. These include mortality, physical and mental health, educational outcomes, primary care, prevention and quality of care. One of the reasons that the Advisory Group chose not to analyse an indicator such as physician use or hospital use is that it is more difficult to determine if differential use is justified or not, or if it is reflecting access or need.

Many MCHP reports give detailed information on geographical boundaries, such as Regional Health Authorities (RHAs), or sub–divisions of these (such as the RHA districts, or within Winnipeg, the Community Areas). However, *this report focuses on neighbourhood income groupings*, which are an amalgamation of Statistics Canada's dissemination areas (DA) derived from the census. These neighbourhood income groupings are thus geographically disparate, amalgamated into a virtual "area" that in reality represents small sections within each of the RHAs of Manitoba.

The basic concept of socioeconomic gradients is examined using five groupings of neighbourhood income (from lowest to highest) in both urban (Winnipeg and Brandon) and rural (all other regions) Manitoba. Neighbourhood income quintiles represent approximately 20% of the population in the relevant grouping (rural, or urban), ranked by the average household income. R1 (rural) and U1 (urban) are the lowest neighbourhood income groups; R5 (rural) and U5 (urban) are the highest neighbourhood income groups. As well, each indicator is also analysed for the "not found" group (NF)—a group of people whose average household neighbourhood income is not given in the census data, since these people live in a dissemination area of the census that is an institution or that represents a government agency building. There is limited discussion in the main body of this report on the NF group (which is a relatively small group of Manitobans), but a summary of findings is given in Chapter 9 of the report. The NF group appears to be a group at high risk, requiring further study.

The purpose of this report is to document health inequities across socioeconomic groups in Manitoba and to determine if the gap is widening or narrowing over time. Various measures were used to identify whether or not there was a gap, and whether or not this was changing over time—Disparity Rate Ratios (DRRs), Disparity Rate Differences (DRDs), comparing both of these over time, comparing within and between urban and rural neighbourhood income quintile groupings, and using Lorenz curves and Gini coefficients. It appears useful to quantify gaps with a variety of statistical measures, since we observed different patterns depending upon the measure. In general, the measures were internally consistent with each other. But at other times there were mixed conclusions, with some measures indicating no change over time and others showing an increase or decrease in health equity. The summary table in this executive summary (and also in Chapter 9 of the report) shows a synopsis of the findings of each health indicator—this will hopefully enable the reader to get an overall sense of the direction, magnitude, and changes over time of the various health and social outcomes to determine if there is evidence of socioeconomic inequality or not.

A Summary of Indicators: Is the gap widening or narrowing?

Table E.1 shows a detailed comparison of the inequality measures for each of the 18 indicators, by rural and urban neighbourhood income quintile groups. These are compared over time and by rural and urban. Is socioeconomic inequality increasing or decreasing over time? According to the table, it depends upon the health or social indicator. Synopses of Table E.1 are included as Table E.2

(derived from Table E.1's columns 2–7) and Table E.3 (derived from columns 8–10). Measuring the "gap" (inequality) is done in three ways in this report: Disparity Rate Ratios, Disparity Rate Differences, and Lorenz curves (including Gini coefficients).

Disparity Rate Ratio (DRR) is one measure of a socioeconomic gap in a health or social outcome, by dividing the rate of the lowest by the rate of the highest neighbourhood income group at a given time period (i.e., R1/R5 or U1/U5). This is sometimes referred to in the text as the "rate ratio." For example, in Table E.1, the PMR (premature mortality rate) of R1 in the first time period was 5.36; and R5 was 3.98, giving a DRR in T1 of 1.35, i.e., 5.36/3.98 = 1.35. In the last time period T5, R1/R5 = 1.86. There is also a statistical test for the time comparison of the DRR, measuring the change in the DRR from the first to the last time period. This can be thought of as a way to express the relative increase or decrease in inequality between the lowest and highest neighbourhood income quintile groups over time. In Table E.1, the change over time is indicated by the (38%) in brackets and an up arrow, indicating that the increase in the DRR from T1 to T5 is from 1.35 to 1.86, or 38% increase; and it is statistically significant. If it were not statistically significant, then Table E.1 would have an NS (meaning not statistically significant). So using the DRR measure for PMR, we would conclude that inequality in PMR for the rural neighbourhood income groups increased over time.

Disparity Rate Difference (DRD*)* is another measure of a socioeconomic gap in a health or social outcome, by subtracting the rate of the lowest neighbourhood income group from the rate of the highest neighbourhood income group (i.e., R1 minus R5, or U1 minus U5). This is sometimes referred to in the text as the "rate difference", or absolute difference. For example, Table E.1 indicates that in the first time period T1, the DRD for the urban groups is 2.72 (i.e., U1–U5, or 5.70–2.98 = 2.72). DRDs can be thought of as a way to express how many "more" events occur in the lowest neighbourhood income quintile group compared to the highest. So comparing the rate differences in T1, there are 2.72 more deaths per thousand people in the lowest income quintile group compared to the highest income quintile group. There is also a statistical test for the time comparison of the DRD, measuring the change in the DRD or rate difference from the first to the last time period. This is given as a ratio of DRDs from the last time period to the first time period. The p–value associated with this is also provided. For example, in Table E.1, for the urban neighbourhood income quintile groups, the DRD was 2.72 in the first time period T1, and 3.46 in the last time period T5. So the change over time is 3.46/2.72, or 1.27, which is statistically significant—this means that the rate differences between U1 and U5 widened over time.

Lorenz Curves and Gini Coefficients: A Lorenz curve is the graphical representation of inequality. If there were equity in the population, then the outcome would be equally distributed by the population size, so 20% of the population would experience 20% of the outcome event, 40% would experience 40% of the event, continuing to 100%. However, sometimes the curve bends, in that a greater portion of the disease outcome is represented in the lowest 20% of the population. The Lorenz curve in Chapter 3 shows that in the last time period, 29.1% of the premature deaths occurred in the lowest rural income group that only represents 20% of the population. In this report, Lorenz curves for the first and last time periods, for both rural and urban groups are shown. The degree of "bend" or inequality in the Lorenz curve is mathematically measured using a Gini coefficient, with a value between zero and one ("zero" means no inequality and "one" means the maximal inequality with the lowest neighbourhood income group having all of the disease events). For example, in Table E.1, there was a statistically significant increase in the Gini coefficients from T1 to T5 in both the rural and urban neighbourhood income quintile groups from T1 to T5 (rural: 0.058 to 0.119; urban: 0.131 to 0.205), meaning that inequality increased over time in both rural and urban groupings. In the last time period, the degree of inequality was statistically significantly higher in the urban groups compared to the rural groups (Gini coefficient of 0.205 versus 0.119).

Table E.1: Changes in Health Inequalities Over Time: Summary of Results by Indicator*

NS means not statistically significantly different

Indicator	Change in inequality over time (first to last time period "T") by neighbourhood income quintile–DRR and DRD measure the inequality between the lowest and highest neighbourhood income quintile groups						Comparison of inequality between rural and urban neighbourhood income quintile groups		
	RURAL neighbourhood income quintiles			*URBAN neighbourhood income quintiles*			*RURAL vs. URBAN*		
	Disparity Rate ratio, DRR (% change over time)	Disparity Rate difference DRD (% change over time)	Gini Coefficient	Disparity Rate ratio, DRR (% change over time)	Disparity Rate difference DRD (% change over time)	Gini Coefficient	Trends in Disparity Rate ratio (DRR) over time	Trends in Disparity Rate difference (DRD) over time	**Most recent time period only:** comparison of Gini Coefficients, rural vs. urban
Chapter 3: Mortality									
Premature Mortality Rate PMR (average annual number of people aged 0-74 who died, per 1,000 people aged 0-74)	↑ (38%)	↑ (58%)	↑	↑ (50%)	↑ (27%)	↑	Higher in urban	Higher in urban	Greater inequality in urban
	T1: 1.35 T5: 1.86	T1: 1.39 T5: 2.19 per 1,000	T1: 0.058 T5: 0.119	T1: 1.91 T5: 2.88	T1: 2.72 T5: 3.46 per 1,000	T1: .131 T5: .205			T5 rural: 0.119 urban: 0.205
Potential Years of Life Lost PYLL (average annual years of life lost per 1,000 aged 0-74)	NS	↑ (17%)	↑	↑ (55%)	↑ (19%)	↑	NS	Higher in urban (mostly)	Greater inequality in urban
	T1: 1.77 T5: 2.29	T1: 53.8 T5: 62.9 per 1,000	T1: 0.103 T5: 0.168	T1: 2.32 T5: 3.59	T1: 61.2 T5: 72.8 per 1,000	T1: 0.169 T5: 0.255			T5 rural: 0.168 urban: 0.255
Under Age 5 Mortality Rate (average annual rate of deaths per 1,000 under age five)	NS	↓ (64%)	NS	NS	NS	NS	NS	NS	NS
	T1: 2.19 T5: 1.66	T1: 2.33 T5: 0.83 per 1,000	T1: 0.155 T5: 0.110	T1: 2.19 T5: 2.32	T1: 1.74 T5: 1.20 per 1,000	T1: 0.160 T5: 0.129			T5 rural: 0.110 urban: 0.129

Table E.1: Continued

Indicator	RURAL change over time			URBAN change over time			RURAL vs. URBAN		
	DRR	DRD	Gini	DRR	DRD	Gini	DRR	DRD	Gini R vs. U
Chapter 4: Child Health									
Teenage Pregnancy (average annual rate of pregnancies per 1,000 females aged 15-19)	↑ (80%)	↑ (34%)	↑	↑ (102%)	↑ (25%)	↑	Higher in urban	Higher in urban	Greater inequality in urban
	T1: 2.21 T8: 3.98	T1: 60.5 T8: 80.6	T1: 0.197 T8: 0.286	T1: 4.93 T8: 9.95	T1: 76.4 T8: 95.0	T1: 0.303 T8: 0.406			T8 rural: 0.286 urban: 0.406
High School Completion (% Grade 9 students graduating from Grade 12 within six years)**	NS	↑ (19%)	NS	↑ (8%)	↑ (18%)	NS	T2-T5 rural higher than urban; T1, T6, T7 NS	T2-T7 rural higher than urban; T1 NS	NS
	T1: 0.63 T7: 0.60	T1: -28.50 T7: -33.97	T1: 0.069 T7: 0.079	T1: 0.61 T7: 0.56	T1: -34.67 T7: -41.07	T1: 0.089 T7: 0.098			T7 rural: 0.079 urban: 0.098
Dental Extraction Rate (number of children aged 0-5 hospitalized for dental extractions per 1,000 children aged 0-5)	NS	↑ (245%)	NS	NS	↑ (146%)	NS (p=.053)	NS	All times, rural higher than urban	NS (p=.064)
	T1: 4.15 T5: 6.45	T1: 14.58 T5: 50.28	T1: 0.363 T5: 0.383	T1: 7.79 T5: 13.09	T1: 6.82 T5: 16.76	T1: 0.356 T5: 0.421			T5 rural: 0.383 urban: 0.421
Breastfeeding Initiation Rate (% live born newborns being breastfed upon hospital discharge)**	↑ (14%)	↑ (86%)	↑	↓ (9%)	↓ (22%)	NS	NS except T7 where rural is greater	T1, T2 urban greater, T4 to T7 rural greater	Greater inequality in rural
	T1: 0.82 T7: 0.71	T1: -13.8 T7: -25.8	T1: 0.040 T7: 0.070	T1: 0.76 T7: 0.82	T1: -20.4 T7: -15.9	T1: 0.051 T7: 0.039			T7 rural: 0.070 urban: 0.039
Chapter 5: Adult Health									
Diabetes Prevalence (percentage of people aged 19+ having a diagnosis of diabetes over a three-year period)	↑ (25%)	↑ (187%)	↑	↑ (20%)	↑ (173%)	↑	NS	Higher in rural	Greater inequality in rural
	T1: 1.67 T8: 2.08	T1: 2.54 T8: 7.29	T1: 0.097 T8: 0.143	T1: 1.54 T8: 1.85	T1: 1.75 T8: 4.76	T1: 0.092 T8: 0.119			T8 rural: 0.143 urban: 0.119

Table E.1: Continued

Indicator	RURAL change over time			URBAN change over time			RURAL vs. URBAN		
	DRR	DRD	Gini	DRR	DRD	Gini	DRR	DRD	Gini R vs. U
Amputations due to Diabetes (rate of amputations per 1,000 people aged 19+ with diabetes)	NS T1: 2.00 T8: 3.38	NS T1: 13.9 T8: 18.3	↑ T1: 0.138 T8: 0.255	NS T1: 2.53 T8: 2.77	NS T1: 11.3 T8: 9.9	NS T1: 0.170 T8: 0.211	NS	Higher in rural (since T4)	NS T8 rural: 0.266 urban: 0.211
Ischemic Heart Disease (% of persons aged 19+ with a diagnosis of IHD)	↑ (45%) T1: 1.07 T8: 1.55	↑ (422%) T1: 0.50 T8: 2.59	↑ T1: 0.019 T8: 0.074	NS T1: 1.07 T8: 1.33	↑ (196%) T1: 0.51 T8: 1.51	↑ T1: 0.011 T8: 0.057	NS	Higher in urban T2; higher in rural T4, T6-T8	NS T8 rural: 0.074 urban: 0.057
Multiple Sclerosis (persons aged 16+ diagnosed with MS over a six-year period, per 100,000 persons aged 16+)	NS T1: 0.78 T4: 0.61	NS T1: -45.3 T4: -110.9	NS T1: 0.042, NS T4: 0.054	NS T1: 0.99 T4: 0.96	NS T1: -2.3 T4: -10.7	NS T1: 0.010, NS T4: 0.008, NS	NS except at T4, where greater in rural	NS except at T4, where greater in rural	NS T4 rural: 0.054 urban: 0.008
Chapter 6: Primary Care and Prevention									
Continuity of Care (% of population having at least 50% of their physician visits over a two-year period to the same physician)**	NS T1: 0.88 T12: 0.83	↑ (26%) T1: -9.31 T12: -11.70	↑ T1: 0.026 T12: 0.037	NS T1: 0.93 T12: 0.92	NS T1: -5.76 T12: -5.99	NS T1: 0.015 T12: 0.016	NS to mid-1990s; very slightly greater in rural after	Greater gap in rural	Greater inequality in rural T12 rural: 0.037 urban: 0.016
Hospitalizations for TB (average annual rate of persons per 100,000 who were hospitalized for TB)	↑(114%) T1: 2.72 T5: 5.83	↑(83%) T1: 26.22 T5: 47.91	↑ T1: 0.260 T5: 0.463	NS T1:14.46 T5: 9.43	↓ (45%) T1: 35.20 T5: 19.19	NS T1: 0.496 T5: 0.401	NS except at T1 where urban is higher	NS except at T5 where rural is greater	NS T5 rural: 0.463 urban: 0.401
Cervical Cancer Screening (% females aged 18-69 having at least one Pap test over three years)**	↑ (12%) T1: 0.82 T8: 0.72	↑ (53%) T1: -12.03 T8: -18.37	↑ T1: 0.035 T8: 0.059	NS T1: 0.84 T8: 0.80	↑ (27%) T1: -11.55 T8: -14.62	↑ T1: 0.033 T8: 0.041	NS or slightly greater in rural	Mostly greater in rural	Greater inequality in rural T8 rural: 0.059 urban: 0.041

This page edited May 18, 2011.

Table E.1: Continued

Indicator	RURAL change over time			URBAN change over time			RURAL vs. URBAN		
	DRR	DRD	Gini	DRR	DRD	Gini	DRR	DRD	Gini R vs. U
Chapter 7: Mental Health									
Cumulative Mental Illness (% of persons aged 10+ having a diagnosis of one or more of anxiety, personality disorders, depression, substance abuse, or schizophrenia over a five-year period)	↑ (12%)	↑ (757%)	↑	NS	↑ (27%)	NS	Higher in urban	Higher in urban	Greater inequality in urban
	T1: 0.98 T5: 1.10	T1: -0.21 T5: 1.83	T1: 0.001 T5: 0.012	T1: 1.50 T5: 1.43	T1: 6.92 T5: 8.82	T1: 0.076 T5: 0.071			T5: rural: 0.012 urban: 0.071
Dementia (% of persons aged 55+ with a diagnosis of dementia over a five-year period)	NS	NS	NS	NS	↑ (96%)	NS	NS	Mostly higher in urban, and increasing over time	Greater inequality in urban
	T1: 1.08 T5: 1.03	T1: 0.48 T5: 0.23	T1: 0.010, NS T5: 0.003, NS	T1: 1.25 T5: 1.28	T1: 1.39% T5: 2.73%	T1: 0.050 T5: 0.056			T5: rural: 0.003 urban: 0.056
Suicide Deaths and Suicide attempts (number of persons per 1,000 aged 10+ who either completed or attempted suicide at least once in a three-year period)	↑ (149%)	↑ (181%)	↑	NS	↑ (46%)	NS	Until mid-1990s, higher in urban; after mid-1990s similar in urban and rural	Until mid-1990s, similar in rural and urban; after mid-1990s, higher in rural	NS
	T1: 2.01 T8: 5.01	T1: 0.55 T8: 1.53	T1: 0.181 T8: 0.295	T1: 4.40 T8: 4.85	T1: 0.68 T8: 0.99	T1: 0.273 T8: 0.305			T8 rural: 0.295 urban: 0.305

Table E.1: Continued

Chapter 8: Pharmaceutical Use									
Post-Acute Myocardial Infarction (AMI) Care: Beta-Blocker Prescribing (% AMI patients aged 20+ with prescription within four months of the AMI)**	NS T1: 0.83 T4: 0.91	NS T1: -11.60 T4: -7.37	NS T1: 0.041 T4: 0.018, NS	NS T1: 0.86 T4: 0.98	↓ (80%) T1: -10.04 T4: -1.99	NS T1: 0.028, NS T4: 0.005, NS	NS	NS	NS T4 rural: 0.018, NS urban: 0.005, NS

*Note: if there is no statistically significant difference between the comparative numbers, then NS indicates this (i.e., rates are similar). Arrows increasing or decreasing are only shown if the change is statistically significant (p<.05).

** in the case of certain indicators where fewer events or percentages occur in the lowest compared to the highest quintile (such as breastfeeding, or high school completion), DRRs are below 1, and DRDs are negative – the directions of differences are somewhat non-intuitive. The "lower" the ratio below 1.0 (for example, 0.7 rather than 0.8), the greater the disparity (i.e., 30% compared to 20% difference). As well, the more negative the difference (for example, -20 compared to -10), the greater the disparity. So what appears as a positive outcome ("lower" disparity) of lower DRRs or lower DRDs on the y-axis is actually a greater disparity.

Source: Manitoba Centre for Health Policy, 2010

Table E.2: Is the socioeconomic gap widening or narrowing over time?

Trends in inequality over time for the health and social indicators

Socioeconomic gap is widening over time	Socioeconomic gap is similar over time	Socioeconomic gap is narrowing over time
Premature Mortality Rate Potential Years of Life Lost Teen pregnancy Breastfeeding (rural only) High school completion (urban mainly) Diabetes Ischemic heart disease Continuity of care (rural only) Hospitalizations for TB (rural only) Cervical cancer screening Cumulative mental illness (rural only) Suicide deaths and suicide attempts (rural only)	Under age 5 mortality High school completion (rural mainly) Dental Extractions (NS or possible increase) Amputation due to diabetes Multiple Sclerosis Continuity of care (urban only) Hospitalizations for TB (urban only—NS or possible decrease) Cumulative mental illness (urban only) Dementia Post–AMI beta–blocker prescription use	Breastfeeding (urban only)

Source: Manitoba Centre for Health Policy, 2010

Table E.3: Is the socioeconomic gap wider or narrower in rural or urban neighbourhood income groups?

Trends for rural and urban income groupings for the health and social indicators

Socioeconomic gap (inequality) is wider in rural	Socioeconomic gap (inequality) is similar between rural and urban	Socioeconomic gap (inequality) is wider in urban
Comparing rural and urban inequality over time (using DRR and DRD trends over time)*		
High school completion (higher or similar) Breastfeeding Dental extractions Diabetes Amputation due to diabetes IHD (most recent time periods) Continuity of care Cervical cancer screening	Under age 5 mortality Hospitalizations for TB MS Post-AMI beta-blocker prescription use	PMR PYLL Teen pregnancy Cumulative mental illness Dementia
Comparing rural to urban in the most recent time period only (using Gini Coefficients only)		
Breastfeeding Diabetes Continuity of care Cervical cancer screening	Under age 5 mortality High school completion Dental extraction (though a trend to higher in urban) Amputation due to diabetes IHD MS Hospitalizations for TB Suicide deaths/suicide attempts Post-AMI beta-blocker prescription use	PMR PYLL Teen pregnancy Cumulative mental illness Dementia

*Mixed results were seen for suicide deaths/suicide attempts over time, depending upon the measure.

Source: Manitoba Centre for Health Policy, 2010

Types of program or policy interventions to decrease the socioeconomic gap

There is debate as to whether programs should be universal or aimed at specific "at risk" groups. According to Geoffry Rose's Theorem (1992)**,** a large number of people at small risk may give rise to more cases of disease than a small number who are at high risk. In other words, a small change over a large population gives a greater overall benefit than a large change over a small at–risk group within that population. If each person changes positively, even by a small amount, the population distribution will be profoundly affected. By shifting the population curve (normal distribution curve) by only a small amount, say one–half of a standard deviation, the percentage of the population below the mean changes from 50% to 31%—a substantial decrease in those considered 'below' the original average (mean) cut–off.

If everyone experiences a similar improvement, resulting in a true population shift, the overall mean shows improvement. However, the gap between the healthiest and the least healthy remains the same in absolute difference terms. So planners and policy–makers need to strive towards improving the overall health of the entire population, but also simultaneously reducing the gap between the most and least healthy by differentially improving the health of the least healthy. In other words, we need to focus on shifting the entire population to improved health while "squishing" the distribution, i.e., giving targeted interventions to the least healthy so they will 'catch up' to attain the health status of the most healthy. Targeted programs are also needed when the least healthy group is not improving as rapidly as the rest of the population, thus increasing the gap and necessitating rapid catch up to even maintain the gap that existed previously. Once again, a targeted intervention for this at–risk group, along with the universal intervention, must be considered both to catch up the group which lags behind and, once caught up, to shrink the gap.

Given the results of this research report, the Gini coefficients and the Lorenz curves may give decision–makers evidence upon which to base either the universal population approach or simultaneous universal and targeted approaches. If the Gini coefficient is 0, i.e., the Lorenz curve approximates the line of equality, then the health risk is equally distributed throughout the socioeconomic groups. The more the bend (i.e., the greater the Gini coefficient), the more inequality exists, and the more a targeted policy or program (in addition to a universal program) is needed to increase the overall health of the population. An effective targeted program needs to be designed to increase the health of the least healthy group along with the rest of the population and even increase health at a more rapid pace (thereby shrinking the gap and reducing the absolute difference in inequality).

Looking at our measures of inequity, when do we continue to stick with a more universal approach only; and when do we approach programs and policies from both the universal and the targeted directions?

This may give a hint to planners and policy–makers as to the continuum of universal versus targeted + universal programs, since as the Gini coefficient increases, the larger the inequality, and the more necessity for targeted programs to affect lowest neighbourhood income groups differentially. See Tables E.4 and E.5 for the degree of inequality and the increasing need for targeted programs on top of universal programs.

Table E.4: Degree of socioeconomic inequality

(as measured by Gini coefficients) in the most recent time period, and the need for targeted programs or policies

Low degree of inequality Gini Coefficient < 0.060	Medium degree of inequality Gini Coefficient 0.060-0.200	High degree of inequality Gini Coefficient > 0.200
Universal programs are needed for all indicators to ensure increasing health of the entire population		
universal programs and policies	universal and targeted programs and policies	highly targeted programs and policies to supplement universal approaches
Breastfeeding (urban)	PMR (rural)*	PMR (urban)*
IHD (urban)*	PYLL (rural)*	PYLL (urban)*
MS	Under age 5 mortality	Teen pregnancy*
Continuity of Care*	High school completion*	Dental extractions
Cervical Cancer Screening*	Breastfeeding (rural)*	Amputation due to diabetes
Cumulative mental illness (rural)*	Diabetes*	Hospitalizations for TB*
Dementia	IHD (rural)*	Suicide/suicide attempts*
Post–AMI beta–blocker prescription use	Cumulative mental illness (urban)	

*Note: The asterisk indicates that, according to Table E.1, there was an increase in inequality over time in the following health indicators: PMR, PYLL, Teen pregnancy, Breastfeeding (rural only), High school completion (urban mainly), Diabetes, Ischemic heart disease, Continuity of care (rural only), Hospitalizations for TB (rural only), Cervical cancer screening, Cumulative mental illness (rural only), and Suicide deaths and suicide attempts (rural only).

Source: Manitoba Centre for Health Policy, 2010

Table E.5: Adjusted* Percentage of Health Events Occurring in the Lowest Income Quintile Group

for most recent time period

Indicator	Adjusted percentage of the health event which occurs in the lowest income quintile group (bracketed number shows the exact percentage of the population in the lowest income quintile group for that indicator)**	
	Rural percentage	*Urban percentage*
Premature death before age 75	29.1% (20.0%)	33.4% (19.5%)
Potential years of life lost	33.0% (20.0%)	38.5% (19.5%)
Death before age five	31.2% (26.2%)	37.7% (24.0%)
Teen pregnancy	44.7% (22.5%)	44.6% (17.4%)
High school completion	13.9% (19.9%)	11.0% (16.5%)
Dental extractions ages 0-5	53.6% (26.0%)	55.9% (23.7%)
Breastfed newborns	22.3% (27.7%)	23.2% (26.2%)
Diabetes age 19 and older	28.8% (18.2%)	27.4% (20.2%)
Amputation due to diabetes	45.9% (26.2%)	44.9% (26.0%)
Ischemic heart disease	24.4% (18.2%)	23.9% (20.2%)
Multiple sclerosis	13.5% (18.4%)	19.0% (19.8%)
Continuity of care	16.3% (18.3%)	19.5% (20.8%)
Hospitalization for TB	57.2% (19.9%)	52.9% (20.0%)
Pap tests	14.6% (18.3%)	16.7% (19.1%)
Mental illness age 10 and older	20.1% (18.9%)	25.0% (19.8%)
Dementia age 55 and older	17.0% (16.9%)	26.1% (20.4%)
Suicide/suicide attempts age 10+	41.5% (19.0%)	42.4% (19.7%)
Beta-blocker prescriptions post-heart attack	22.5% (23.6%)	24.3% (25.0%)

Source: Manitoba Centre for Health Policy, 2010

*Percentages are adjusted for age and/or sex where applicable.

**note: if the health events are distributed equally amongst the five income groupings in rural and urban Manitoba, then the percentage of health events should equal the percentage of the population in the income group, i.e., around 20% of health events in 20% of the population.

Recommendations

The World Health Organization and the Commission on Social Determinants of Health, in the 2008 document *Closing the gap in a generation: Health equity through action on the social determinants of health*, calls us all to action. Although health inequalities have been documented throughout the world, we need to understand particular areas of great inequity (i.e., unfair or avoidable inequality), or particular areas of increasing inequity, in order to target future resources.

Given the information contained in this report, the following recommendations can be made:

- For those health indicators with moderate to substantial Gini coefficients and evidence of increasing inequality over time, targeted intervention strategies along with universal approaches need to be considered. These include:
    - Injury prevention (related to early death as indicated by PMR, PYLL, and suicide/suicide attempts)
    - teen pregnancy reduction
    - prevention and primary care strategies for TB
    - high school completion programs
    - breastfeeding programs (especially in rural areas)
    - chronic disease management and prevention (diabetes prevention, ischemic heart disease prevention)
- For those health indicators with substantial Gini coefficients and evidence of no change in inequality over time, targeted interventions along with universal approaches need to be considered knowing that the inequality seems entrenched. These include:
    - Prevention of the necessity of dental extractions for children under five
    - Prevention of the adverse outcome of lower limb amputation for people with diabetes through appropriate care
    - Reduction of mortality under the age of five through directed strategies to prevent causes of death in this group (note: the major cause of child mortality is injury, at 49% of the total deaths)
    - Strategies to address mental illness, especially in urban areas (as indicated by the cumulative mental illness indicator)
- For a marker of good quality of care in the healthcare system, it is interesting to note that post–AMI beta–blocker prescription use shows very little disparity by neighbourhood income group. It has actually showed trends to equity or improved equity over time. This may indicate a needs–based approach, or good clinical practice guidelines, whereby all people with AMIs have similar treatment in the healthcare system no matter what the neighbourhood income group or geographical location (urban or rural).

The authors realize that the results of this report are only a starting point. This research does not pick out particular programs or policies that work to reduce inequity. It merely shows where socioeconomic inequity is the most profound or increasing over time. We hope that this will lead to further discussion by planners and policy–makers throughout the province, as a catalyst to closing the gap in Manitoba.

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Chapter 1: Introduction and Methods

Introduction and Description of the Research Team

Health status and the use of health and social services are key indicators for studying patterns in population health. However, it is not only the actual rate or **prevalence**[1] that is important, but the distribution of health or health services within the population itself. Are there inequities in health status or the use of services by socioeconomic groups within Manitoba? Many previous MCHP reports have looked at neighbourhood income and geographical disparities, both cross–sectional and over time. But no report has focused on **health inequity** so specifically, nor has analysed how to measure these inequities in the most methodologically rigorous way. This report, called *Health Inequities in Manitoba: Is the socioeconomic gap in health widening or narrowing over time?*, is designed to focus on inequality, both the methodology used to quantify inequality and the analysis of existing inequality within Manitoba's socioeconomic groups.

In 2009, the 62nd World Health Assembly (Resolution A62/52) called upon the international community to "take note of the final report of the Commission on Social Determinants of Health (2008) and its recommendations"; "to consider **health equity** in working towards achievement of the core global development goals, and to develop indicators to monitor progress"; "to develop and implement goals and strategies to improve public health with a focus on health inequities"; and "to ensure dialogue and cooperation among relevant sectors with the aim of integrating a consideration of health equity into relevant public policies and enhancing intersectoral action." This current health inequities project, to study the influence of neighbourhood income on health inequality, is one initiative by **Manitoba Health** to both collect evidence and to develop a methodology for ongoing monitoring and evaluation of socioeconomic inequality in health outcomes.

Through an ongoing grant relationship between the Manitoba Centre for Health Policy (MCHP) and Manitoba Health, MCHP scientists produce research reports that are of direct interest to the policy–making and planning needs of the provincial government. As part of the provincial impetus to reduce health inequality, Manitoba Health and MCHP jointly decided on a research project to document socioeconomic inequality in selected health and social outcomes, in a "rapid turnaround" deliverable project. This report will help undergird the need for population–based data for various provincial reports looking at the health status of Manitobans and on how to reduce inequity. Thus, this particular project, by necessity, had to be very targeted as to the number of indicators explored, the range of indicators in order to ensure a wide scope of health inequities, and the realistic approach that indicators must be based on previous validated work using the Repository of databases housed at MCHP. On advisement of the Deputy Minister of Health, an Advisory Group was struck that represented key health planning sectors—Manitoba Health's Health Information Management Branch, the Chief Public Health Office, key medical officers of health from both southern and northern RHAs, and Healthy Child Manitoba. Normally, an Advisory Group to a deliverable meets once or twice a year throughout the duration of the two–year project. However, given the mandate of "rapid turnaround", the Advisory Group in this situation became part of the research team, meeting frequently throughout January to April 2010, helping choose the small group of indicators for the report, helping refine the analyses, and helping write the results. So this group became part of the research team itself, and as such are named as research scientists for this project.

MCHP is a unit of the Department of Community Health Sciences in the University of Manitoba's Faculty of Medicine. According to its mission, MCHP is a research centre of excellence that conducts world class population–based research on health services, population and public health, and the social determinants of health. MCHP develops and maintains the comprehensive population–based data repository on behalf of

1 Throughout this report, terms in bold typeface are defined in the Glossary at the end of this report.

the Province of Manitoba for use by the local, national, and international research community. MCHP promotes a collaborative environment to create, disseminate, and apply its research. The work of MCHP supports the development of policy, programs, and services that maintain and improve the health of Manitobans.

Background Literature on Health Inequity

It has long been recognized that health outcomes vary according to social factors, such as income level and ethnicity. Life expectancy is shorter and illness levels are higher for those with lower socioeconomic status (Adler, Boyce, Chesney, Folkman & Syme, 1993; Marmot, Kogevinas, & Elston, 1987; Marmot et al., 1991; Mustard et al., 1995; Syme & Berkman, 1976). The relationship between health and socioeconomic status is generally referred to as a "socioeconomic gradient" (Marmot et al., 1991; Willms, 2003). The term "gradient" emphasizes the idea that the change in outcomes is gradual and occurs across the full range of socioeconomic status. It is not just the case that individuals living in poverty have poorer outcomes when compared to individuals not living in poverty, but that each increase in socioeconomic status is associated with an increase in positive outcomes (Marmot et al., 2008).

The socioeconomic gradient in health outcomes has also been well documented in Manitoba (Brownell et al., 2008; Fransoo et al. 2009; Martens et al., 2002, 2003, 2004; Mustard et al., 1995; Roos et al., 2001). Roos et al. (2001) found that while the health of Manitobans in general improved from 1985 through 1998, gaps in health status appeared to increase between those Manitobans living in the northern regions of the province compared to the rest of Manitoba, as well as between those living in areas with the lowest neighbourhood income levels compared to areas with higher neighbourhood income. Further research demonstrated that these gaps increased due to improvements in health status for those living in southern regions of the province, and in higher neighbourhood income areas, with little change in health status occurring for those in the north and in low neighbourhood income areas (Brownell et al., 2003).

For purposes of this report, we are using two definitions of health inequity:

Health Inequity is unfair and avoidable or remediable differences in health among social groups (Bonnefoy, Morgan, Kelly, Butt, & Bergman, 2007).

Health Equity suggests that all people can reach their full health potential and should not be disadvantaged from attaining it because of their race, ethnicity, religion, gender, age, social class, socioeconomic status, or other socially determined circumstance (Dahlgren & Whitehead, 2006).

However, it is important to note that inequality is what we can measure (i.e., gaps or differentials in outcomes); and if we deem these to be unfair and avoidable, these inequalities essentially become inequity (which brings upon it a judgment). Therefore, in most places in this report, we refer to the gap measurements as inequalities.

Objectives of this Report

The purpose of the current deliverable is to focus on key indicators of health status (including measures of health, the social determinants of health, and healthcare services which presumably are related to health—such as prevention or quality of care) and examine whether socioeconomic gaps in these indicators have changed over time.

The specific objectives of this report are

a. to provide up–to–date information on several key indicators of health status;
b. to determine whether the socioeconomic gaps for these indicators have changed over time, and if so, in what direction the change has occurred; and
c. to provide detailed information on the population characteristics of the rural and urban **neighbourhood income quintiles**.

A list of the chapter titles are as follows:

Chapter 1: Introduction and Methods
Chapter 2: A Description of the Neighbourhood Income Quintiles using Census Data
Chapter 3: Mortality
Chapter 4: Child Health
Chapter 5: Adult Health
Chapter 6: Primary Care and Prevention
Chapter 7: Mental Health
Chapter 8: Pharmaceutical Use
Chapter 9: Summary and Conclusions: Closing the Gap

The Appendices also contain useful information.

- Appendix 1 is the Glossary, where various terms used in the report are defined and additional information may be given beyond what is described in the text.

- Appendix 2 gives **crude rate** tables and population sizes, since most of the indicators in the body of the text are **"adjusted" rates** to reflect a fair comparison between **neighbourhood income groupings** that have very different age structures of their populations.

What's in this Report: Neighbourhood Income Quintile Groupings versus Regional Areas

Many MCHP reports give detailed information on geographical boundaries, such as **Regional Health Authorities (RHAs)** or sub–divisions of these (such as the RHA districts or, within Winnipeg, the Community Areas). However, *this report focuses on neighbourhood income groupings*, which are an amalgamation of Statistics Canada's **dissemination areas (DA)** for purposes of the census. These neighbourhood income groupings are thus geographically disparate, amalgamated into a virtual "area" that in reality represents small sections within each of the RHAs of Manitoba. Chapter 2 goes into detail as to the characteristics of R1 through to R5 (rural neighbourhood **income quintile** groups), U1 through to U5 (the urban, i.e., Winnipeg and Brandon, neighbourhood income quintile groups), and the **not found (NF)** group.

The focus of this report is to give insight to policy–makers, decision–makers, and planners on socioeconomic inequities in health status, healthcare use, and social services outcome indicators. Carefully selected indicators representing a wide range of health status, healthcare use, and educational outcomes have been chosen, with the hope of illustrating both inequity and areas of possible equity. Note that there are times when "inequity" may be totally inappropriate, such as health status outcomes, but also when "inequity" may be appropriate, such as seeing greater use of healthcare services by those with the greatest underlying health needs (i.e., usually the lowest neighbourhood income quintile groups).

The outcome indicators reflect both the planning and decision making needs, and the availability of population–based data to measure these outcomes. In addition, previous MCHP research reports have explored the validity of these indicators using administrative data.

Neighbourhood Income Quintile Groups: Further Explained

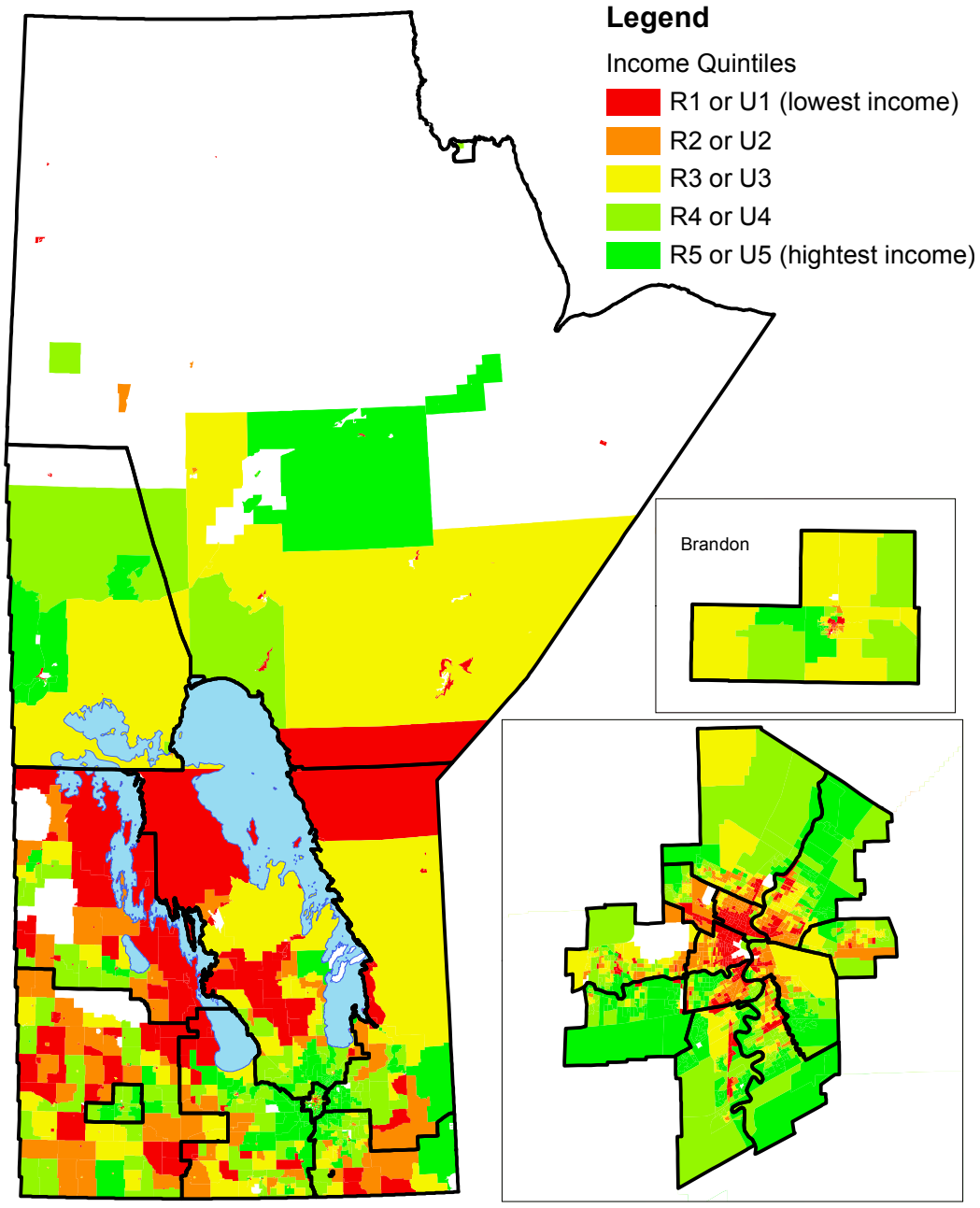
The basic concept of inequality is represented by the neighbourhood income quintile groupings used in all analyses—five groupings of neighbourhood income (from lowest to highest) in both **urban** (Winnipeg and Brandon) and rural (all other regions) Manitoba. R1 (rural) and U1 (urban) are the lowest neighbourhood income groups; R5 (rural) and U5 (urban) are the highest neighbourhood income groups. As well, each indicator is also analysed for the "not found" group (NF)—a group of people whose **average household neighbourhood income** is not available in the census data, since these people live in a dissemination area of the census that is an institution or that represents a government agency building. There is limited discussion in the main body of this report on the NF group (which is a relatively small group of Manitobans), but a summary of findings is given in Chapter 9. The NF group appears to be a group at very high risk, requiring further study.

Figure 1.1 presents a map of the DAs by neighbourhood income quintile group. In the map, Winnipeg and Brandon RHAs are shown in separate side maps. These represent the "urban neighbourhood income quintile groups" U1 (lowest) to U5 (highest) average household income. The rest of the province, on the main map, displays the nine non–urban RHAs—South Eastman, Central, Assiniboine, North Eastman, Interlake, Parkland, Burntwood, Nor–Man, and Churchill RHAs with the DA areas in each, from R1 (lowest) to R5 (highest) average household income.

Neighbourhood income quintiles represent approximately 20% of the population in the relevant grouping (rural or urban), ranked by the average household income. Thus there are different "break points" of neighbourhood income in rural or urban quintile groupings. In this report, a person is assigned to a specific neighbourhood income quintile via the postal code conversion file (PCCF), which links a postal code to the census data. Neighbourhood income quintiles are calculated for the Manitoba population separately for each year, so individuals are always assigned the correct quintile relevant to the time point of the indicator. For example, an urban or rural **income quintile created for the 1984 Manitoba population** will use the average household income values reported in the 1986 census year. The average household incomes are sorted from lowest to highest and then divided into five groups, thereby dividing 20% of the population in each urban or rural income group. Population–based average household income cut–offs for assigning a person to a neighbourhood income quintile are centred between census years, with 1984–1988 based on the 1986 census, 1989–1993 on the 1991 census, 1994–1998 on the 1996 census, 1999–2003 on the 2001 census, and 2004–2008 on the 2006 census. A person can change neighbourhood income quintiles annually, depending upon where they live at any given year and what their corresponding census dissemination area's (DA) average household income is for that year. Please refer to the Glossary for more extensive information on income quintiles and the corresponding neighbourhood income quintile cut–offs for each of the rural and urban neighbourhood income quintile groupings by census year. For example, using the 2006 census year, the ranges of average household income values for urban quintiles were: greater than $0 up to $42,407 for U1, up to $54,663 for U2, up to $68,132 for U3, up to $87,201 for U4, and above that for U5. In rural neighbourhood income quintiles, DAs with an average household income greater than $0 up to $41,576 for R1, up to $47, 929 for R2, up to $53,811 for R3, up to $65,235 for R4, and above that for R5.

This page edited November 1, 2012.

Figure 1.1: Distribution of Rural and Urban Neighbourhood Income Quintiles, 2006 Census Data Dissemination Areas*



Charles Burchill, Manitoba Centre for Health Policy. January 2009
Based on 20% Population groups of Average Household Income by Census Dissemenination Areas. Census of Canada 2006.

* Note: white areas in map indicate census areas which are not enumerated (such as park areas).

Methods Used in this Report:

The meaning of "population–based"

This report is a population–based report. What does this mean? First, it means that for all indicators, the rates or the prevalence are based upon every person living in Manitoba who has a provincial health card. This includes all people living in Manitoba, including First Nations communities. For some indicators, a certain age of population is used. For example, for teen pregnancy, we look only at females aged 15–19, and for **under age five mortality** rates, we look only at children. Each chapter includes definitions for the particular indicator(s) included, describing the population included in that analysis both in a paragraph descriptor as well as a subtitle within the graphs themselves. So the rates are not based upon smaller "samples," but rather the entire population fitting these criteria—hence, "population–based".

Furthermore, the information in this report is based on *where you live, not where you go for treatment*. For example, a person living in a remote dissemination area may be hospitalized in Winnipeg for a certain illness, but the hospitalization is "attributed back" to the population living in that remote area. For example, the rate of **hospitalization for tuberculosis (TB)** of the people in dissemination areas within a remote region like Burntwood RHA includes all the hospitalizations of all the people who live in Burntwood, whether that hospitalization took place in a Burntwood hospital or a hospital in another RHA such as Winnipeg, Nor–Man, or Churchill. Thus, the report offers insights into the health and healthcare use patterns of the population *within a grouping of dissemination areas that cross geographical regions*, no matter where the people received the care.

The data sets used in this research

MCHP houses sets of data collectively referred to as the **Population Health Research Data Repository** (often identified as the **Repository**). These are derived from administrative claims data, that is, data which are obtained to administer the universal healthcare and social services systems within Manitoba (see Martens 2006 for further details). However, prior to MCHP using these data, identifying information such as name and street address are removed; and the true health number (personal health information number or PHIN) is scrambled into a fictitious and encrypted PHIN only used in the Repository housed at MCHP. Therefore, the Repository contains anonymized information, which is only "linkable" across files through a fictitious number assigned to the records and only linked for purposes of the study after all ethical and privacy approvals are met.

The Repository includes information of key interest to health and social planners, such as mortality and birth information, physician and hospital use, pharmaceutical use, use of services such as home care and nursing homes (personal care homes), and information derived from education and family services programs. As well, dissemination area information from census data, like average household income for the geographical area, is "attributed" to all people living in that area. This gives insight into how socioeconomic factors affect health patterns or healthcare use.

For purposes of this report, the following database files of the Population Health Research Data Repository were accessed:

- hospital claims (records of hospital admissions)
- medical claims (records of visits to physicians outside of those occurring to a hospital in–patient)
- physician files to identify the type of service provided—a family physician/**general practitioner (GP)**, or a specialist (such as a psychiatrist)
- the registry files (records of the time a person is registered as a resident of Manitoba, as well as their age, sex, and area of residence)

- vital statistics (records of births, deaths, and causes of death)
- pharmaceutical claims (pharmaceutical use from the **Drug Program Information Network (DPIN)**)
- the 1986, 1991, 1996, 2001, and 2006 census files (for socioeconomic information at the dissemination area level)
- education enrolment and achievement data
- public access census files

Depending upon the source of data, rates and prevalence are generated for either **fiscal years** or calendar years. For example, "2006/07" represents the fiscal year April 1, 2006 to March 31, 2007, whereas 2006 represents calendar year January 1, 2006 to December 31, 2006. Most healthcare use data are reported in fiscal years, whereas most mortality data (such as **premature mortality rates**) are reported in calendar years. Some indicators are analysed by one–year time periods. However, many of the indicators are analysed by a group of years (three to 12 years, depending on the indicator), but the rate has been annualized to report an "average" annual rate over the time period chosen.

For purposes of this particular study, MCHP obtained ethical approval, from the University of Manitoba's Faculty of Medicine Human Research Ethics Board and from the Health Information Privacy Committee of the Manitoba government, to access the Population Health Research Data Repository. As well, trustees of various non–health data gave permission for use of these data for the report—Ministry of Education, Citizenship & Youth and the Ministry of Family Services & Consumer Affairs.

How rates were generated

To compare and estimate rates of events in this report, the count of events for each indicator was "modelled" using a statistical technique called a generalized linear model (GLM), suitable for non–normally distributed data such as counts. Various distributions were used for different indicators depending upon which fit the data best, including Poisson distribution (very rare events) and negative binomial distribution (relatively rare but highly variable). In the models that created the time graphs, covariates of age and sex (male/female) were included in the model to "adjust" for differences in underlying neighbourhood income quintile age/sex distributions.

In order to obtain neighbourhood income quintile rates for the various graphs, relative risks were estimated for each group. To estimate relative risks of rates rather than counts of events, the log of the population count was included in the model as an offset. Estimated rates were calculated for each group by multiplying the Manitoba crude reference rate by the appropriate relative risk estimate.

Adjusted rates, crude rates, and statistical testing of rates

Most of the indicators are given as adjusted rates**,** adjusted for age (and sex where relevant) through the statistical modelling described earlier. This means that the rate has been adjusted to *create a fair comparison among neighbourhood income quintile groupings with different age distributions.* All rates are adjusted to reflect what the rate would be if each area's population had the same age (and sex, in some indicators) distribution as the Manitoba overall population for that particular time period.

Rates are **suppressed** (that is, not reported) where the counts upon which the rates are based represent five events or less (unless the rate is truly 0, in which case it can be reported). This is to avoid breeches of confidentiality, and this data protocol is similar to the way in which Statistics Canada reports data. Throughout the report, the letter "s" in tables indicates a suppressed rate.

Appendix 2 contains tables listing the *crude rates or prevalence* (the actual count divided by the actual population) without any adjustment for age and sex distributions. These tables also include the 'observed' number of events for each indicator where possible (unless this information is suppressed

to avoid breeches in confidentiality). This type of information is helpful in giving a realistic look at the effect of the population burden of illness on the region's healthcare system—actual numbers of the population who will require healthcare services for their illness or condition.

Despite the fact that many of the rates and prevalence graphs in this report are based on several years of data, most graphs are presented as *annualized* rates/prevalence, that is, the average value for *one* year (based on an average over all the years of data used). Exceptions are indicated when they occur.

In our exploration of using data from the time trend analyses to complete the **Lorenz curve** analyses, much discussion ensued. Normally, Lorenz curve analyses (see description below) use unadjusted event counts; but to have a fair comparison between neighbourhood income quintile groupings, there was a strong desire to age– and sex–adjust the event counts prior to graphing the income inequality. Thus, we developed a mathematical approach to produce adjusted Lorenz curves and **Gini coefficients**, which is available upon request from the authors.

Statistical testing indicates how much confidence to put in the results. If a difference is "statistically significant," then this difference is large enough that we are confident it is not just due to chance. In other words, if some rate is considered "statistically different" than the Manitoba average, we would say that this difference (either higher or lower than the average) is not due to random fluctuation simply expected by chance; but rather, this is most likely (we are 95% 'sure') that it is a real difference. The *notation "p<.05"* means that the probability of seeing a difference as large as this by chance alone is less than 5% (.05 out of 1 is 5%), so we say that there is a statistically significant difference—and we are 95% sure of the fact that this difference is real.

Many comparisons of values are given in this report by means of a relative risk or relative rate (RR). An *RR of greater than one* (with 95% Confidence Limits both above one, and a p–value less than 0.05, meaning statistically significant) *means that there is a higher probability, an RR of less than one* (with 95% Confidence Limits both below one) *means a lower probability*, and an RR around one (or 95% Confidence Limits crossing over one, and a p–value which is greater than 0.05, meaning not statistically significant) means that the rates are similar (i.e., not statistically significantly different).

Most of the graphs contain information about *statistical comparisons.* This simply gives an indication as to whether or not a group's rate is statistically higher or lower than the comparison group or if the rate should be considered similar to the comparison group when no statistical difference is noted. When you see a large difference that is NOT statistically significant, it is telling you that this rate is considered similar to the comparison, since it could fluctuate greatly from year to year. This is usually due to the rate being based on small numbers (either a small number of events, or a small underlying population); so it could change from year to year and may be higher, similar, or lower than the comparison the next time it is measured.

Difference between prevalence and rate:

Prevalence refers to the percentage of the population having a certain condition at a given point in time (point prevalence) or over a given period of time (period prevalence). In other words, it is calculated using a numerator of people with a given condition over a denominator of the entire population. This gives the portion of the population that has this condition during a given time period. In our report, we often use the concept of prevalence, for example, we have one indicator which is the period prevalence of **diabetes** over a three–year time period. This is simply the age– and sex–adjusted percentage of people who have a diagnosis of diabetes during a given time period, in this case, during the three–year period. This would include both people who had diabetes before the time period began and people

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newly diagnosed during the time period. In prevalence, a person can only contribute once to this percentage.

Some of our health services indicators are listed as rates. In this case, a rate refers to the number of occurrences divided by the size of the population. It also involves a time period in which these events occurred. For example, the rate of hospitalizations for tuberculosis for the province of Manitoba was 16.7 per 100,000 in time period one (1984/85–1988/89) and 12.8 per 100,000 in time period five (2004/05–2007/08). In a rate, a person can contribute more than one event—for example, one person could have more than one hospitalization contributing to this rate during the year.

The Various Types of Graphs

Beginning in Chapter 3, there are three types of graphs given for each indicator:

a) Time trend graphs including Disparity Rate Ratios and Disparity Rate Differences:

Separately by rural and urban neighbourhood income quintiles, each indicator shows the trend in rates or prevalence over time—usually from around 1984 to the most recent data available in 2008—for each of the neighbourhood income quintile groupings (R1 through R5 or U1 through U5). Under the graph itself is a table showing the actual rates for each of the neighbourhood income quintile groups and each of the time periods. Below this table is given further information to quantify "inequality"—**Disparity Rate Ratios (DRRs)** and **Disparity Rate Differences (DRDs)**—as well as a statistical test of the DRRs and DRDs comparing the first time period to the last time period.

Disparity Rate Ratio (DRR) is one measure of a socioeconomic gap, dividing the rate of the lowest neighbourhood income group by the rate of the highest neighbourhood income group (i.e., R1/R5 or U1/U5). This is sometimes referred to in the text as simply the "rate ratio". There is also a statistical test for the **time comparison of the DRR**, measuring the change in the DRR or rate ratio from the first to the last time period. This is given as a ratio of DRRs from the last time period to the first time period. We also provide its 95% confidence interval and the p–value. DRRs can be thought of as a way to express the relative increase or decrease in inequality between the lowest and highest neighbourhood income quintile groups over time.

An example:

In Chapter 6 (see Figure 6.9), the DRR of hospitalization due to tuberculosis is 2.72 in the first time period, meaning that the rate is almost three times as high in R1 compared to R5, and 5.83 in the last time period. This means the rate is over five times higher in R1 compared to R5 in the last time period. As well, the statistical comparison of these DRRs indicates a statistically significant increase of 114% in the rate ratio (5.83/2.72 = 2.14, $p < 0.01$; note that 2.14 translates into an 114% higher rate in the last time period).

Disparity Rate Difference (DRD) is another measure of a socioeconomic gap, subtracting the rate of the lowest neighbourhood income group from the rate of the highest neighbourhood income group (i.e., R1 minus R5 or U1 minus U5). This is sometimes referred to in the text as the "rate difference". There is also a statistical test for the time comparison of the DRD, measuring the change in the DRD or rate difference from the first to the last time period. This is given as a ratio of DRDs from the last time period to the first time period. The p–value associated is also provided. DRDs can be thought of as a way to express how many "more" events occur in the lowest neighbourhood income quintile group compared to the highest.

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An example:

In Chapter 6 (see Figure 6.9), the DRD of hospitalization due to tuberculosis is 26.2 per 100,000 in the first time period, meaning there are 26.2 "more" hospitalizations in R1 compared to R5. In the last time period, the DRD is 47.9 per 100,000, meaning there are 47.9 more hospitalizations in R1 compared to R5. However, a statistical comparison of these rare events shows that the comparison of the DRDs (47.9/26.2) is 1.82, and is statistically significantly different. The conclusion would be that there was am 82% increase in hospitalizations for TB overtime.

The research team thought it critical to give both the DRR and the DRD. Rate ratios can be useful, but can also lead to misleading interpretations if used alone. For example, if rates in both the lowest neighbourhood income group (R1) and highest neighbourhood income group (R5) in the rural areas dropped substantially by exactly the same absolute amount, the rate ratio could actually be shown to increase mathematically, due to dividing by a smaller number in the second time period. To illustrate this: assume that an indicator dropped from 50 to 40 in R1 from time one to time two, and from 20 to 10 in R5. Although the DRD, the rate difference between R1 and R5, is 30 in both T1 (50 minus 20) and T2 (40 minus 10), the DRR, or rate ratio, is 50/20 or 2.5 at T1 and 40/10 or 4.0 at T2. So in one sense (the rate difference), improvement has been made in both groups and equally; but in another sense (the rate ratio), there has actually been a worsening of inequality.

b) Lorenz Curves and Gini Coefficients:

A Lorenz curve is the graphical representation of inequality. If there were equity in the population, then the outcome would be equally distributed by the population size. In other words, 20% of the population would experience 20% of the outcome event, 40% would experience 40% of the event, continuing to 100%. In our report, equity is represented by a dashed line on the Lorenz curve graph. Any bend from that, whether it be a bend upwards or downwards, illustrates inequality. A Gini coefficient, with a value between zero and one, is a mathematical measurement of the degree of inequality. A Gini coefficient of zero means that the null hypothesis is accepted, i.e., there is no inequality, and the Lorenz curve would approximate the dashed line of equal distribution throughout the population's neighbourhood income groups. A Gini coefficient of 1 means the maximal inequality, such that the lowest neighbourhood income group would have all of the disease events despite the fact it is only 20% of the population. The Gini coefficient represents the fraction of the area under the bending curve to the line of equity (as a fraction of the total area between that line and the outer bounds of the graph). The confidence intervals (CI) of the Gini coefficients were derived using bootstrapping techniques.

In our report, we are using an adjusted Lorenz curve approach, meaning that the attribution of outcome events to the differing neighbourhood income quintile groups has been adjusted for underlying differences in the groups' age and sex (male/female) structure. We give the percentage of the entire population that is within each neighbourhood income quintile group (R1 through R5 on the rural graphs, U1 through U5 on the urban graphs) for that particular indicator. Recalling that these neighbourhood income quintile groups are based upon around 20% of the population in each grouping based upon the census closest to that time period, it is important to note that some indicators select certain age groupings, or females only, so that the real percentage may vary slightly from the estimated 20%. So on each Lorenz curve, the actual percentage is shown on the x–axis, below the notation for the neighbourhood income quintile group (like R1). Also, the accumulating percentage is shown in R2 through R5. On the Lorenz curve itself, the corresponding percentage of events for R1, and the accumulating percentages R2 through R5 are indicated.

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An example:

In Chapter 6 (see Figure 6.11), the hospitalization events due to tuberculosis have been illustrated using a Lorenz curve. For the rural neighbourhood income quintiles in the first time period (1984/85–1988/89), you will see on the x–axis that R1 is 20% of the population, R2 an additional 20% meaning a total of 40%, R3 an additional 20.1% for a total of 60.1% and so on. For the 20% of the population in R1, they have 40.9% of the events (i.e., hospitalizations for tuberculosis). The number on the graph above R2 is 65.1%, meaning that an additional 24.2% (65.1–40.9 = 24.2) of the TB hospitalizations occur in R2 (which represents an additional 20% of the people). So a preponderance of TB hospitalization events occur within the lowest neighbourhood income quintile group. The Gini coefficient is 0.260, meaning that the area between the curve and the line of equality is 26.0% of the total area in that half of the graph. This is statistically significant, since the 95% CIs (0.187–0.333) do not include 0. In the second time period, the inequality is even larger, with the 19.9% of the R1 population in 2004/05–2007/08 experiencing 57.2% of the hospitalizations due to TB. The Gini coefficient is now 0.463 (95% CI 0.403–0.523). There was a statistically significant increase in the Gini coefficient from the first to last time period, since the 95% CI do not overlap. Similar information is also available for the urban neighbourhood income quintile groups.

c) Graphs of DRRs and DRDs over time, comparing rural and urban:

The final set of graphs illustrate information given in the time trend tables, but showing both rural and urban results as well as the 95% CIs (error bars) at each time period. The DRRs are an indication of rate ratio between the lowest and highest neighbourhood income quintile group, and the DRDs are an indication of the rate difference. Although these two graphs basically reiterate previous information, it is interesting to note historical trends in the DRRs and DRDs and in the comparison of rural to urban.

An example:

In Chapter 6 (see Figures 6.15 and 6.16), comparisons of DRRs and DRDs for hospitalization due to tuberculosis are illustrated in these graphs. The rate ratio (DRR) was statistically higher in urban compared to rural in the first time period, but appears to be statistically similar (with overlapping error bars) in all other time periods to the present. Similarly, the rate difference (DRD) was similar throughout all time periods until the most recent time period, where the rural rate difference is much higher (and statistically higher) than the urban rate difference.

The research team has found that it is important to realize the strengths and weaknesses of each way to measure inequality. Therefore, each of the outcomes was analysed through time trend graphs, relative and absolute difference measures, the use of Lorenz curves, and comparisons amongst all of these. The intent is to give the fullest picture possible of equity or inequity in a given health or social outcome.

Limitations of the Data

Because data analyses were limited to those data available in the Repository housed at MCHP, our chosen indicators were dictated by this limitation. We chose *not* to use survey data, such as the Canadian Community Health Survey (CCHS), for three reasons: 1) CCHS is sample data; and although it is chosen to be representative of the non–First Nations community participants, it is a relatively small sample compared to the Repository containing de–identified records for the entire population of Manitoba; 2) we chose to go back as far in time as possible, usually to the mid–1980s, to give an idea of change over time, but survey data at the population level are not available for this long period of time over such extensive indicators; 3) we chose to use only data which contains information about

all Manitobans, including First Nations on–reserve populations. Unfortunately, CCHS does not survey people living on–reserve. Our Repository records do contain most, if not all, records for the indicators chosen in this report.

Given the fact that rural Manitoba is more heterogeneous when measuring average household income at the dissemination area level, compared to urban settings where DA groupings represent relatively small numbers of city blocks and families, there is the potential for truncation of disparity within rural neighbourhood income quintiles. In other words, the rural neighbourhood income groupings, based on DA income, may actually represent a more diverse grouping of incomes than in the urban DA groupings. Therefore, inequality in rural Manitoba may be understated with this approach. That being said, for most indicators the patterns of inequality are similar for urban and rural neighbourhood income groups, and some indicators even showed greater disparity in the rural group. Therefore, although this is not perfect, it appears to be a useful way to measure inequality both within rural groupings over time and between rural and urban neighbourhood income groupings. Access to person–level income data may overcome this limitation in the future, but the Repository currently does not contain person–level income data for all Manitobans.

By excluding institutionalized populations (and putting them into the "Income Not Found" or NF grouping), the analyses probably understate the inequality experienced in some of the dissemination areas. A further description of the NF group is found in Chapter 9, which shows the disparate rates of the NF group in relationship to the two lowest neighbourhood income quintile groupings of R1 and U1 and in comparison to the overall provincial average.

By only using average household income in the census to determine the neighbourhood income quintile groupings, no acknowledgement of the importance of average household size is taken into account. Presumably, this would increase the disparity in terms of income, since there are typically larger household sizes in the lower income areas, and smaller household sizes in the highest income areas, which would result in even poorer conditions for the R1 and U1 and even richer conditions for the R5 and U5 groupings. Future work could consider the use of the neighbourhood income adjusted for household size.

A Targeted Versus Population Approach: Interpreting the information

In the conclusions of Chapter 9, we discuss a population–based versus targeted approach and what our report on inequities is telling us about each outcome indicator. Please refer to that chapter for a brief discussion on the Rose Theorem, the meaning of population shift, and how to approach reducing inequality while also improving the overall health of Manitobans.

Summary

There is a wealth of information in this report on outcome indicators of use to planners and decision–makers of Manitoba who are interested in public health and health service programs and policies. The research team hopes that this will prove useful to planners, decision–makers, and policy–makers within our province. At the same time, we hope it will be useful in producing a methodology for other research scientists and decision–makers to approach similar analyses throughout the world.

The information can be used in many ways. First, a region can understand intra–regional inequality through examining the neighbourhood income quintile map in this Chapter and applying the information to planning for certain sub–regional areas. Secondly, as a jumping off point for provincial

initiatives, this report gives us fertile ground on which to base future policies, programs, and evaluations of initiatives both provincially and regionally.

We hope that this information will be a useful tool in the effort to improve the health and well–being of Manitobans and more importantly, to reduce inequity in our province. If you would like to access an electronic version of this report, which may help you in creating your own summary presentations, you will find this on the website of the Manitoba Centre for Health Policy, under Publications. You will also find Excel spreadsheets for the graphs in this report by looking under the MCHP link called "Data Extras."

The MCHP website address is **http://www.umanitoba.ca/faculties/medicine/units/mchp/**

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Chapter 2: A Description of the Neighbourhood Income Quintiles using Census Data

This report analyses various health and social indicators over time by using neighbourhood income quintiles as a proxy for socioeconomic status. Neighbourhood income quintiles divide the Manitoba population into five neighbourhood income groups (from lowest neighbourhood income to highest neighbourhood income) so that approximately 20% of the population is in each group. They are created within two population groups: urban (Winnipeg and Brandon) and rural (other Manitoba areas). The indicator analyses in Chapters 3 through 8 use the Data Repository housed at MCHP, in which individuals are assigned an neighbourhood income quintile based upon their postal code via the Postal Code Conversion File (PCCF). The PCCF is provided by Statistics Canada and links postal codes to Census Dissemination Areas (DA). In the Census, DAs are the smallest geographical areas available for which all census data are disseminated. (Census Divisions and Sub–divisions are larger geographical areas available in the Census.) DAs usually contain between 400–700 people and are approximately the size of one city block in urban centres. In this chapter, we wish to explore census data indicators not available in Repository such as the percent of the population who are of aboriginal origin or the percent who are immigrants. However, we cannot simply work backwards to map DAs onto their corresponding postal codes to assign neighbourhood income quintiles to DAs because DAs can cover more or less area than postal codes within the same geographical space, and overlapping can occur. As such, this chapter has used a slightly different methodology to assign neighbourhood income quintiles to geographical areas.

Tables and graphs in this chapter characterize information from the 1986, 1996, and 2006 census by neighbourhood income quintile. Dissemination areas (formally enumeration areas prior to 2001) are assigned to a neighbourhood income quintile based on the average household income cut–offs developed by MCHP during creation of the quintiles. Each neighbourhood income quintile based on the Manitoba population, U1 through to U5 and R1 through to R5, have corresponding minimum and maximum average household income values. To classify DAs to one of the neighbourhood income quintiles, each DA was first determined to be either urban (Winnipeg and Brandon) or rural; and then the DA was sorted into one of the quintiles based on where the average household income of that DA lay within the cut–offs. For DAs with missing or suppressed income, imputation for an average household income was attempted. Where possible, the Census Sub–Division's (CSD) average household income was used to approximate the DA's average household income. However, DAs associated to First Nation communities often have a missing average household income at both the DA and CSD level. Therefore, a different imputation was done; the mean household income for the North and South First Nation communities were calculated and then assigned to each North and South First Nation DA respectively. After these two rounds of imputations, any remaining DAs with missing or suppressed income were placed into the not found (NF) income group. Despite being counter–intuitive, this method produced the best possible estimates for classifying DAs into neighbourhood income quintiles given the limitations with applying MCHP Data Repository methods to the census data. Once all DAs were converted into rural and urban neighbourhood income quintiles, a weighted percentage was calculated for each of the census characteristics by neighbourhood income quintile.

There are several limitations to this chapter's information. According to the census, Manitoba's population is approximately 3% smaller than is found in the Repository at MCHP, which could lead to slightly different percent of the population in each neighbourhood income quintile. The 2006 census contained 2,152 DAs for Manitoba. Thirty–seven DAs had an average household income that was

suppressed or zero. Of those, 31 DAs had less than 40 residents. Income measures are not reported in the census if the population size of the DA is fewer than 250 residents or 40 households. If a DA contains at least 40 non–institutionalized people, but less than 250 people, other census characteristics will be reported but the DA will have an average household income of zero. After imputation, only six DAs were categorized as income "not found" (NF) with a population of 830 individuals. In the Repository data, the number of people in the NF group for the 2006 Manitoba population is slightly higher than the NF group for the 2006 census. If an individual's postal code is not included in the PCCF, then their postal code cannot be linked to a DA and thus the neighbourhood income quintile of the individual remains NF. So, in other chapters a higher percentage of the population has been categorized as not found. Another limitation of the method used to assign neighbourhood income quintiles to DAs was that the census population distribution across neighbourhood income quintiles was not as equal as when the Repository population is assigned neighbourhood income quintiles, particularly in the rural DAs. One main difference between the two methods is that assignment of the Repository population to neighbourhood income quintiles excludes DAs where the majority (greater than 90%) of residents reside in institutions such as personal care homes or prisons. Also, the smaller range of neighbourhood income values within rural areas could make subtle differences in population distributions more apparent in the census population. However, despite the neighbourhood income quintile distribution for the rural census DAs not being exactly 20% in each, this linking technique was the best approach given the limited linkage possibilities of the census to other data sources.

To determine the overall mean values for the following tables, the population weighted average of the DAs in each neighbourhood income quintile was calculated. For example, as the total average household income for a given neighbourhood income quintile is comprised of several DAs, the following calculation was necessary:

$$Total\ average\ household\ income\ in\ the\ income\ quintile$$

$$= \frac{\sum(average\ household\ income\ in\ each\ DA * population\ in\ each\ DA)}{\sum(population\ in\ all\ DAs\ in\ the\ income\ quintile)}$$

Tables 2.1, 2.2, and 2.3 represent census data from each decade—1986, 1996, and 2006. Note that information is missing for 14 First Nations communities in 1986, two First Nations communities in 1996, and no information is missing in 2006. Therefore, a comparison over time of the percentage of Aboriginal people (especially in R1) is not accurate, given the problem of missing First Nations data in 1986 and 1996 (and thus there would presumably be an underestimate of the percentage of Aboriginal for 1986 and 1996).

Table 2.1: Neighbourhood Income Quintile Group Description Chart 1986 Census

Income Quintile	Population size	% in group from Repository	Mean income	% Inuit	% Metis	% North American Indian	% of Aboriginal origin	% Immigrant	% Unemployed	% Completed high school	% Private dwellings in need of major repairs
NF	6641	100.0		NA	NA	NA	NA	NA	NA	NA	NA
R1	87411	19.9	$17,647	NA	NA	NA	25.4	0.6	11.6	25.1	NA
R2	88185	20.1	$23,299	NA	NA	NA	12.0	0.3	8.2	32.3	NA
R3	87403	19.9	$26,317	NA	NA	NA	3.7	0.7	6.4	37.7	NA
R4	87789	20.0	$30,066	NA	NA	NA	2.2	0.6	5.7	39.2	NA
R5	88921	20.2	$39,437	NA	NA	NA	3.4	0.3	5.6	49.6	NA
U1	133820	19.9	$18,724	NA	NA	NA	7.1	4.1	12.8	44.3	NA
U2	134322	20.0	$26,629	NA	NA	NA	2.4	1.4	9.1	49.3	NA
U3	134059	20.0	$32,827	NA	NA	NA	1.1	0.9	7.3	54.6	NA
U4	134245	20.0	$40,110	NA	NA	NA	0.7	0.7	6.1	61.0	NA
U5	135162	20.1	$55,556	NA	NA	NA	0.2	0.5	5.2	68.0	NA

Note: Information is missing for 14 First Nations communities
Columns may not add to total due to rounding of numbers
NA = "Not Available"

Source: Manitoba Centre for Health Policy, 2010

Table 2.2: Neighbourhood Income Quintile Group Description Chart 1996 Census

Income Quintile	Population size	% in group from Repository	Mean income	% Inuit	% Metis	% North American Indian	% of Aboriginal origin	% Immigrant	% Unemployed	% Completed high school	% Private dwellings in need of major repairs
NF	10712	100.0		0.00	11.9	44.1	55.9	0.0	22.2	49.1	17.0
R1	88582	19.8	$27,306	0.03	6.7	40.1	46.9	0.5	14.0	36.7	20.6
R2	88101	19.7	$34,558	0.00	4.6	11.0	15.6	0.6	6.7	46.1	13.3
R3	89229	20.0	$38,593	0.05	3.6	3.4	7.1	0.8	5.7	48.7	11.2
R4	88196	19.7	$43,814	0.05	4.9	4.5	9.5	0.9	5.3	51.1	11.5
R5	93097	20.8	$58,645	0.07	4.7	5.1	9.8	0.5	5.4	61.7	9.9
U1	137329	20.0	$24,687	0.04	7.5	11.8	19.3	5.4	15.9	52.4	9.7
U2	137415	20.0	$36,002	0.05	4.5	4.4	9.0	2.5	9.1	60.7	11.2
U3	137330	20.0	$44,688	0.06	3.1	3.1	6.3	1.6	6.5	64.8	9.7
U4	137357	20.0	$55,907	0.05	2.4	1.8	4.2	1.4	5.6	70.9	6.0
U5	137112	20.0	$78,249	0.02	1.5	1.1	2.5	1.0	4.5	77.3	5.3

Note: Information is missing for 2 First Nations communities
Columns may not add to total due to rounding of numbers

Source: Manitoba Centre for Health Policy, 2010

Table 2.3: Neighbourhood Income Quintile Group Description Chart 2006 Census

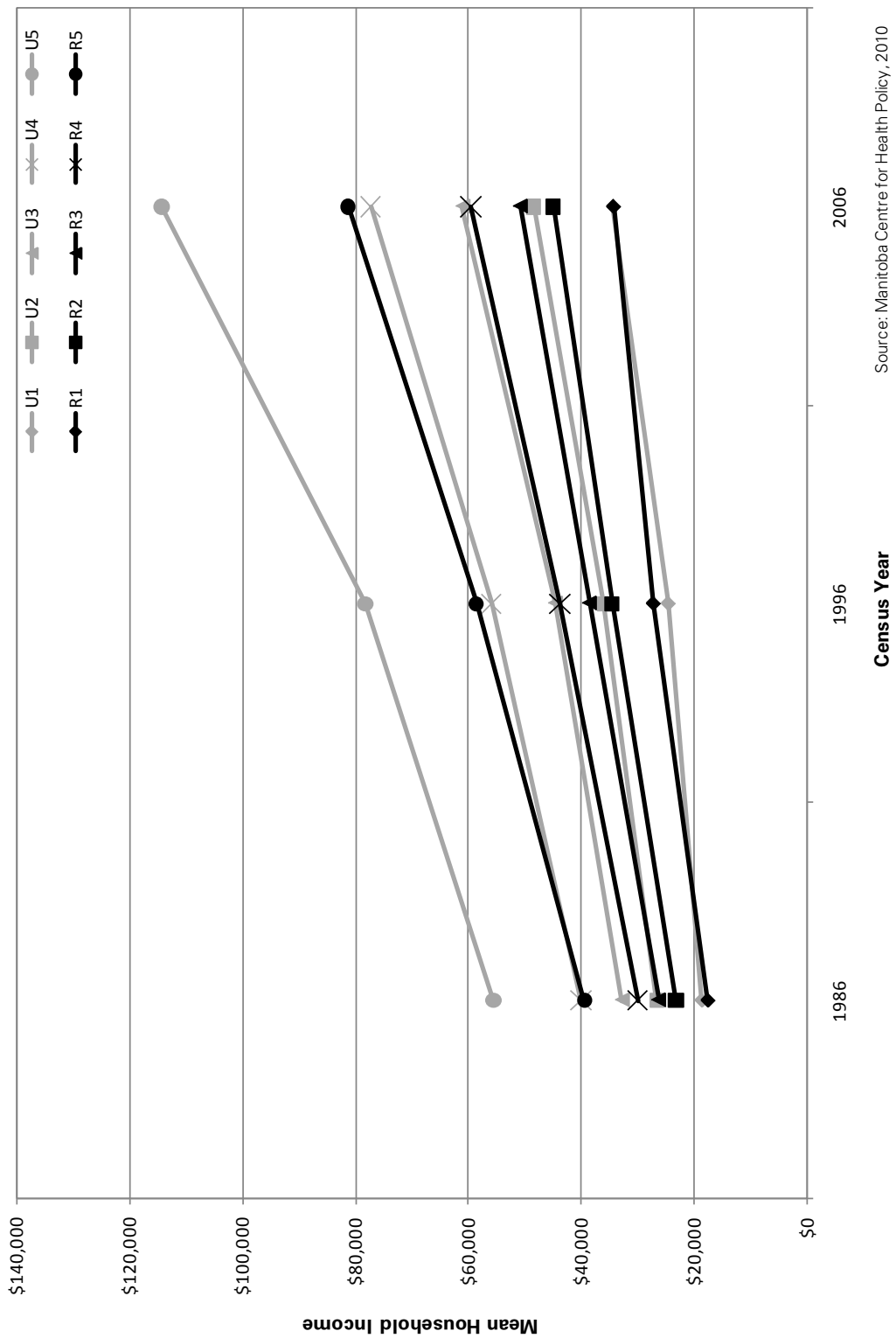
Income Quintile	Population size	% in group from Repository	Mean income	% Inuit	% Metis	% North American Indian	% of Aboriginal origin	% Immigrant	% Unemployed	% Completed high school	% Private dwellings in need of major repairs
NF	10251	100.0		0.00	3.7	44.5	47.6	0.0	13.4	56.8	26.3
R1	91367	19.8	$34,331	0.01	5.4	48.2	52.5	0.6	12.9	43.9	24.8
R2	91509	19.9	$45,021	0.13	6.9	10.6	16.9	1.6	5.3	58.5	11.3
R3	91580	19.9	$50,851	0.03	7.3	6.9	13.5	2.1	4.4	61.2	10.4
R4	91296	19.8	$59,572	0.12	8.0	6.4	13.7	1.9	3.9	64.2	10.3
R5	95152	20.6	$81,336	0.16	7.2	6.4	13.0	1.2	3.9	72.3	7.1
U1	142655	20.1	$34,371	0.12	8.1	11.6	19.0	7.3	8.5	68.2	10.6
U2	141721	20.0	$48,458	0.11	7.7	6.6	13.9	3.2	5.1	73.1	11.2
U3	141732	20.0	$61,085	0.07	5.4	4.0	9.1	2.7	4.5	77.8	8.3
U4	141564	20.0	$77,308	0.10	5.0	2.7	7.4	2.0	3.9	81.0	5.2
U5	141703	20.0	$114,331	0.03	2.9	1.6	4.5	1.9	3.5	84.6	4.3

Note: Information is included for all First Nations communities in Manitoba
Columns may not add to total due to rounding of numbers

Source: Manitoba Centre for Health Policy, 2010

Figure 2.1: Mean Household Income Over Time by Urban and Rural Income Quintiles

Weighted average household incomes for urban and rural residents



Source: Manitoba Centre for Health Policy, 2010

Key findings:

Trends in average household income over time, by neighbourhood income quintile

Table 2.4: Average Household Income Changes over Census Years 1986, 1996, 2006

Area	Measure	Census Date*			Comparison over time: T3 to T1 (T3/T1) (2006 to 1986)
		T1: 1986	T2: 1996	T3: 2006	
Rural	Average Household Income for R1 and R5	R1: $17,647 R5: $39,437	R1: $27,306 R5: $58,645	R1: $34,331 R5: $81,336	R1: 1.95 R5: 2.06
	Disparity Rate Ratio (R5/R1)	2.23	2.15	2.37	1.06
	Disparity Rate Difference (R5-R1)	$21,790	$31,339	$47,005	2.16
Urban	Average Household Income for U1 and U5	U1: $18,724 U5: $55,556	U1: $24,687 U5: $78,249	U1: $34,371 U5: $114,331	U1: 1.84 U5: 2.06
	Disparity Rate Ratio (U5/U1)	2.97	3.17	3.33	1.12
	Disparity Rate Difference (U5-U1)	$36,832	$53,562	$79,960	2.17

*T1=time 1 (1986); T2=time 2 (1996); T3=time 3 (2006) Source: Manitoba Centre for Health Policy, 2010

By both relative and absolute measures, the neighbourhood income inequality is increasing over time between the lowest and the highest neighbourhood income groups. In the rural neighbourhood income quintiles, the disparity rate ratio is over 2 for all time periods, meaning that the relative neighbourhood income of R5 is 2.23 times (1986), 2.15 times (1996), and 2.37 times (2006) that of R1. Not only is there over twice the neighbourhood income in R5, but the disparity in 2006 is 6% higher than in 1986 (as indicated by the last column, 1.06, or 6% increase from a DRR of 2.23 in T1 to 2.37 in T3). As well, the rate difference goes from $21,790 more per household in R5 compared to R1 in 1986 to $47,005 more in 2006, which is over double (2.16 times).

In urban areas, the rate ratio (DRR) goes from 2.97 in 1986 to 3.33 in 2006, so those in U5 have an average household income around three times that of U1. This disparity is increasing over time by about 12% from T1 to T3. As well, the rate difference goes from $36,832 in 1986 to $79,960 in 2006, which is over double (2.17 times).

The disparity at each time period, both in relative and rate differences, is substantially greater in urban compared to rural areas. Comparing these over time, disparity is also increasing on every measure, with rate ratios increasing more in urban (12% increase) compared to rural (6% increase) from 1986 to 2006. Interestingly, in both the rural and urban highest neighbourhood income quintile, the actual dollar amounts increased by similar amounts from 1986 to 2006 (2.06 times), whereas the lowest neighbourhood income quintile groups in both rural and urban increased by less than two times (1.95 times for R1, and only 1.84 times for U1). So the highest neighbourhood income quintile group appears

to be increasing in average household income faster than the lowest neighbourhood income quintile group. The colloquial statement, the "rich are getting richer", is born out in various measures of disparity, both in urban and rural Manitoba. One qualifier to this analysis is that the average census household income is not adjusted for the size of the household itself.

Trends in percentage completing high school over time, by neighbourhood income quintile

Table 2.5: Change in Percentage Completing High School over Census Years 1986, 1996, 2006

Area	Measure	Census Date			Comparison over time: T3 to T1 (T3/T1) (2006 to 1986)
		T1: 1986	T2: 1996	T3: 2006	
Rural	High School Completion Rates for R1 and R5	R1: 25.1% R5: 49.6%	R1: 36.7% R5: 61.7%	R1: 43.9% R5: 72.3%	R1: 1.75 R5: 1.46
	Disparity Rate Ratio (R5/R1)	1.98	1.68	1.65	0.83
	Disparity Rate Difference (R5-R1)	24.5%	25.0%	28.4%	1.16
Urban	High School Completion Rates for U1 and U5	U1: 44.3% U5: 68.0%	U1: 52.4% U5: 77.3%	U1: 68.2% U5: 84.6%	U1: 1.54 U5: 1.24
	Disparity Rate Ratio (U5/U1)	1.53	1.48	1.24	0.81
	Disparity Rate Difference (U5-U1)	23.7%	24.9%	16.4%	0.69

Source: Manitoba Centre for Health Policy, 2010

In rural neighbourhood income quintile groups, the **high school completion** rate was almost double (1.98 times) in R5 compared to R1 in 1986, but 1.65 times higher in 2006. Therefore, the rate ratio is decreasing over time by 17% (T3/T1=0.83). That being said, as the high school completion levels go up for all rural neighbourhood income quintile groups, the rate difference slightly increased over time, from a difference of 24.5% to 28.4% (28.4/24.5=1.16 or a 16% increase in the rate difference). Looking at Tables 2.1 through 2.3, one can see the high school completion rates have increased dramatically for R1, from 25.1% completing high school in 1986 to 43.9% in 2006 and for R5 during the same time period, 49.6% in 1986 to 72.3% in 2006.

In urban areas, both the relative and rate differences are decreasing over time. The rate ratio displays 1.53 times the high school completion rate for U5 compared to U1 in 1986, but only 1.24 times in 2006, for a 19% decrease (ratio 0.81) in disparity over time. Concurrently, the absolute difference in high school completion rates dropped from 23.7% in 1986 to 16.4% difference in 2006, for a 31% decrease (ratio 0.69) over time. Looking at Tables 2.1 through 2.3, one can see that the high school completion rates have increased dramatically for U1, from 44.3% to 68.2% completing high school in 1986 and 2006 respectively. For U5, the rates went up from 68.0% to 84.6% over the same time period.

Chapter 3: Mortality

Premature Mortality Rate (PMR)

Definition

Premature mortality rates are often used as an overall indicator of population health status and are correlated with other commonly used measures. It is an important indicator of general health in a population because high premature mortality rates indicate poor health.

In this report, PMR is the average annual number of deaths among area residents under 75, per 1,000 residents aged 74 and under. Rates were calculated for four 5–year periods and a final four–year period, and were age– and sex–adjusted to the Manitoba population in the last time period.

Time Periods	Average annual rate per 1,000
T1: 1984–1988	4.17
T2: 1989–1993	3.86
T3: 1994–1998	3.73
T4: 1999–2003	3.54
T5: 2004–2007	3.33

Key findings: Premature Mortality Rate (PMR)

Manitoba overall rates:

- From the first time period T1 (1984–1988) to the last time period T5 (2004–2007), the PMR (age– and sex–adjusted death before the age of 75) dropped from 4.17 to 3.33 deaths per 1,000 provincially.

Rates by neighbourhood income quintile over time:
Rural:

- From T1 to T5, the PMR of rural neighbourhood income quintile groups R2 to R5 decreased steadily, whereas the PMR of the lowest rural neighbourhood income quintile R1 plateaued.
- The disparity between R1 and R5 increased substantially. The rate ratio of R1 compared to R5 was 1.35 in the first time period and 1.86 in the last time period, for a statistically significant increase of 38%. The absolute difference gap of PMR comparing R1 to R5 also statistically significantly increased by 58% over time, from 1.39 more deaths per 1,000 in the first time period to 2.19 more deaths per 1,000 in the last time period.

Urban:

- From T1 to T5, the PMR of urban neighbourhood income quintile groups U2 to U5 decreased steadily, whereas the PMR of the lowest urban neighbourhood income quintile U1 plateaued.
- In the urban areas, it appears that there is a greater spread by neighbourhood income quintile between all quintiles, compared to little spread in the R2 to R5 categories.

- The disparity between U1 and U5 increased substantially. The rate ratio of U1 compared to U5 was 1.91 in the first time period and 2.88 in the last time period, for a statistically significant increase of 50%. The absolute difference of PMR comparing U1 to U5 also statistically significantly increased by 27% over time, from 2.72 more deaths per 1,000 in the first time period to 3.46 more deaths per 1,000 in the last time period.

Lorenz Curves:

Rural over time:

- In T1, 25.6% of the premature deaths occurred in the 20.0% of the population in the lowest neighbourhood income quintile group R1, with the Gini coefficient of 0.058 indicating a statistically significant disparity.
- In T5, 29.1% of the premature deaths occurred in the 20.0% of the population in the lowest neighbourhood income quintile group R1, with the Gini coefficient of 0.119 indicating a statistically significant disparity.
- The Gini coefficient increased from the first to the last time period ($p<.001$), showing a statistically significant increase in inequality over that time period (note: statistical testing for Gini coefficients over time are shown in the Glossary in a table under the term "Gini coefficient").

Urban over time:

- In T1, 27.4% of the premature deaths occurred in the 19.3% of the population in the lowest neighbourhood income quintile group U1, with the Gini coefficient of 0.131 indicating a statistically significant disparity.
- In T5, 33.4% of the premature deaths occurred in the 19.5% of the population in the lowest neighbourhood income quintile group U1, with the Gini coefficient of 0.205 indicating a statistically significant disparity.
- The Gini coefficient increased from the first to the last time period ($p<.0001$), showing a statistically significant increase in inequality over that time period.

Rural compared to urban in most recent time period:

- In the most recent time period T5, there is a statistically significantly higher Gini coefficient in urban compared to rural (0.205 vs. 0.119, $p<.0001$), indicating a higher level of inequality in urban Manitoba for premature death (i.e., death before the age of 75).

Disparity measures over time by rural and urban:

- The disparity rate ratios (i.e., the ratio of the PMR of the lowest compared to the highest neighbourhood income group) are increasing over time for both rural and urban Manitoba. However, the ratios are consistently higher in urban, indicating a larger rate ratio between lowest and highest neighbourhood income groups in urban Manitoba.
- The disparity rate differences (i.e., the absolute difference of PMR between the lowest and highest neighbourhood income group) appear to be increasing over time; but from 1999–2003 to the last time period 2004–2007, there is a plateauing in both rural and urban Manitoba. However, the absolute differences are consistently higher in urban, indicating a larger rate difference between lowest and highest neighbourhood income groups in urban Manitoba.

What is this telling us?

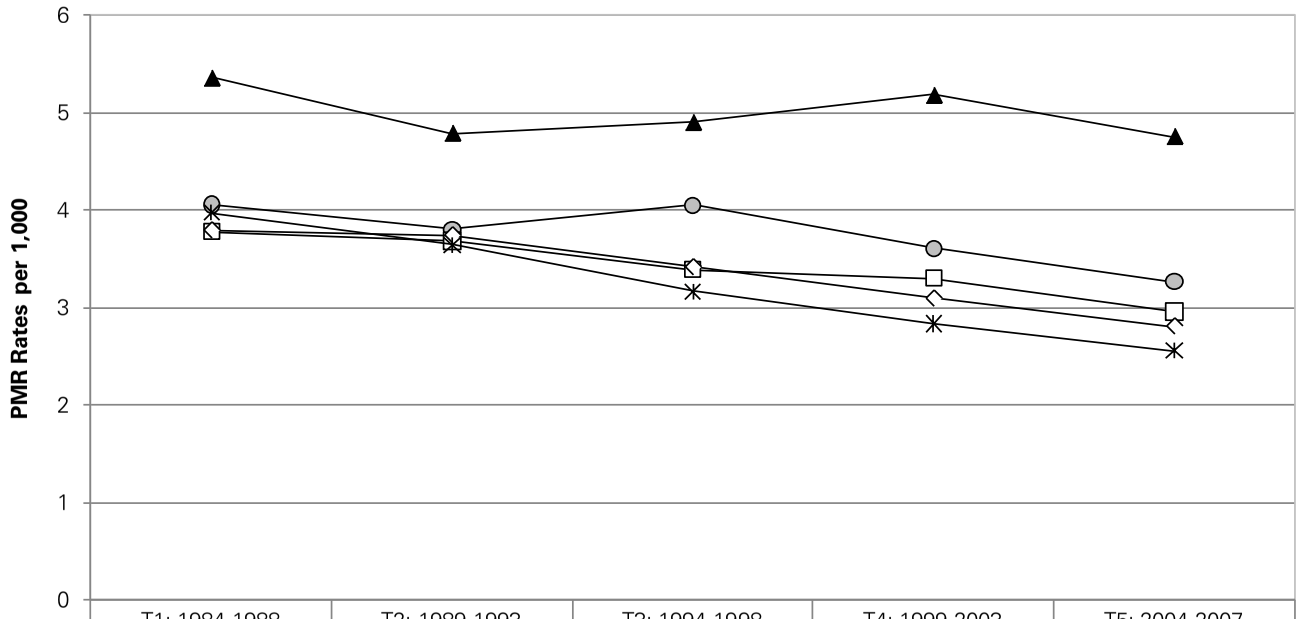
- The socioeconomic gap in premature mortality is widening over time for both rural and urban Manitobans.
- By all measures, the socioeconomic gap is larger in urban than in rural Manitoba.
- The lowest neighbourhood income group in both rural and urban Manitoba appears to show no improvement over time, in contrast with the overall patterns shown by all other neighbourhood income groups.
- The largest socioeconomic gap in premature mortality is seen in the most recent time period of 2004–2007 for urban Manitoba, where approximately one–third of the premature deaths is experienced by lowest urban neighbourhood income group representing around one–fifth of the urban population.

Where to from here?

- Causes of premature death in the lowest urban and rural neighbourhood income quintiles need further exploration, to be able to target appropriate interventions. These causes may differ between urban and rural neighbourhood income quintile groups, but a separate analyses by neighbourhood income quintile is needed to understand causes of death more deeply.

Figure 3.1: Premature Mortality Rates Over Time by Rural Income Quintile

Adjusted by (2004-2007) age & sex, annual rate per 1,000 residents aged 0-74



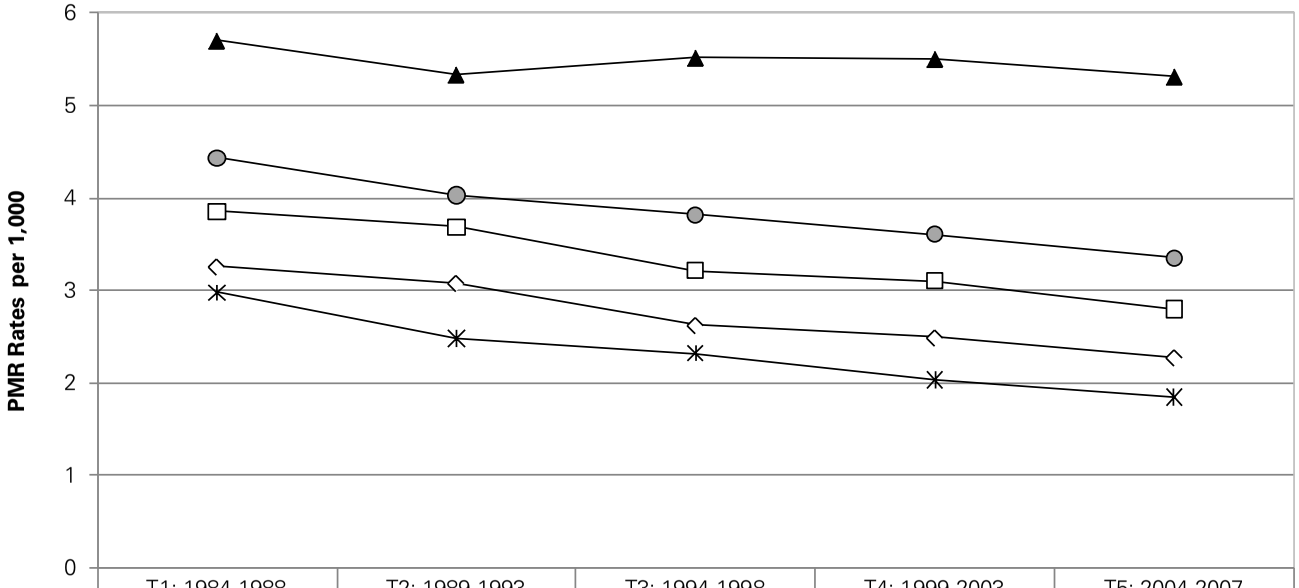
	T1: 1984-1988	T2: 1989-1993	T3: 1994-1998	T4: 1999-2003	T5: 2004-2007
Not Found (not displayed)	17.86	15.84	18.81	22.73	23.28
R1 (Lowest income)	5.36	4.79	4.90	5.18	4.76
R2	4.06	3.81	4.05	3.61	3.27
R3	3.78	3.69	3.40	3.30	2.96
R4	3.79	3.74	3.42	3.10	2.81
R5 (Highest income)	3.98	3.65	3.17	2.84	2.56
Disparity Rate Ratios (R1/R5)	1.35	1.31	1.55	1.83	1.86
Disparity Rate Differences (R1-R5)	1.39	1.14	1.74	2.35	2.19

Time Period (years)

Comparison of Disparity Rate Ratios T5 to T1: 1.38 (95% CI 1.22, 1.55) p< .001
Comparison of Disparity Rate Differences T5 to T1: 1.58, p< .001

Source: Manitoba Centre for Health Policy, 2010

Figure 3.2: Premature Mortality Rates Over Time by Urban Income Quintile
Adjusted by (2004-2007) age & sex, annual rate per 1,000 residents aged 0-74



	T1: 1984-1988	T2: 1989-1993	T3: 1994-1998	T4: 1999-2003	T5: 2004-2007
Not Found (not displayed)	17.86	15.84	18.81	22.73	23.28
U1 (lowest income)	5.70	5.33	5.51	5.50	5.31
U2	4.43	4.03	3.82	3.61	3.35
U3	3.85	3.69	3.21	3.11	2.80
U4	3.26	3.08	2.63	2.49	2.28
U5 (highest income)	2.98	2.48	2.32	2.03	1.84
Disparity Rate Ratios (U1/U5)	1.91	2.15	2.38	2.71	2.88
Disparity Rate Differences (U1-U5)	2.72	2.85	3.19	3.47	3.46

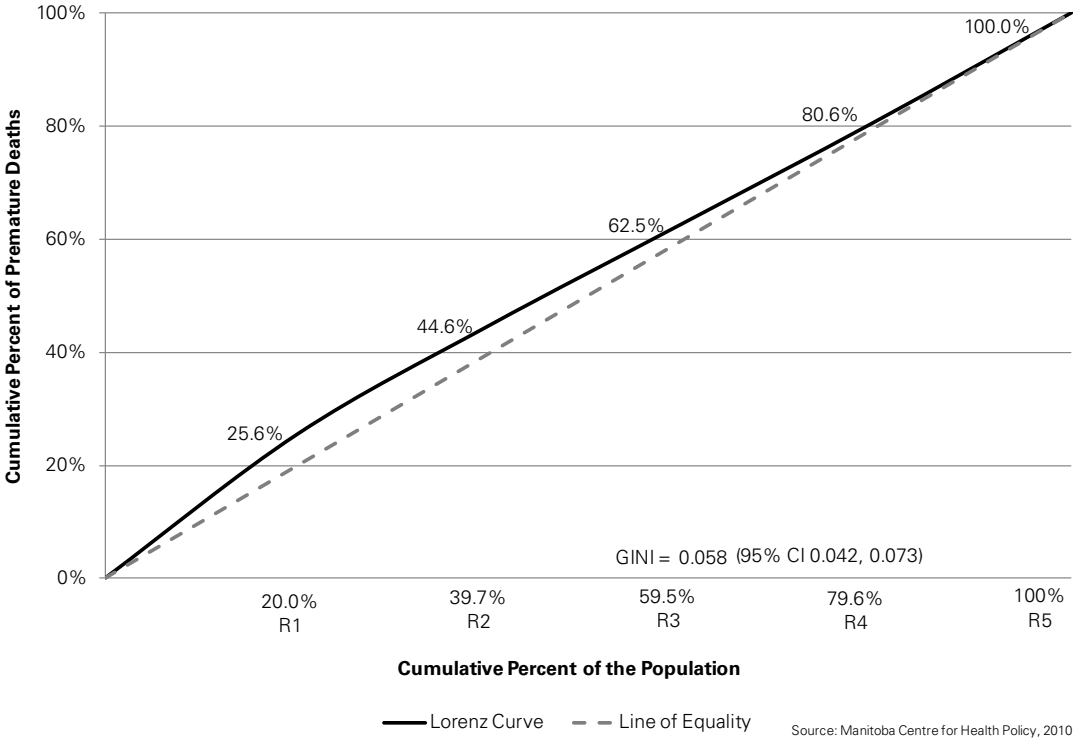
Time Period (years)

Comparison of Disparity Rate Ratios T5 to T1:1.50 (95% CI 1.36 ,1.67) p< .001

Comparison of Disparity Rate Differences T5 to T1: 1.27, p< .001

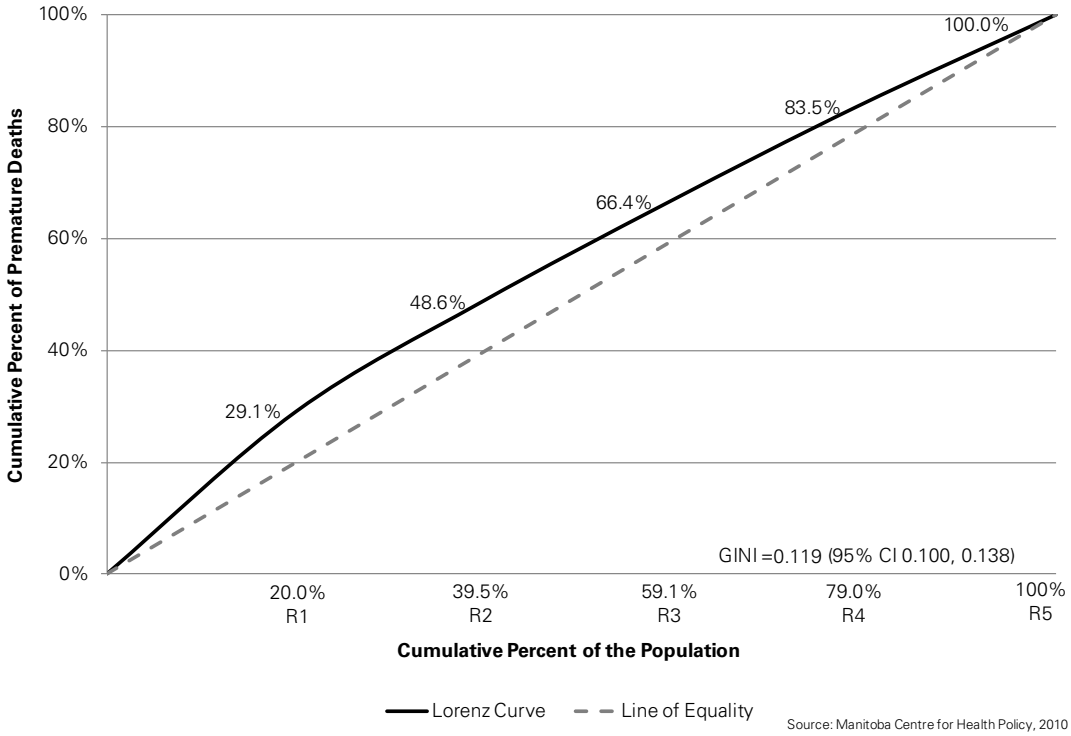
Source: Manitoba Centre for Health Policy, 2010

Figure 3.3: Adjusted Lorenz Curve for Premature Mortality in Rural Areas for 1984-1988
Adjusted by (2004-2007) age & sex, residents aged 0-74



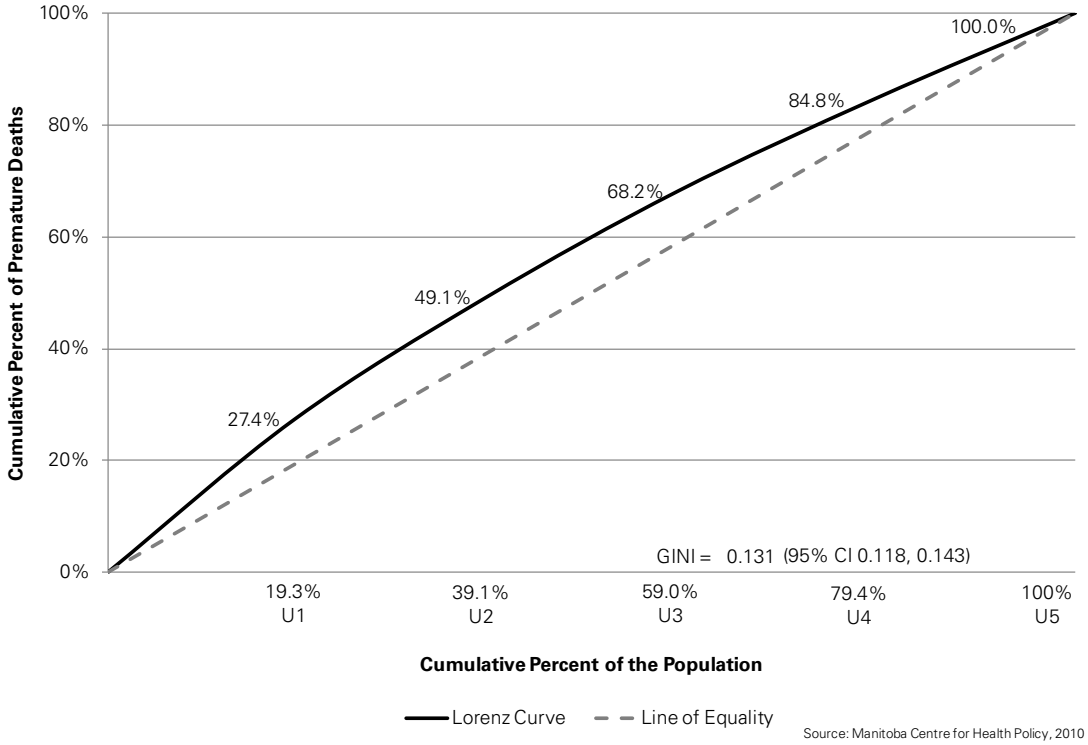
Source: Manitoba Centre for Health Policy, 2010

Figure 3.4: Adjusted Lorenz Curve for Premature Mortality in Rural Areas for 2004-2007
Adjusted by (2004-2007) age & sex, residents aged 0-74



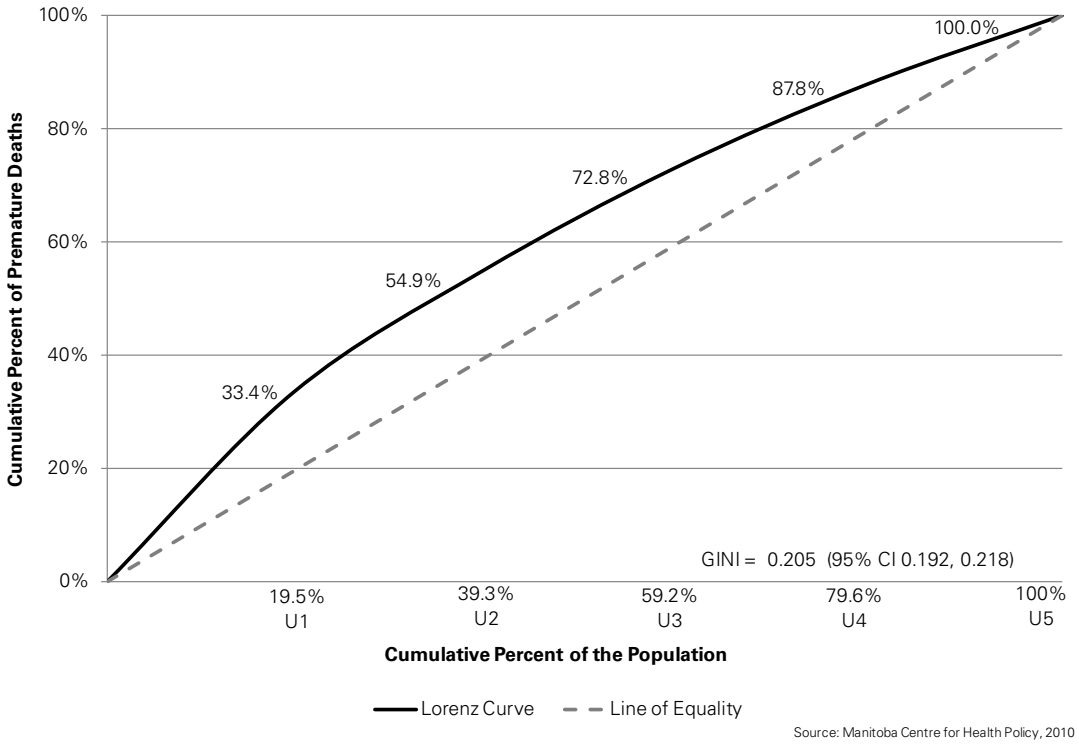
Source: Manitoba Centre for Health Policy, 2010

Figure 3.5: Adjusted Lorenz Curve for Premature Mortality in Urban Areas for 1984-1988
Adjusted by (2004-2007) age & sex, residents aged 0-74



Source: Manitoba Centre for Health Policy, 2010

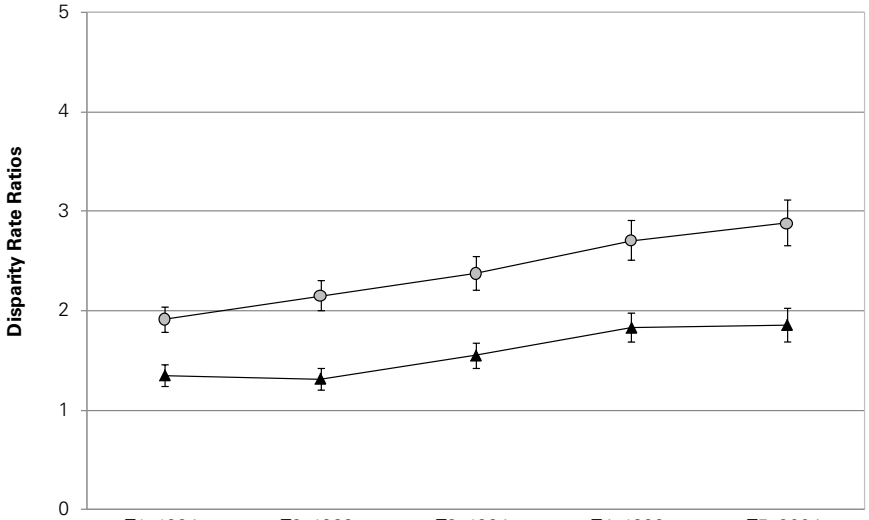
Figure 3.6: Adjusted Lorenz Curve for Premature Mortality in Urban Areas for 2004-2007
Adjusted by (2004-2007) age & sex, residents aged 0-74



Source: Manitoba Centre for Health Policy, 2010

Figure 3.7: Premature Mortality Disparity Rate Ratios by Urban and Rural Income Quintile

Adjusted by (2004-2007) age & sex per 1,000 residents aged 0-74



	T1: 1984-1988	T2: 1989-1993	T3: 1994-1998	T4: 1999-2003	T5: 2004-2007
Urban Disparity Rate Ratios	1.91	2.15	2.38	2.71	2.88
Rural Disparity Rate Ratios	1.35	1.31	1.55	1.83	1.86

Time Period (years)

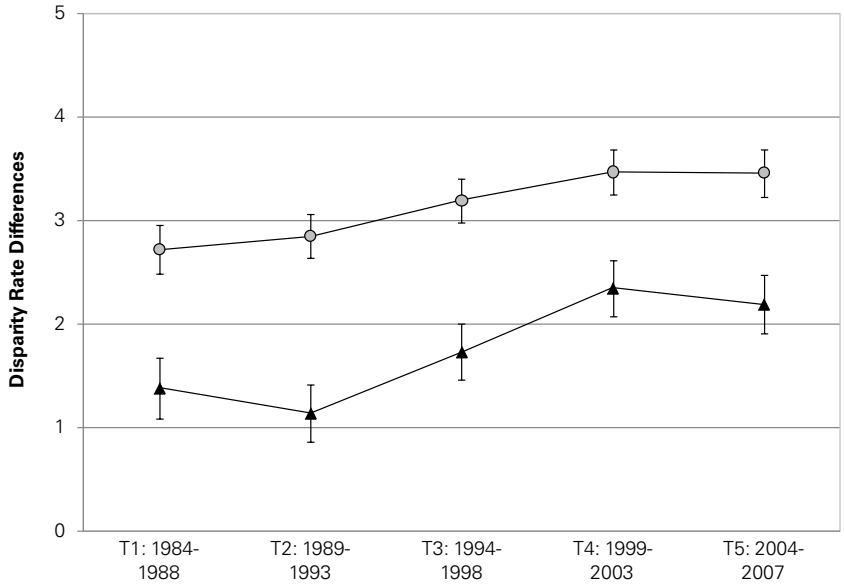
Urban Disparity Rate Ratios T5 to T1: 1.50 (95% CI 1.36, 1.67) p< .001

Rural Disparity Rate Ratios T5 to T1: 1.38 (95% CI 1.22, 1.55) p< .001

Source: Manitoba Centre for Health Policy, 2010

Figure 3.8: Premature Mortality Disparity Rate Differences by Urban and Rural Income Quintile

Adjusted by (2004-2007) age & sex per 1,000 residents aged 0-74



	T1: 1984-1988	T2: 1989-1993	T3: 1994-1998	T4: 1999-2003	T5: 2004-2007
Urban Disparity Rate Differences	2.72	2.85	3.19	3.47	3.46
Rural Disparity Rate Differences	1.39	1.14	1.74	2.35	2.19

Time Period (years)

Urban Disparity Rate Differences T5 to T1: 1.27, p< .001

Rural Disparity Rate Differences T5 to T1: 1.58, p< .001

Source: Manitoba Centre for Health Policy, 2010

Potential Years of Life Lost (PYLL)

Definition

Potential years of life lost (PYLL) is an indicator of early death (before age 75), which gives greater weight to deaths occurring at a younger age than to those at later ages. PYLL emphasizes the loss to society of the potential contribution that younger individuals can make. By emphasizing the loss of life at an early age, PYLL focuses attention on the need to deal with the major causes of early deaths, such as injury, in order to improve health status. For example, the death of a 50–year–old contributes 'one death' to premature mortality, but '25 years' to PYLL; whereas the death of a 70–year–old also contributes 'one death' to premature mortality, but only 'five years' to PYLL.

In this report, PYLL is the average annual number of potential years of life lost for deaths up to age 74, per 1,000 residents from birth to age 74. For each death, the PYLL value is calculated as: PYLL = 75 – age at death. This indicator has some similarity to premature mortality and life expectancy, but PYLL is more sensitive to deaths at younger ages. Rates were calculated for four 5–year periods and a final four–year period and were age– and sex–adjusted to the Manitoba population in the last time period.

NOTE: in other MCHP reports, PYLL has also been analysed as the potential years of life lost for deaths from age one to 74 per 1,000 residents aged one to 74. Analyses of PYLL excluding the births occurring during the first year of life are available on request from the lead author (P. Martens). There is little overall change in trends or in measures of inequality, but the PYLL rates are around 10–15% lower.

Time Periods	Average annual rate per 1,000
T1: 1984–1988	75.15
T2: 1989–1993	68.56
T3: 1994–1998	67.98
T4: 1999–2003	62.50
T5: 2004–2007	60.53

Key findings: Potential Years of Life Lost (PYLL)

Manitoba overall rates:

- From the first time period T1 (1984–1988) to the last time period T5 (2004–2007), the PYLL (potential years of life lost among residents dying before the age of 75, per 1,000 residents 74 and under) dropped from 75.15 to 60.53 years per 1,000 provincially.

Rates by neighbourhood income quintile over time:

Rural:

- From T1 to T5, the PYLL of rural neighbourhood income quintile groups R3 to R5 decreased steadily, whereas the PYLL of R2 remained unchanged except for a jump in T3 (1994–1998). In the lowest rural neighbourhood income quintile (R1), there was a drop from T1 to T2 (1989–1993) but thereafter the rate increased slightly.

- With the exception of T3, there was very little difference in the PYLL among R2 to R5 residents at all times. The rate ratio of R1 compared to R5 showed no statistically significant change. The absolute difference gap of PYLL comparing R1 to R5 statistically significantly increased by 17% over time, from 53.77 more potential years of life lost per 1,000 in the first time period to 62.93 more potential years of life lost per 1,000 in the last time period.

Urban:

- From T1 to T5, the PYLL of urban neighbourhood income quintile groups U2 to U5 decreased steadily, whereas the PMR of the lowest urban neighbourhood income quintile U1 decreased in T2, increased slightly in T3, and plateaued after that.
- In the urban areas, it appears that there is a greater spread by neighbourhood income quintile between all quintiles, compared to little spread in the R2 to R5 categories.
- The disparity between U1 and U5 increased substantially. The rate ratio of U1 compared to U5 was 2.32 in the first time period and 3.59 in the last time period, for a statistically significant increase of 55%. The absolute difference of PYLL comparing U1 to U5 also statistically significantly increased by 19% over time, from 61.19 more potential years of life lost in the first time period to 72.82 more potential years of life lost per 1,000 in the last time period.

Lorenz Curves:

Rural over time:

- In T1, 30.4% of the PYLL occurred in the 20.0% of the population in the lowest neighbourhood income quintile group R1, with the Gini coefficient of 0.103 indicating a statistically significant disparity.
- In T5, 33.0% of the PYLL occurred in the 20.0% of the population in the lowest neighbourhood income quintile group R1, with the Gini coefficient of 0.168 indicating a statistically significant disparity.
- The change in Gini coefficient from the first to the last time period was statistically significant (p=.00023), indicating that the inequality across rural neighbourhood income quintiles increased over that time period.

Urban over time:

- In T1, 29.7% of the PYLL occurred in the 19.3% of the population in the lowest neighbourhood income quintile group U1, with the Gini coefficient of 0.169 indicating a statistically significant disparity.
- In T5, 38.5% of the PYLL occurred in the 19.5% of the population in the lowest neighbourhood income quintile group U1, with the Gini coefficient of 0.255 indicating a statistically significant disparity.
- The Gini coefficient increased from the first to the last time period, showing a statistically significant increase in inequality over that time period (p<.02).

Rural compared to urban in most recent time period:

- In the most recent time period T8, there is a statistically significantly higher Gini coefficient in urban compared to rural (0.255 vs. 0.168, p<.04), indicating a higher level of inequality in urban Manitoba for PYLL.

Disparity measures over time by rural and urban:

- The disparity rate ratios (i.e., the ratio of the PYLL of the lowest compared to the highest neighbourhood income group) are increasing over time for urban Manitoba, but not for rural Manitoba. The ratios are consistently higher in urban, indicating a larger rate ratio between lowest and highest neighbourhood income groups in urban Manitoba.

- The disparity rate differences (i.e., the absolute difference of PYLL between the lowest and highest neighbourhood income group) are increasing in both rural and urban Manitoba. Once again, the absolute differences are consistently higher in urban, with the exception of T4 (1999–2003), indicating a larger rate difference between lowest and highest neighbourhood income groups in urban Manitoba.

What is this telling us?

- The socioeconomic gap in PYLL is widening over time for both rural and urban Manitobans, particularly for urban Manitobans.

- By all measures, the socioeconomic gap is larger in urban than in rural Manitoba.

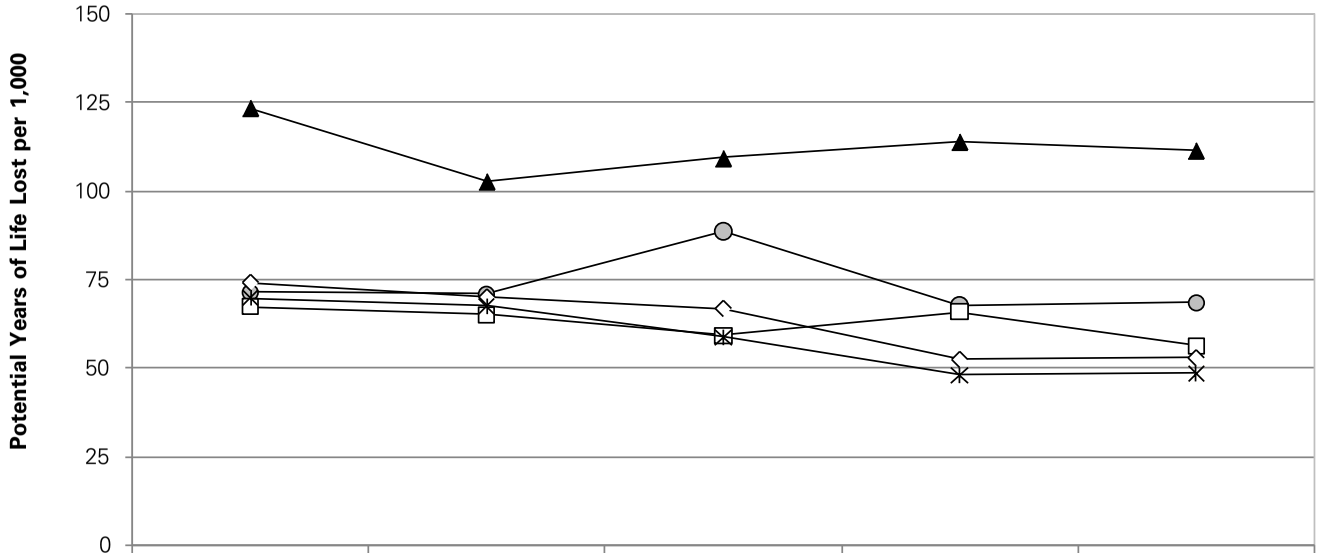
- The lowest neighbourhood income group in urban Manitoba appears to show no improvement over time, in contrast with the overall patterns shown by all other neighbourhood income groups.

- The largest socioeconomic gap in PYLL is seen in the most recent time period of 2004–2007 for urban Manitoba, where over one–third of the PYLL is experienced by lowest urban neighbourhood income group representing around one–fifth of the urban population.

Where to from here?

- Causes of potential years of life lost in the lowest urban and rural neighbourhood income quintiles need further exploration, in order to target appropriate interventions.

Figure 3.9: Potential Years of Life Lost Over Time by Rural Income Quintile
Adjusted by (2004-2007) age & sex, annual rate per 1,000 residents aged 0-74



	T1: 1984-1988	T2: 1989-1993	T3: 1994-1998	T4: 1999-2003	T5: 2004-2007
NF (Not displayed)	429.71	301.94	407.50	427.85	554.18
R1 (lowest income)	123.53	102.89	109.40	114.03	111.57
R2	71.39	71.05	88.67	67.72	68.53
R3	67.39	65.10	59.27	66.02	56.39
R4	74.14	70.03	66.81	52.40	52.87
R5 (highest income)	69.77	67.63	58.79	48.02	48.63
Disparity Rate Ratios (R1/R5)	1.77	1.52	1.86	2.37	2.29
Disparity Rate Differences (R1-R5)	53.77	35.25	50.61	66.01	62.93

Time Period (years)

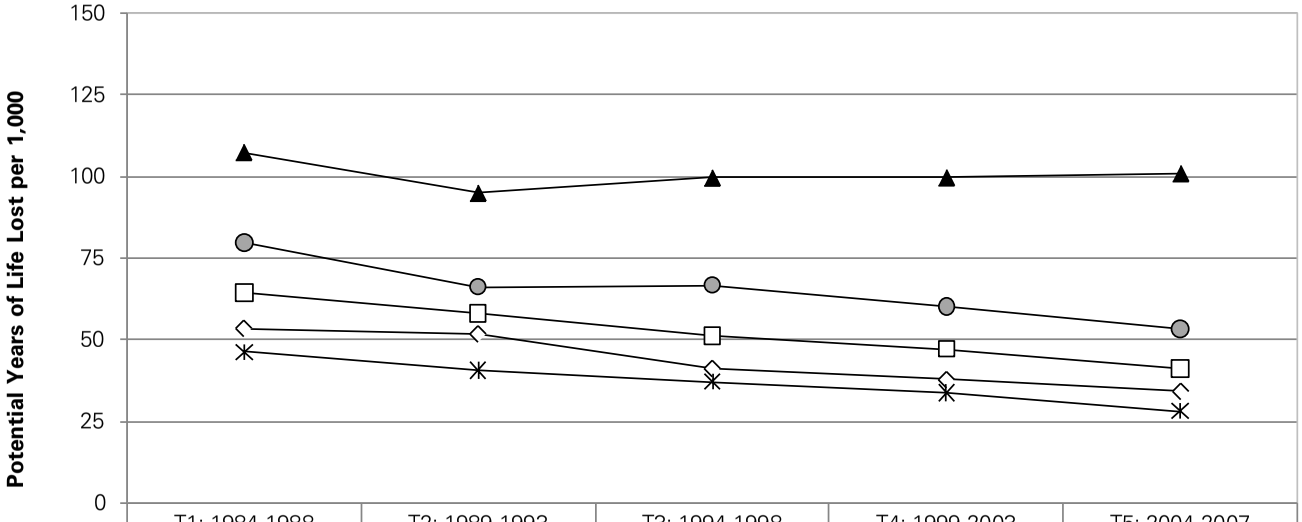
Comparison of Disparity Rate Ratios T5 to T1:1.30 (95% CI0.95 ,1.78) NS

Comparison of Disparity Rate Differences T5 to T1: 1.17, p< .001

Source: Manitoba Centre for Health Policy, 2010

Figure 3.10: Potential Years of Life Lost Over Time by Urban Income Quintile

Adjusted by (2004-2007) age & sex, annual rate per 1,000 residents aged 0-74



	T1: 1984-1988	T2: 1989-1993	T3: 1994-1998	T4: 1999-2003	T5: 2004-2007
NF (Not displayed)	429.71	301.94	407.50	427.85	554.18
U1 (lowest income)	107.38	94.90	99.56	99.62	100.89
U2	79.66	66.11	66.74	60.19	53.27
U3	64.32	58.05	51.17	47.03	41.05
U4	53.21	51.53	41.10	37.73	34.20
U5 (highest income)	46.19	40.59	37.12	33.65	28.07
Disparity Rate Ratios (U1/U5)	2.32	2.34	2.68	2.96	3.59
Disparity Rate Differences (U1-U5)	61.19	54.31	62.43	65.97	72.82

Time Period (years)

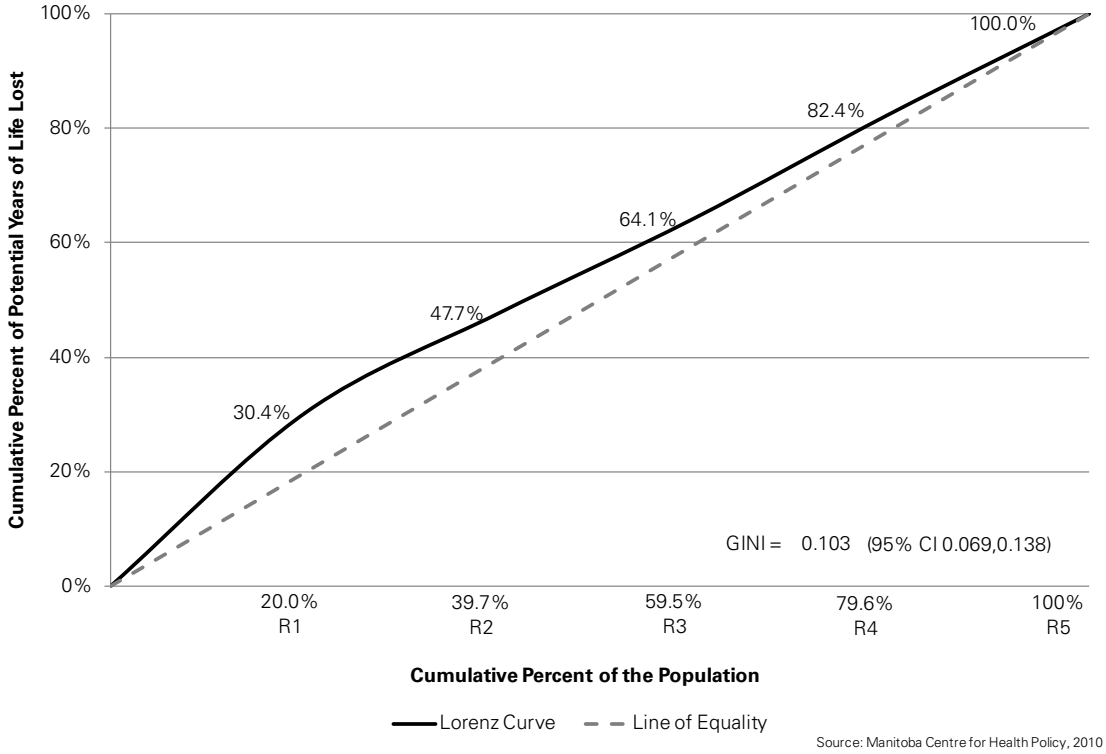
Comparison of Disparity Rate Ratios T5 to T1: 1.55 (95% CI 1.42 , 2.12) p<.01

Comparison of Disparity Rate Differences T5 to T1:1.19 , p<.001

Source: Manitoba Centre for Health Policy, 2010

Figure 3.11: Adjusted Lorenz Curve for Potential Years of Life Lost in Rural Areas 1984-1988

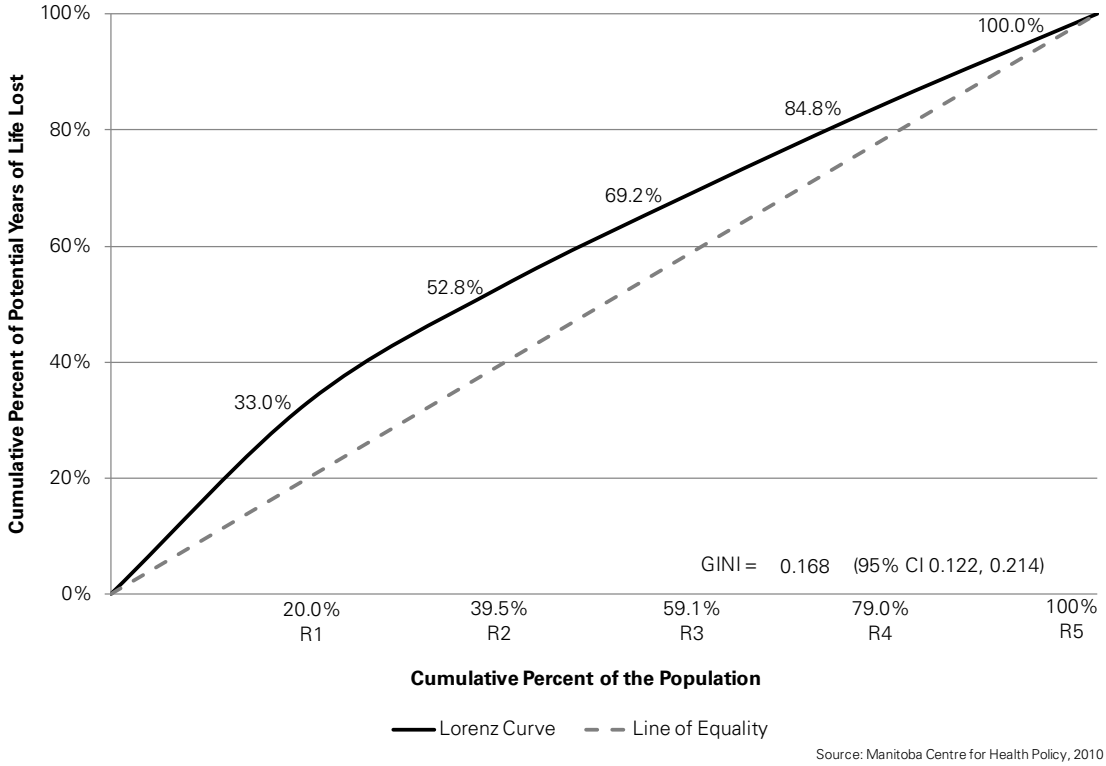
Adjusted by (2004-2007) age & sex, residents aged 0-74



Source: Manitoba Centre for Health Policy, 2010

Figure 3.12: Adjusted Lorenz Curve for Potential Years of Life Lost in Rural Areas 2004-2007

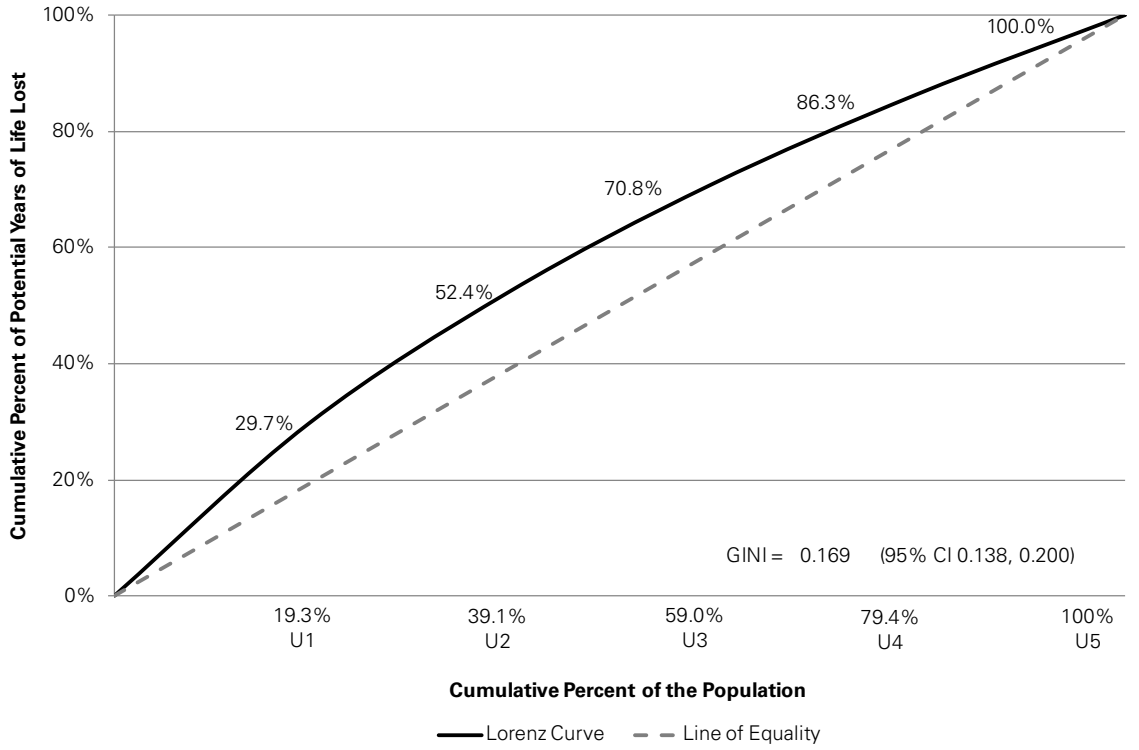
Adjusted by (2004-2007) age & sex, residents aged 0-74



Source: Manitoba Centre for Health Policy, 2010

Figure 3.13: Adjusted Lorenz Curve for Potential Years of Life Lost in Urban Areas 1984-1988

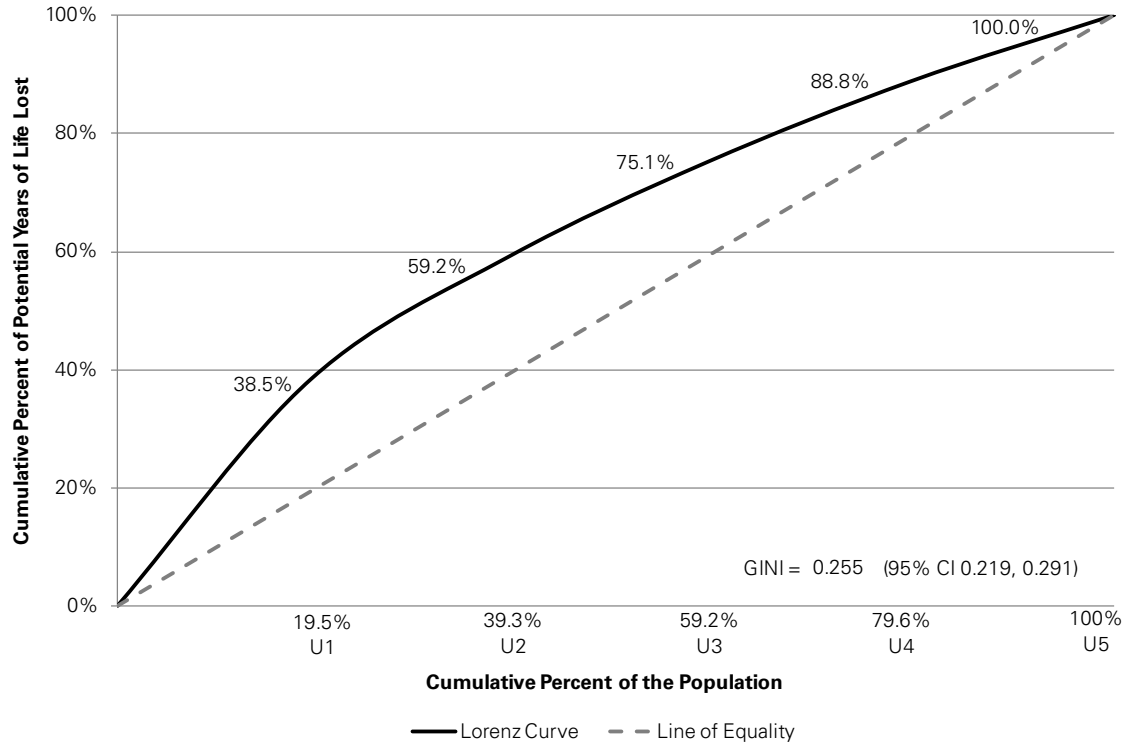
Adjusted by (2004-2007) age & sex, residents aged 0-74



Source: Manitoba Centre for Health Policy, 2010

Figure 3.14: Adjusted Lorenz Curve for Potential Years of Life Lost in Urban Areas 2004-2007

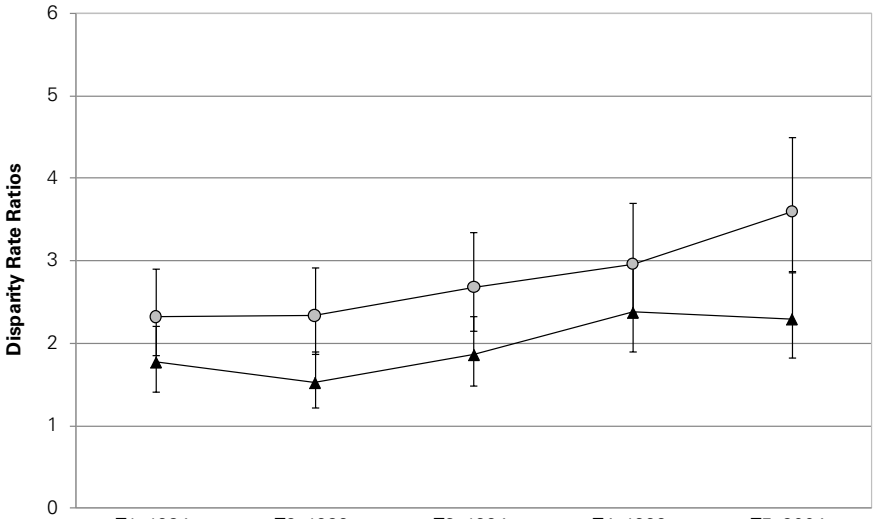
Adjusted by (2004-2007) age & sex, residents aged 0-74



Source: Manitoba Centre for Health Policy, 2010

Figure 3.15: Potential Years of Life Lost Disparity Rate Ratios by Urban and Rural Income Quintile

Adjusted by (2004-2007) age & sex, per 1,000 residents aged 0-74



	T1: 1984-1988	T2: 1989-1993	T3: 1994-1998	T4: 1999-2003	T5: 2004-2007
Urban Disparity Rate Ratios	2.32	2.34	2.68	2.96	3.59
Rural Disparity Rate Ratios	1.77	1.52	1.86	2.37	2.29

Time Period (years)

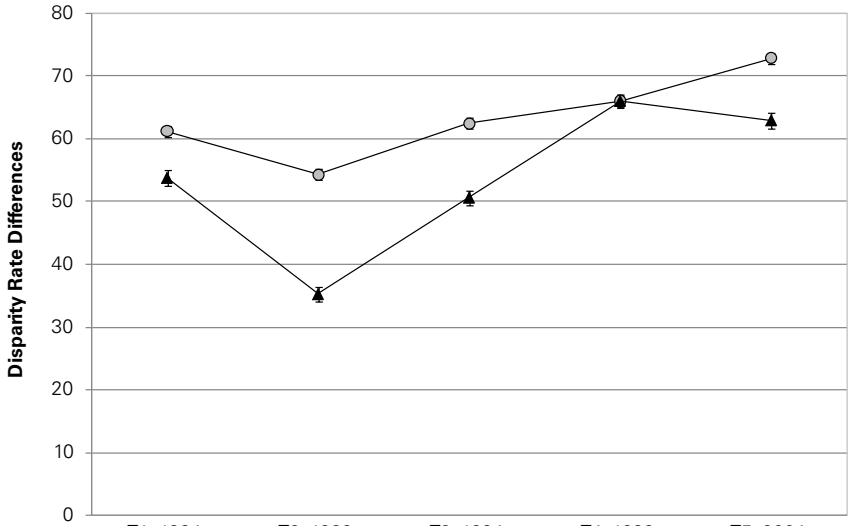
Urban Disparity Rate Ratios T5 to T1: 1.55 (95% CI 1.42, 2.12) p< .01

Rural Disparity Rate Ratios T5 to T1:1.30 (95% CI 0.95, 1.78) NS

Source: Manitoba Centre for Health Policy, 2010

Figure 3.16: Potential Years of Life Lost Disparity Rate Differences by Urban and Rural Income Quintile

Adjusted by (2004-2007) age & sex, per 1,000 residents aged 0-74



	T1: 1984-1988	T2: 1989-1993	T3: 1994-1998	T4: 1999-2003	T5: 2004-2007
Urban Disparity Rate Differences	61.19	54.31	62.43	65.97	72.82
Rural Disparity Rate Differences	53.77	35.25	50.61	66.01	62.93

Time Period (years)

Urban Disparity Rate Differences T5 to T1: 1.19, p< .001

Rural Disparity Rate Differences T5 to T1: 1.17, p< .001

Source: Manitoba Centre for Health Policy, 2010

Under Age Five Mortality Rate

Definition

An indicator of death among infants and children under age five. This indicator is the average annual number of deaths per 1,000 children under the age of five, in each time period. Rates of death under the age of five is seen as an indicator of health status, level of healthcare in an area, and the effectiveness of prenatal and child care.

Time Periods	Average annual rate per 1,000
T1: 1984–1988	2.50
T2: 1989–1993	1.80
T3: 1994–1998	1.83
T4: 1999–2003	1.80
T5: 2004–2007	1.58

Key findings: Under Age Five Mortality Rate

Manitoba overall rates:

- From the first time period T1 (1984–1988) to the last time period T5 (2004–2007), the under age five mortality rate (deaths among infants and children under age five) dropped from 2.50 to 1.58 deaths per 1,000 provincially. Much of this drop occurred between T1 and T2 and then again from T4 to T5 time periods.

Rates by neighbourhood income quintile over time:

Rural:

- From T1 to T5, the under age five mortality rates of all rural neighbourhood income quintile groups decreased, with much of the decrease occurring between the first and second time periods. R1 demonstrated the greatest decrease from the first to the last time period, from 4.30 to 2.09 deaths per 1,000, and showed a similar rate to R2 in the last time period.

- The disparity between R1 and R5 decreased somewhat over time. The rate ratio of R1 compared to R5 was 2.19 in the first time period and 1.66 in the last time period, for a decrease of 24%, which was not statistically significant. The absolute difference of R1 compared to R5 went from 2.33 more deaths per 1,000 in the first time period to 0.83 more deaths per 1,000 in the last time period, a statistically significant decrease of 64% over time.

Urban:

- From T1 to T5, the under age five mortality rates of all urban neighbourhood income quintile groups decreased. After an initial decrease between the first and second time period, most of the urban neighbourhood income quintiles showed plateauing or slightly rising rates. U2 demonstrated the greatest decrease from the first to last time period, from 2.47 to 0.80 deaths per 1,000.

- The disparity between U1 and U5 was unchanged over the study period. The rate ratio of U1 compared to U5 was 2.19 in the first time period and 2.32 in the last time period, which was not statistically significantly different. The absolute difference of U1 compared to U5 went from 1.74 more deaths per 1,000 in the first time period to 1.20 more deaths per 1,000 in the second time period, which was also not statistically significant.

Lorenz Curves:

Rural over time:

- In T1, 35.2% of the deaths to infants and children under age five occurred in the 22.9% of the population in the lowest neighbourhood income quintile group R1, with the Gini coefficient of 0.155 indicating a statistically significant disparity.
- In T5, 31.2% of the deaths to infants and children under age five occurred in the 26.2% of the population in the lowest neighbourhood income quintile group R1, with the Gini coefficient of 0.110 indicating a statistically significant disparity.
- The Gini coefficients from the first to the last time period were not statistically significantly different from each other, indicating similar socioeconomic inequality for under age five mortality over the study period.

Urban over time:

- In T1, 32.0% of the deaths to infants and children under age five occurred in the 22.0% of the population in the lowest neighbourhood income quintile group U1, with the Gini coefficient of 0.160 indicating a statistically significant disparity.
- In T5, 37.7% of the premature deaths occurred in the 24.0% of the population in the lowest neighbourhood income quintile group U1, with the Gini coefficient of 0.129 indicating a statistically significant disparity. The substantial decrease in deaths per 1,000 in U2 is shown by the "dip" in the Lorenz curve.
- The Gini coefficients from the first to the last time period were not statistically significantly different from each other, indicating similar socioeconomic inequality for under age five mortality over the study period.

Rural compared to urban in most recent time period:

- In the most recent time period T5, there is no statistically significant difference in the Gini coefficient in urban compared to rural, indicating a similar level of inequality in urban and rural Manitoba for under age five mortality.

Disparity measures over time by rural and urban:

- The disparity rate ratios (i.e., the ratio of the under age five mortality rates of the lowest compared to the highest neighbourhood income group) showed no statistically significant change over time for either rural or urban Manitoba. There was also no difference between rural and urban areas of the province in the rate ratio between lowest and highest neighbourhood income groups.
- The disparity rate differences (i.e., the absolute difference of under age five mortality rates between the lowest and highest neighbourhood income group) showed no statistically significant change over the study period for urban Manitoba. In rural Manitoba, the disparity rate differences decreased significantly over time indicating that the rate difference between lowest and highest neighbourhood income groups in rural Manitoba has narrowed.

What is this telling us?

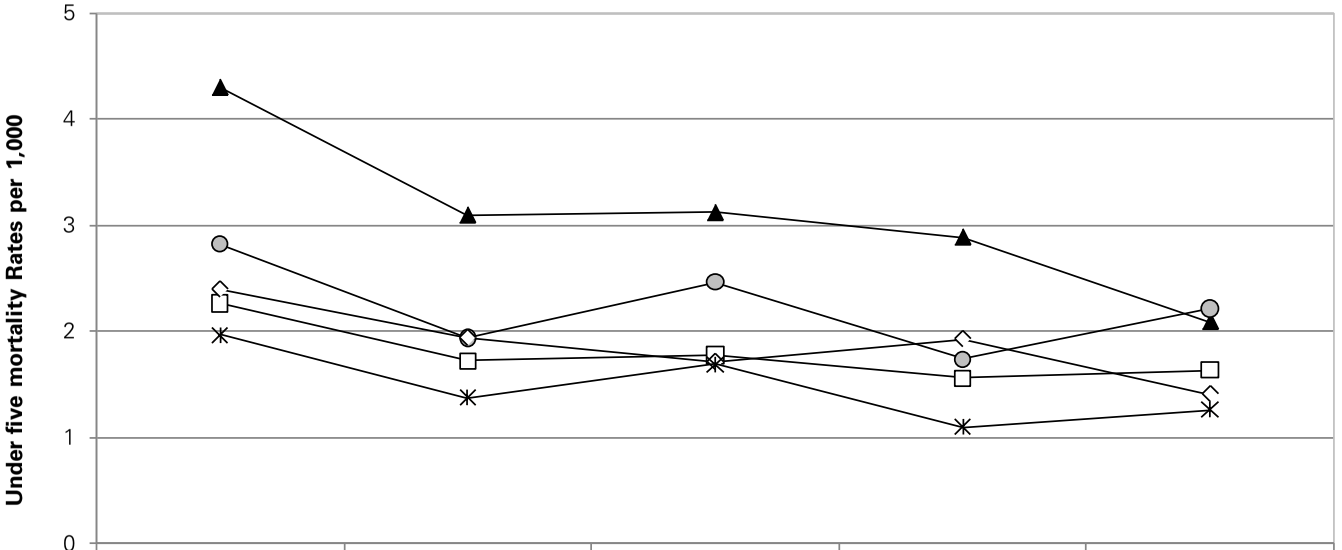
- There is a substantial socioeconomic gap in under age five mortality in both rural and urban Manitoba.
- The socioeconomic gap in under age five mortality has remained fairly stable across the study period, with some signs of a decrease in rural Manitoba.
- By all measures, the socioeconomic gap is similar in urban and rural Manitoba.
- All neighbourhood income groups in both rural and urban Manitoba showed improvement in this measure; under age five mortality rates decreased over time.

Where to from here?

- The decrease in under age five mortality over time is a positive finding, but the existing and sustained gap between the lowest and highest neighbourhood income quintiles remains a concern. Causes of deaths to infants and children under age five in the lowest urban and two lowest rural neighbourhood income quintiles need further exploration so as to target appropriate interventions.

Figure 3.17: Under Five Mortality Rates Over Time by Rural Income Quintile

Adjusted by (2004-2007) age & sex, annual rate per 1,000 children under age 5



	T1: 1984-1988	T2: 1989-1993	T3: 1994-1998	T4: 1999-2003	T5: 2004-2007
NF (Not displayed)	10.96	0.00	0.00	0.00	12.08
R1 (lowest income)	4.30	3.09	3.12	2.89	2.09
R2	2.82	1.94	2.46	1.74	2.21
R3	2.26	1.72	1.77	1.56	1.64
R4	2.39	1.94	1.71	1.93	1.41
R5 (highest income)	1.96	1.37	1.69	1.10	1.26
Disparity Rate Ratios (R1/R5)	2.19	2.25	1.85	2.63	1.66
Disparity Rate Differences (R1-R5)	2.33	1.72	1.43	1.79	0.83

Time Period (years)

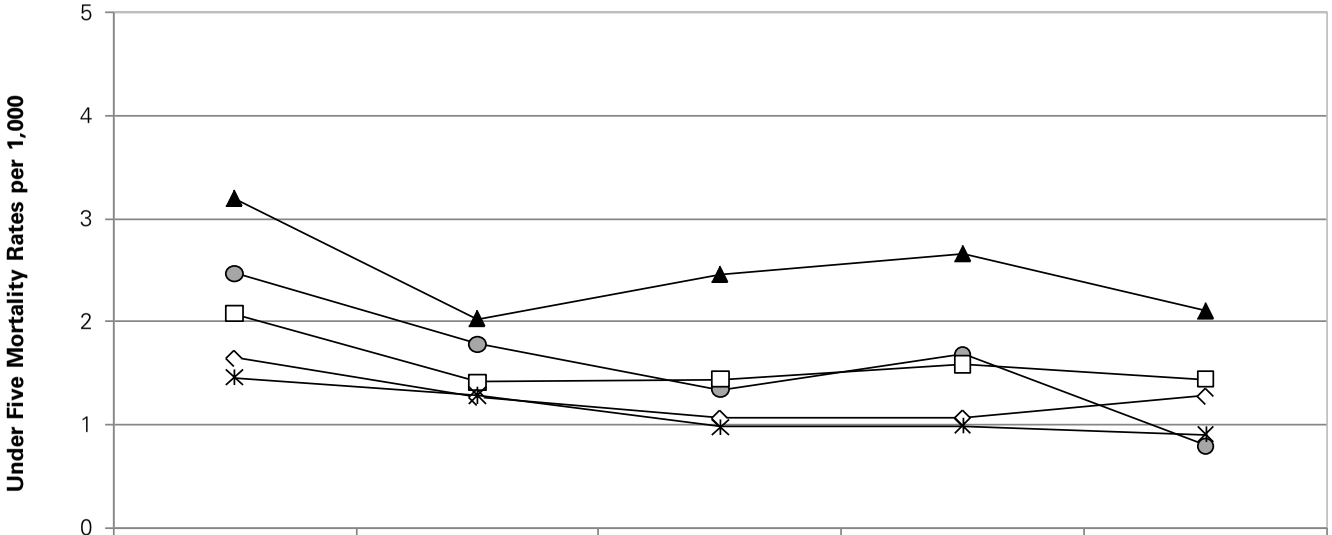
Comparison of Disparity Rate Ratios T5 to T1: 0.76 (95% CI0.45 , 1.27) NS

Comparison of Disparity Rate Differences T5 to T1: 0.36 , p<.01

Source: Manitoba Centre for Health Policy, 2010

Figure 3.18: Under Five Mortality Rates Over Time by Urban Income Quintile

Adjusted by (2004-2007) age & sex, annual rate per 1,000 children under age 5



	T1: 1984-1988	T2: 1989-1993	T3: 1994-1998	T4: 1999-2003	T5: 2004-2007
NF (Not displayed)	10.96	0.00	0.00	0.00	12.08
U1 (lowest income)	3.20	2.03	2.46	2.66	2.10
U2	2.47	1.79	1.34	1.68	0.80
U3	2.08	1.42	1.44	1.59	1.44
U4	1.65	1.27	1.06	1.07	1.28
U5 (highest income)	1.46	1.29	0.98	0.99	0.91
Disparity Rate Ratios (U1/U5)	2.19	1.58	2.51	2.68	2.32
Disparity Rate Differences (U1-U5)	1.74	0.74	1.48	1.67	1.20

Time Period (years)

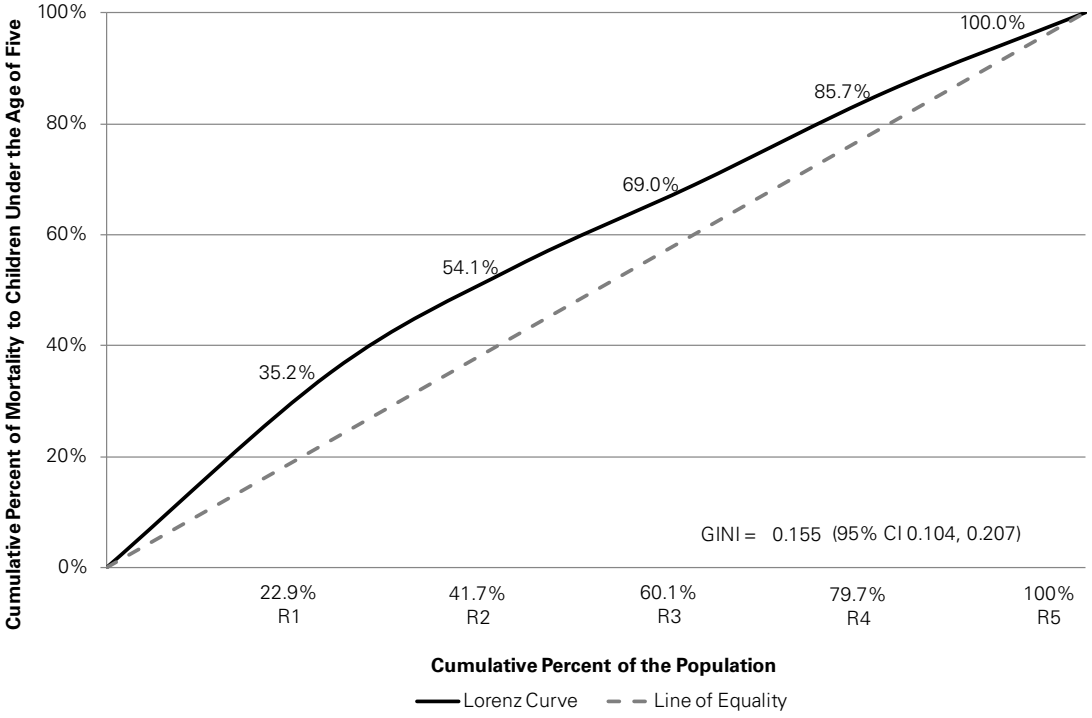
Comparison of Disparity Rate Ratios T5 to T1: 1.06 (95% CI 0.61, 1.82) NS

Comparison of Disparity Rate Differences T5 to T1: 0.69, NS

Source: Manitoba Centre for Health Policy, 2010

Figure 3.19: Adjusted Lorenz Curve for Mortality to Children Under the Age of Five in Rural Areas 1984-1988

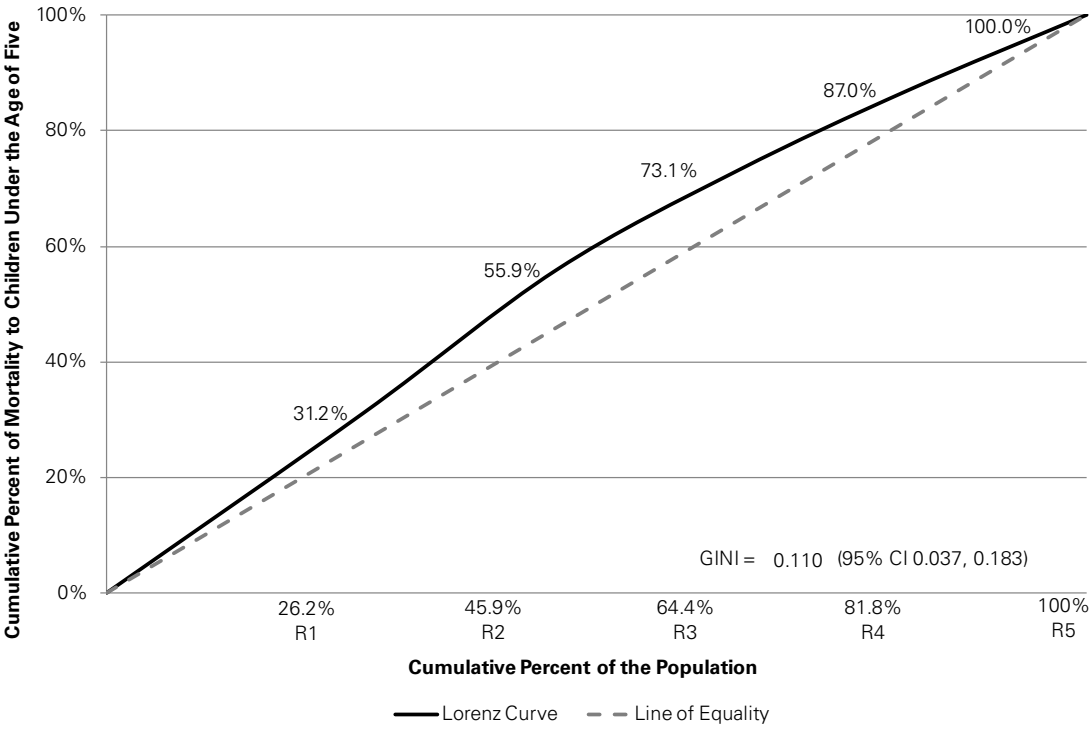
Adjusted by (2004-2007) age & sex, children under age 5



Source: Manitoba Centre for Health Policy, 2010

Figure 3.20: Adjusted Lorenz Curve for Mortality to Children Under the Age of Five in Rural Areas 2004-2007

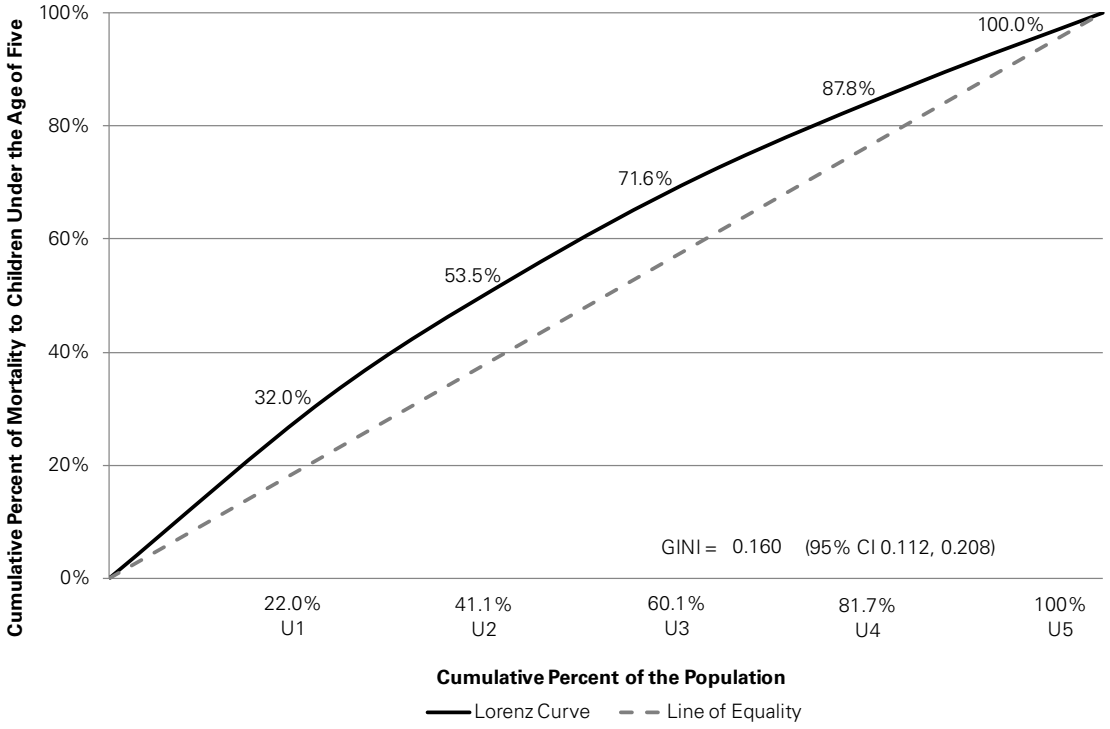
Adjusted by (2004-2007) age & sex, children under age 5



Source: Manitoba Centre for Health Policy, 2010

Figure 3.21: Adjusted Lorenz Curve for Mortality to Children Under the Age of Five in Urban Areas 1984-1988

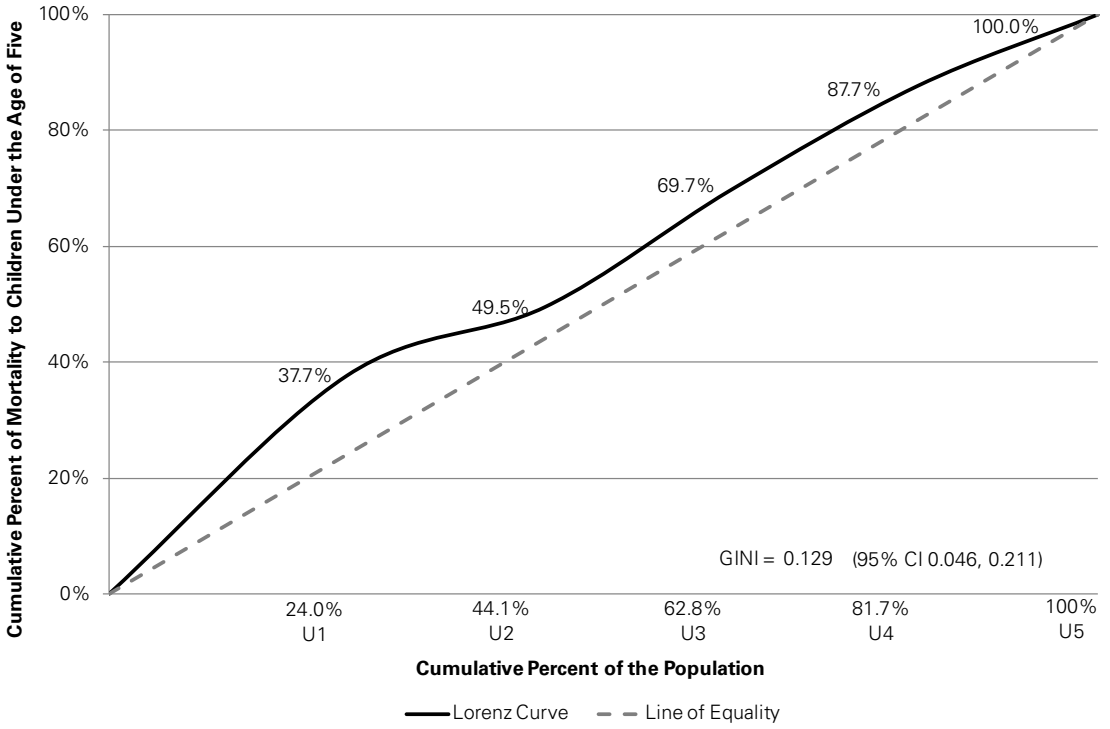
Adjusted by (2004-2007) age & sex, children under age 5



Source: Manitoba Centre for Health Policy, 2010

Figure 3.22: Adjusted Lorenz Curve for Mortality to Children Under the Age of Five in Urban Areas 2004-2007

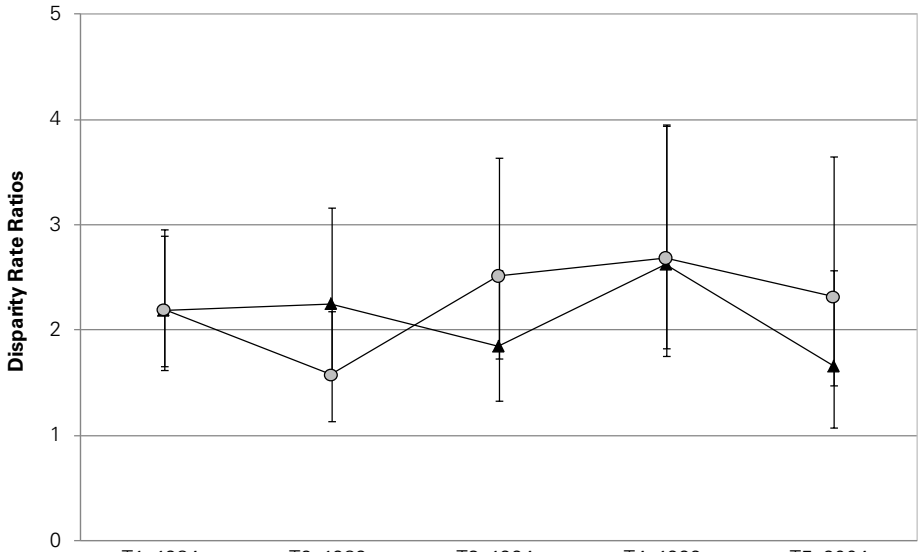
Adjusted by (2004-2007) age & sex, children under age 5



Source: Manitoba Centre for Health Policy, 2010

Figure 3.23: Under Five Mortality Disparity Rate Ratios by Urban and Rural Income Quintile

Adjusted by (2004-2007) age & sex, per 1,000 children under age 5



	T1: 1984-1988	T2: 1989-1993	T3: 1994-1998	T4: 1999-2003	T5: 2004-2007
Rural Disparity Rate Ratios	2.19	2.25	1.85	2.63	1.66
Urban Disparity Rate Ratios	2.19	1.58	2.51	2.68	2.32

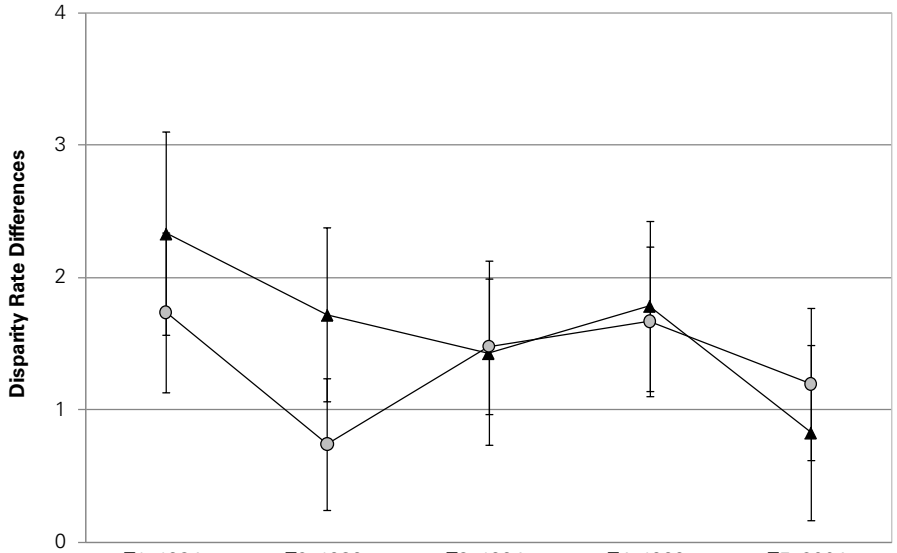
Urban Disparity Rate Ratios T5 to T1: 1.06 (95% CI 0.61, 1.82) NS

Rural Disparity Rate Ratios T5 to T1: 0.76 (95% CI 0.45, 1.27) NS

Source: Manitoba Centre for Health Policy, 2010

Figure 3.24: Under Five Mortality Disparity Rate Differences by Urban and Rural Income Quintile

Adjusted by (2004-2007) age & sex, per 1,000 children under age 5



	T1: 1984-1988	T2: 1989-1993	T3: 1994-1998	T4: 1999-2003	T5: 2004-2007
Rural Disparity Rate Differences	2.33	1.72	1.43	1.79	0.83
Urban Disparity Rate Differences	1.74	0.74	1.48	1.67	1.20

Urban Disparity Rate Differences T5 to T1: 0.69, NS

Rural Disparity Rate Differences T5 to T1: 0.36, p<.01

Source: Manitoba Centre for Health Policy, 2010

Chapter 4: Child Health

Teenage Pregnancy

Definition

Teenage pregnancy includes live births, stillbirths, abortions and ectopic pregnancies of women under the age of twenty. In this report, average annual rates of teenage pregnancy are calculated for females aged 15–19 over 1984/85–2007/08. Age is calculated as of date of admission to hospital in the numerator and December 31 of each fiscal year in the denominator. Please refer to the Glossary in Appendix 1 for diagnosis codes of teen pregnancy used in this report. Note that abortions performed in private clinics may not be included.

Time Periods	Average annual rate per 1,000 females aged 15–19
T1: 1984/85–1986/87	54.24
T2: 1987/88–1989/90	58.21
T3: 1990/91–1992/93	61.59
T4: 1993/94–1995/96	64.83
T5: 1996/97–1998/99	64.54
T6: 1999/00–2001/02	57.98
T7: 2002/03–2004/05	49.88
T8: 2005/06–2007/08	49.91

Key Findings: Teenage Pregnancy

Manitoba overall rates:

From the first time period T1 (1984/85–1986/87) to the last time period T8 (2005/06–2007/08), the teenage pregnancy rate dropped provincially from 54.24 to 49.91 per 1,000 females aged 15–19. However, there was a period of increasing teen pregnancy rates for the first decade to a maximum rate of 64.83 in T4 (1993/94–1995/96), evident in both rural and urban neighbourhood income quintile groups.

*Rates by neighbourhood income quintile over time***:**

Rural:

- From T1 to T8, the teenage pregnancy rate in R1 and R2 peaked in the 1990s. In R3 to R5, overall the teen pregnancy rates have declined fairly steadily since the 1980s. Rates in the last time period are lower than rates in the first time period across all rural neighbourhood income quintile groups.
- The disparity between R1 and R5 increased substantially. The rate ratio of R1 compared to R5 was 2.21 in the first time period and 3.98 in the last time period, for a statistically significant increase of 80%. The absolute difference gap of teenage pregnancy comparing R1 to R5 also statistically significantly increased by 34% over time, from 60.53 more teenage pregnancies per 1,000 in R1 compared to R5 teens in the first time period to 80.58 more teen pregnancies per 1,000 in the last time period.

Urban:

- From T1 to T8, the teenage pregnancy rates across most urban neighbourhood income quintile groups peaked in 1996–1998 and dropped below rates in the first time period. The exception is U1, where teen pregnancy rates were higher in the last time period than in the first time period.
- The disparity between U1 and U5 increased substantially over time. The rate ratio of U1 compared to U5 was 4.93 in the first time period and 9.95 in the last time period, for a statistically significant increase of 102%. The absolute difference gap of teenage pregnancy comparing U1 to U5 also statistically significantly increased by 25% over time, from 76.44 more teenage pregnancies per 1,000 in the R1 teens compared to the R5 teens in the first time period, to 94.96 more pregnancies per 1,000 in the last time period.

Lorenz Curves:

Rural over time:

- In T1, 39.5% of teenage pregnancy occurred in the 22.2% of the population in the lowest neighbourhood income quintile group R1, with the Gini coefficient of 0.197 indicating a statistically significant disparity.
- In T8, 44.7% of teenage pregnancies occurred in the 22.5% of the population in the lowest neighbourhood income quintile group R1, with the Gini coefficient of 0.286 indicating a statistically significant disparity.
- The Gini coefficient increased from the first to the last time period ($p<.0001$), showing a statistically significant increase in inequality over that time period.

Urban over time:

- In T1, 37.3% of teenage pregnancies occurred in the 18.2% of the population in the lowest neighbourhood income quintile group U1, with the Gini coefficient of 0.303 indicating a statistically significant disparity.
- In T8, 44.6% of teenage pregnancies occurred in the 17.4% of the population in the lowest neighbourhood income quintile group U1, with the Gini coefficient of 0.406 indicating a statistically significant disparity.
- The Gini coefficient increase from the first to the last time period ($p<.0001$), showing a statistically significant increase in inequality over that time period.

Rural compared to urban in most recent time period:

- In the most recent time period T8, there is a statistically significantly higher Gini coefficient in urban compared to rural (0.406 vs. 0.286, $p<.0001$), indicating a higher level of inequality in urban Manitoba for teenage pregnancy.

Disparity measures over time by rural and urban:

- The disparity rate ratios (i.e., the ratio of the teenage pregnancy rate of the lowest compared to the highest neighbourhood income group) are increasing over time for both rural and urban Manitoba. However, the ratios are consistently statistically significantly higher in urban, indicating a larger rate ratio between lowest and highest neighbourhood income groups in urban Manitoba. This gap appears to be widening in the most recent time periods.

- The disparity rate differences (i.e., the absolute difference of the teenage pregnancy rate between the lowest and highest neighbourhood income groups) appear to be increasing over time. Whereas the absolute differences are consistently statistically significantly higher in urban, indicating a larger rate difference between lowest and highest neighbourhood income groups in urban Manitoba, this gap appears to be narrowing in the most recent time periods.

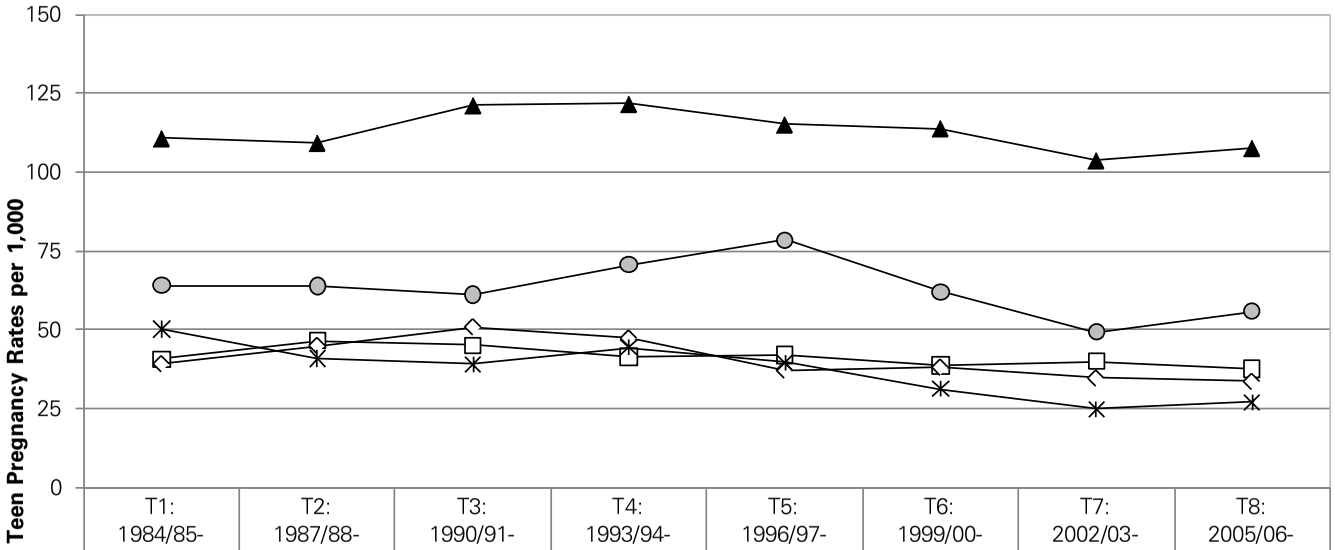
What is this telling us?

- Although teenage pregnancy rates are declining over time in nearly all rural and urban neighbourhood income groups, the socioeconomic gap in teenage pregnancies is widening over time for both rural and urban Manitobans.
- By all measures, the socioeconomic gap is larger in urban than in rural Manitoba.
- The teenage pregnancy rate is lower in the last time period than in the first time period for all rural and urban neighbourhood income groups, except for the lowest neighbourhood income group in urban Manitoba, where it is higher in the last time period than in the first time period.
- The largest socioeconomic gap in teenage pregnancies is seen in the most recent time period (T8) for both rural and urban Manitoba, where nearly 45% of teenage pregnancies are experienced by the lowest neighbourhood income groups R1 and U1 which represent around one–fifth of the females aged 15–19 (22.5% of the teens aged 15–19 in rural groups, and 17.4% of the teens aged 15–19 in urban groups).
- Relative differences in disparity rates for rural and urban Manitoba appear to be diverging, with urban showing an upward trend.
- Absolute differences in disparity rates for rural and urban Manitoba appear to be converging, with urban showing a downward trend and rural showing an upward trend over time.

Where to from here?

- Further investigation is warranted to understand why the lowest neighbourhood income group in urban Manitoba is the only neighbourhood income group in rural or urban Manitoba where the teenage pregnancy rate has increased over time.
- Further investigation is warranted to understand why absolute differences in disparity rate for rural Manitoba is increasing as urban Manitoba is decreasing.

Figure 4.1: Teen Pregnancy Rates Over Time by Rural Income Quintile
Adjusted by (2005/06-2007/08) age, annual rate per 1,000 females aged 15-19



	T1: 1984/85-1986/87	T2: 1987/88-1989/90	T3: 1990/91-1992/93	T4: 1993/94-1995/96	T5: 1996/97-1998/99	T6: 1999/00-2001/02	T7: 2002/03-2004/05	T8: 2005/06-2007/08
NF (Not displayed)	51.91	61.99	108.32	78.08	95.40	78.68	111.11	53.98
R1 (lowest income)	110.73	109.29	121.22	121.64	115.12	113.93	103.75	107.66
R2	64.07	64.01	61.23	70.69	78.44	62.18	49.34	55.97
R3	40.72	46.61	45.23	41.59	42.10	38.73	40.02	37.75
R4	39.29	45.06	50.97	47.41	37.30	38.21	34.76	33.69
R5 (highest income)	50.20	40.98	39.07	44.49	39.73	31.39	24.92	27.08
Disparity Rate Ratios (R1/R5)	2.21	2.67	3.10	2.73	2.90	3.63	4.16	3.98
Disparity Rate Differences (R1-R5)	60.53	68.31	82.15	77.15	75.39	82.54	78.83	80.58

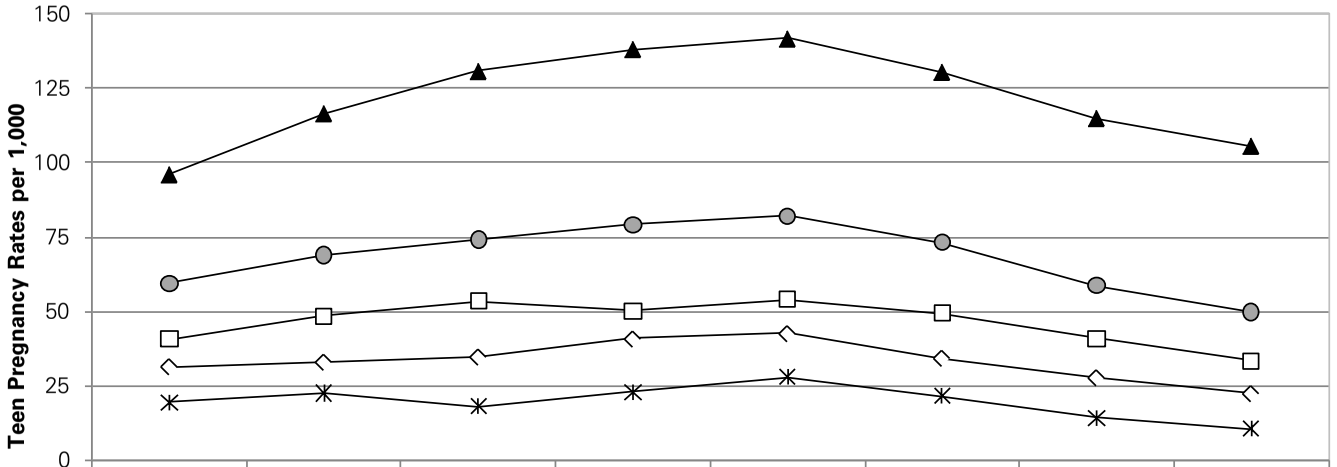
Time Period (fiscal years)

Comparison of Disparity Rate Ratios T8 to T1: 1.80 (95% CI 1.54, 2.11) p< .001

Comparison of Disparity Rate Differences T8 to T1: 1.34, p<.001

Source: Manitoba Centre for Health Policy, 2010

Figure 4.2: Teen Pregnancy Rates Over Time by Urban Income Quintile
Adjusted by (2005/06-2007/08) age, annual rate per 1,000 females aged 15-19



	T1: 1984/85-1986/87	T2: 1987/88-1989/90	T3: 1990/91-1992/93	T4: 1993/94-1995/96	T5: 1996/97-1998/99	T6: 1999/00-2001/02	T7: 2002/03-2004/05	T8: 2005/06-2007/08
NF (Not displayed)	51.91	61.99	108.32	78.08	95.40	78.68	111.11	53.98
U1 (lowest income)	95.91	116.53	130.77	138.20	141.74	130.51	114.92	105.56
U2	59.37	68.87	74.14	79.11	82.12	73.11	58.66	49.85
U3	40.75	48.51	53.49	50.13	54.06	49.46	40.89	33.31
U4	31.44	32.96	34.72	40.84	42.65	34.30	27.69	22.30
U5 (highest income)	19.47	22.53	18.10	22.96	27.89	21.49	14.18	10.60
Disparity Rate Ratios (U1/U5)	4.93	5.17	7.23	6.02	5.08	6.07	8.11	9.95
Disparity Rate Differences (U1-U5)	76.44	94.00	112.67	115.24	113.84	109.02	100.74	94.96

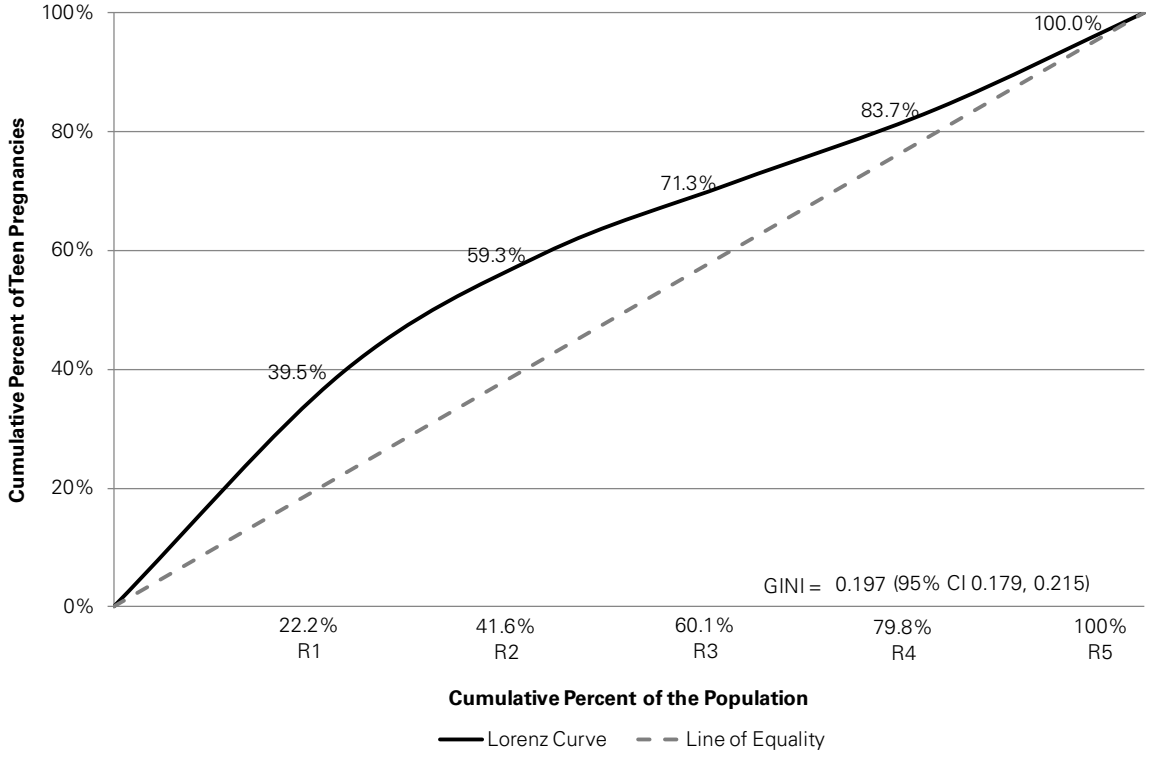
Time Period (fiscal years)

Comparison of Disparity Rate Ratios T8 to T1: 2.02 (95% CI 1.66, 2.46) p< .001

Comparison of Disparity Rate Differences T8 to T1: 1.25, p<.001

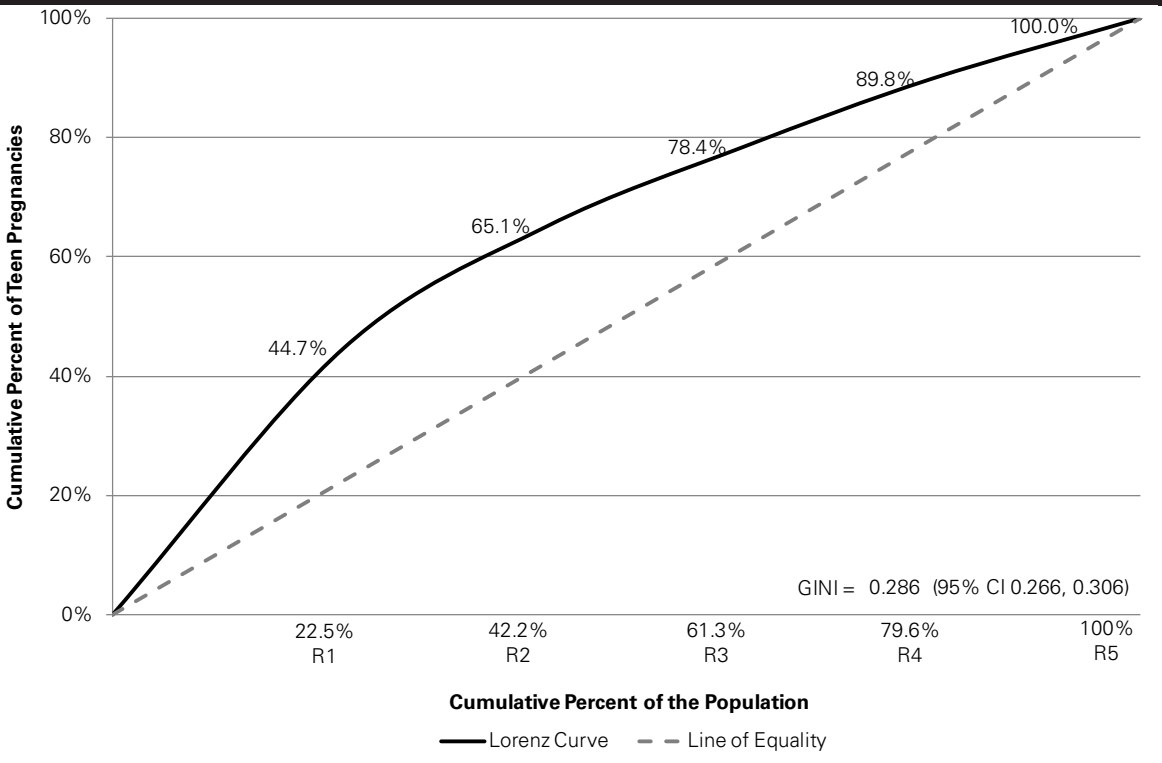
Source: Manitoba Centre for Health Policy, 2010

Figure 4.3: Adjusted Lorenz Curve for Teen Pregnancy in Rural Areas 1984/85–1986/87
Adjusted by (2005-06/2007-08) age, females aged 15-19



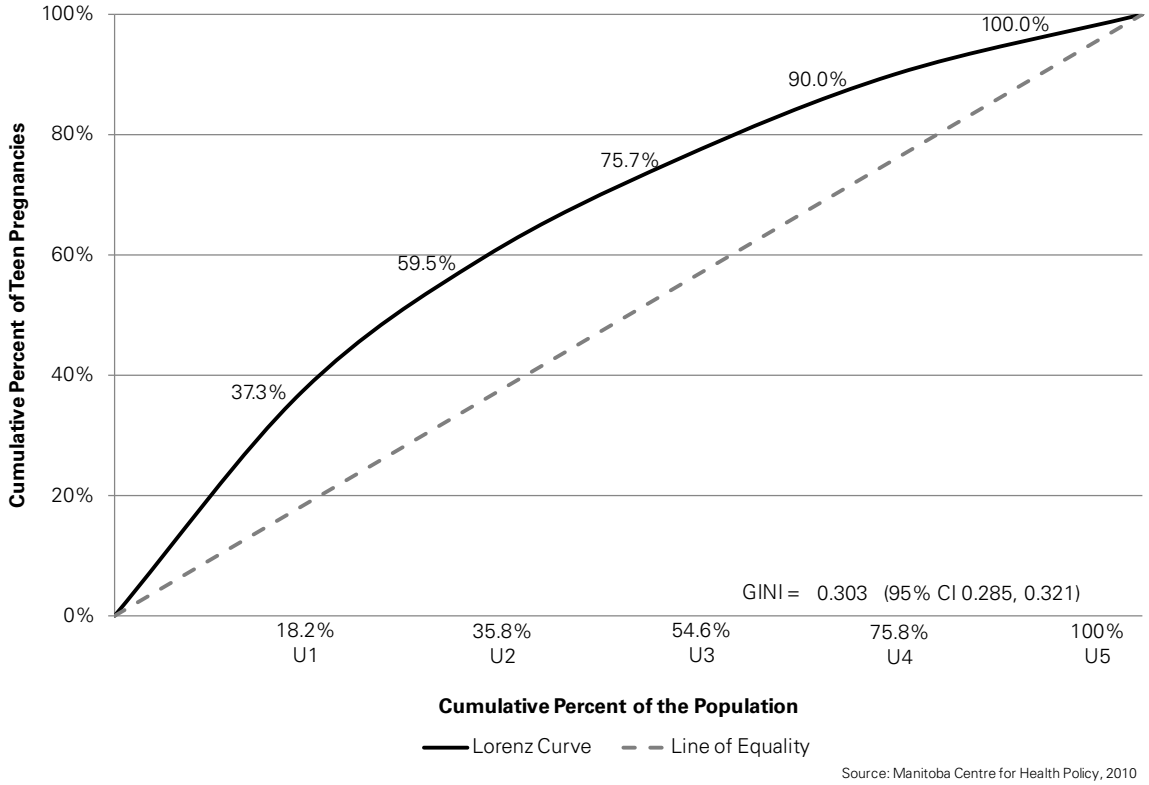
Source: Manitoba Centre for Health Policy, 2010

Figure 4.4: Adjusted Lorenz Curve for Teen Pregnancy in Rural Areas 2005/06–2007/08
Adjusted by (2005-06/2007-08) age, females aged 15-19



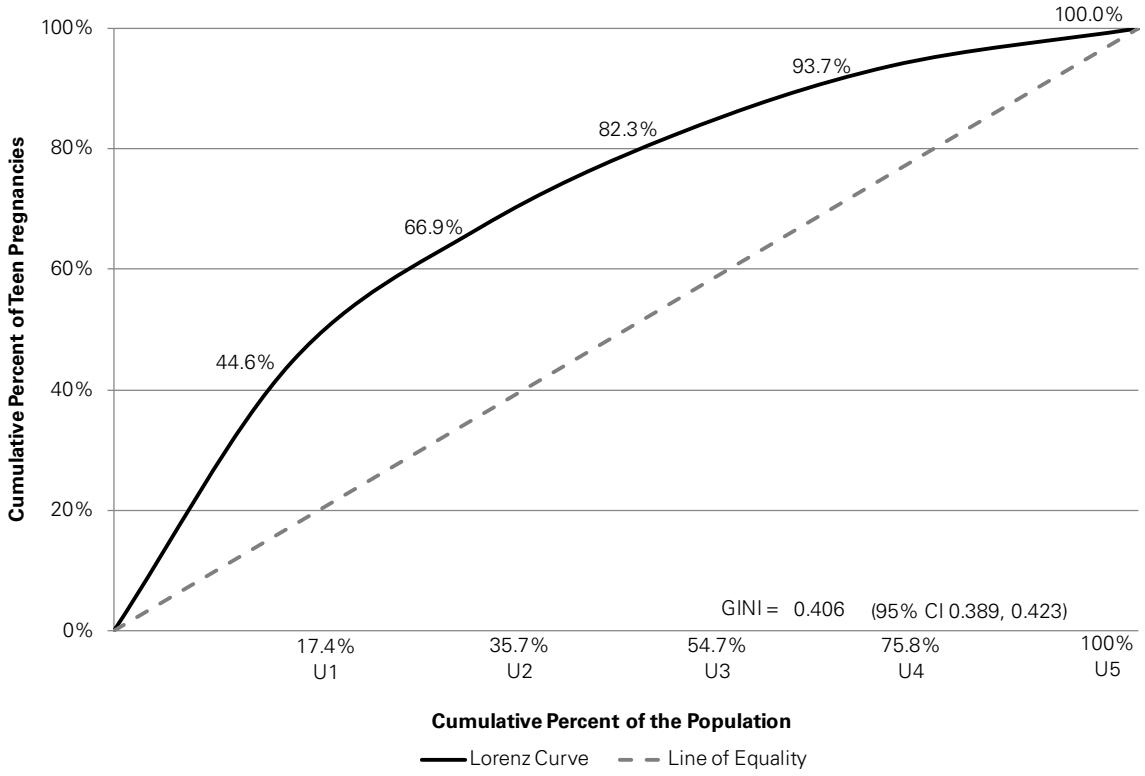
Source: Manitoba Centre for Health Policy, 2010

Figure 4.5: Adjusted Lorenz Curve for Teen Pregnancy in Urban Areas 1984/85–1986/87
Adjusted by (2005/06-2007/08) age, females aged 15-19



Source: Manitoba Centre for Health Policy, 2010

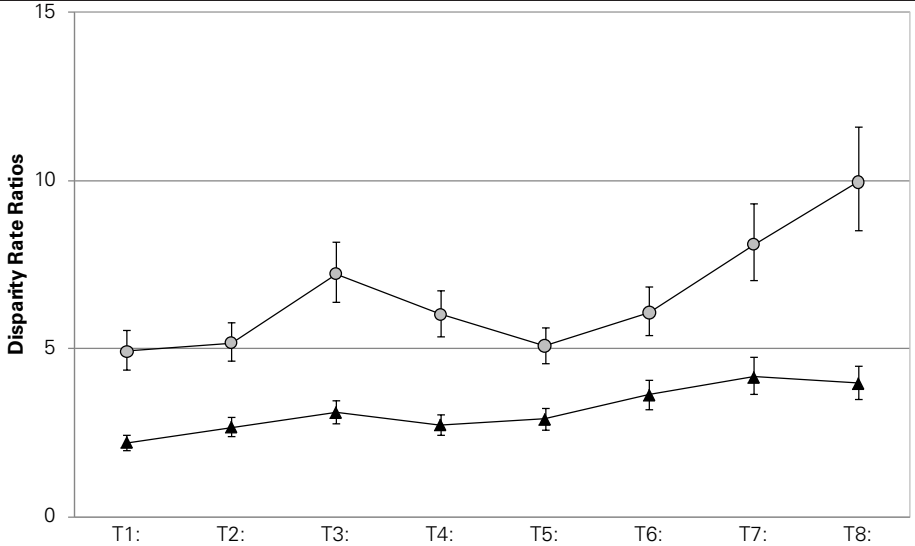
Figure 4.6: Adjusted Lorenz Curve for Teen Pregnancy in Urban Areas 2005/06–2007/08
Adjusted by (2005/06-2007/08) age, females aged 15-19



Source: Manitoba Centre for Health Policy, 2010

Figure 4.7: Teen Pregnancy Disparity Rate Ratios by Urban and Rural Income Quintile

Adjusted by (2005/06-2007/08) age, per 1,000 females aged 15-19



	T1: 1984/85-1986/87	T2: 1987/88-1989/90	T3: 1990/91-1992/93	T4: 1993/94-1995/96	T5: 1996/97-1998/99	T6: 1999/00-2001/02	T7: 2002/03-2004/05	T8: 2005/06-2007/08
Urban Disparity Rate Ratios	4.93	5.17	7.23	6.02	5.08	6.07	8.11	9.95
Rural Disparity Rate Ratios	2.21	2.67	3.10	2.73	2.90	3.63	4.16	3.98

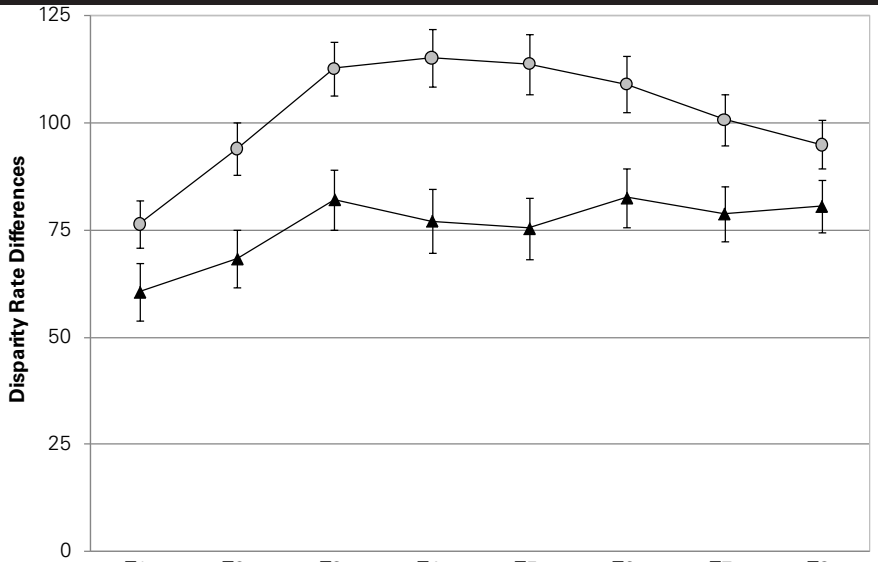
Time Period (fiscal years)

Urban Disparity Rate Ratios T8 to T1: 2.02 (95% CI 1.66, 2.46) p< .001
Rural Disparity Rate Ratios T8 to T1: 1.80 (95% CI 1.54, 2.11) p< .001

Source: Manitoba Centre for Health Policy, 2010

Figure 4.8: Teen Pregnancy Disparity Rate Differences by Urban and Rural Income Quintile

Adjusted by (2005/06-2007/08) age, per 1,000 females aged 15-19



	T1: 1984/85-1986/87	T2: 1987/88-1989/90	T3: 1990/91-1992/93	T4: 1993/94-1995/96	T5: 1996/97-1998/99	T6: 1999/00-2001/02	T7: 2002/03-2004/05	T8: 2005/06-2007/08
Urban Disparity Rate Differences	76.44	94.00	112.67	115.24	113.84	109.02	100.74	94.96
Rural Disparity Rate Differences	60.53	68.31	82.15	77.15	75.39	82.54	78.83	80.58

Time Period (fiscal years)

Urban Disparity Rate Differences T8 to T1: 1.25, p<.001
Rural Disparity Rate Differences T8 to T1: 1.34, p<.001

Source: Manitoba Centre for Health Policy, 2010

High School Completion (Graduation)

Definition

Level of educational attainment where the individual has completed high school (completed Grade 12). Graduated students are identified in the student record or if the student has earned 28 or more credits or if the student earned four or more Grade 12 credits during high school. In this report, individuals were followed from Grade 9 for six years to ensure that those graduating late are identified as high school graduates. Information on credits earned and enrolment is not complete for band–operated schools (missing for about 50% of students). When students in band–operated schools are included in the analyses, as in this chapter, rates of high school completion in areas with band–operated schools may under–estimate high school completion.[2] Rates of high school completion excluding students in band–operated schools can be found in Appendix 3.

When students in band–operated schools are excluded, high school graduations rates increase by about 10%; and there is less disparity shown in rural areas and more disparity in urban areas, compared to when these students are included.

Note: in the graphs, the year refers to the date of onset of the school year. For example, "1996" refers to the school year beginning September 1996 and ending June 1997.

Time Periods	High School Graduates (including Band–Operated schools) (%)
T1: 1996	74.18
T2: 1997	75.90
T3: 1998	76.30
T4: 1999	77.01
T5: 2000	77.51
T6: 2001	77.30
T7: 2002	77.31

Key findings: High School Completion (Graduation)

Manitoba overall rates:

- From the first time period T1 (school year 1996/97) to the last time period T7 (school year 2002/03), high school completion increased from 74.2% to 77.3% provincially.

Rates by neighbourhood income quintile over time:

Rural:

- From T1 to T7, the high school completion rates of rural neighbourhood income quintile groups R2, R4, and R5 fluctuated, but showed an overall increase. The high school completion rate of R3 showed little overall change; and R1, the lowest neighbourhood income quintile group, showed an initial increase and then a subsequent decrease.

2 For example, when a student in a band–operated school has only 16 credits within six years of entering Grade 9 and shows up in the enrolment data only in Grade 9 and 10 and then has four years with no enrolment and no credits earned, we do not know whether this is because they withdrew from school or whether their enrolment and credit information was not submitted to Manitoba Education.

- The disparity between R1 and R5 showed an absolute increase but no relative change. The rate ratio of R1 compared to R5 was 0.63 in the first time period and 0.60 in the last time period, indicating stability in the rate ratio between R1 and R5 over time. The absolute difference gap of high school completion comparing R1 to R5 statistically significantly increased by 19% over time. R1 had around 28 per 100 fewer high school graduates than R5 in the first time period. By the last time period, there were around 34 per 100 fewer graduates in R1 compared to R5.

Urban:

- From T1 to T7, the high school completion rates of urban neighbourhood income quintile groups U2 to U5 fluctuated but showed slight increases over time. For U1, the lowest neighbourhood income quintile group, the rate showed a slight decrease over time.

- The disparity between U1 and U5 increased significantly. The rate ratio of U1 compared to U5 was 0.61 in the first time period and 0.56 in the last time period, for a statistically significant increase in inequality of 8%. The absolute difference in high school completion rates comparing U1 to U5 went from –34.67 in the first time period to –41.07, a statistically significant increase of 18%, representing around 35 per 100 fewer high school graduates in the first time period compared to 41 fewer graduates per 100 in the last time period.

Lorenz Curves:

Rural over time:

- In the first time period T1, 12.9% of the high school graduates were in the 18.5% of the population in the lowest neighbourhood income quintile group R1, with the Gini coefficient of 0.069 indicating a statistically significant disparity.

- In the last time period T7, 13.9% of the high school graduates were in the 19.9% of the population in the lowest neighbourhood income quintile group R1, with the Gini coefficient of 0.079 indicating a statistically significant disparity.

- The Gini coefficient did not change significantly from first to the last time period, suggesting stability in inequality over that time period.

Urban over time:

- In the first time period T1, 11.3% of the high school graduates were in the 15.8% of the population in the lowest neighbourhood income quintile group U1, with the Gini coefficient of 0.089 indicating a statistically significant disparity.

- In the last time period T7, 11.0% of the high school graduates were in the 16.5% of the population in the lowest neighbourhood income quintile group U1, with the Gini coefficient of 0.098 indicating a statistically significant disparity.

- The Gini coefficient was not statistically significantly different over the two time points, indicating that the inequality in high school completion stayed similar over time in the urban areas.

Rural compared to urban in most recent time period:

- In the most recent time period T7, there was a statistically similar Gini coefficient in rural compared to urban (0.079 vs. 0.098), indicating a similar level of inequality in both rural and urban Manitoba for high school completion rates.

Disparity measures over time by rural and urban:

- The disparity rate ratios (i.e., the ratio of the high school completion rates of the lowest compared to the highest neighbourhood income group) are similar in the rural area over time, but increasing over time in the urban area (i.e., the relative risk which is below 1 is getting further away from 1 over time).
- The disparity rate differences (i.e., the absolute difference of high school completion rates between the lowest and highest neighbourhood income group) are increasing over time in both the rural and urban areas. The absolute differences were greater in urban compared to rural areas consistently across time periods.

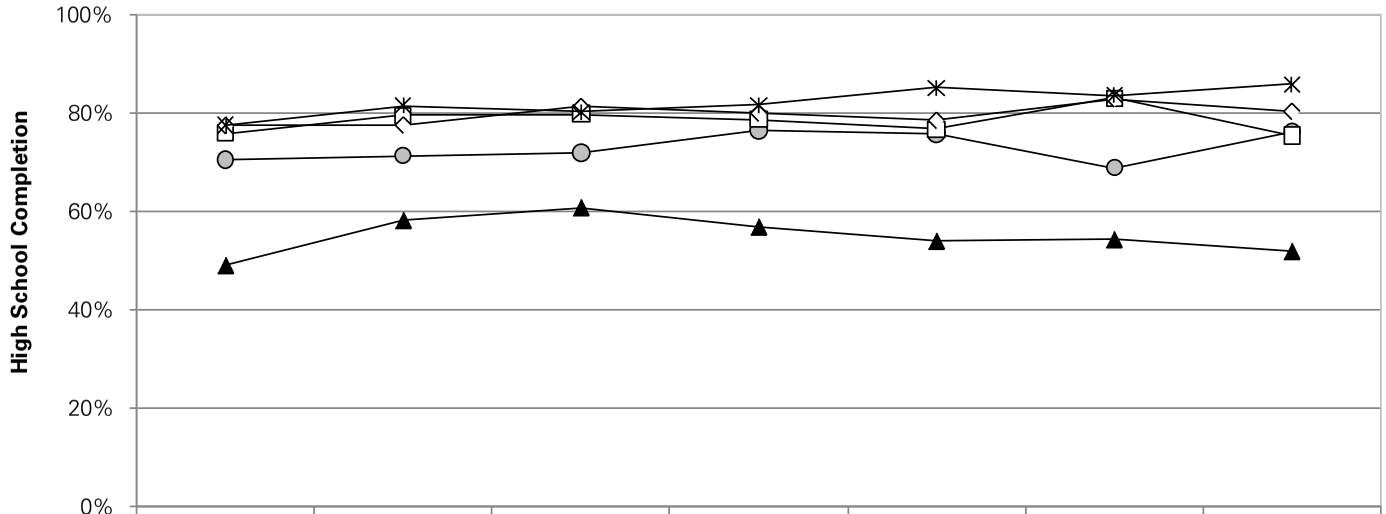
What is this telling us?

- The socioeconomic gap in high school completion rates is widening over time for urban and rural Manitoba.
- By all measures, the socioeconomic gap is similar in urban and rural Manitoba.
- The lowest neighbourhood income group in both urban and rural Manitoba shows no improvement in high school completion rates over time. Most other neighbourhood income quintile groups in rural and urban Manitoba showed improvement in high school completion rates over time.

Where to from here?

- Efforts to increase high school completion in low neighbourhood income areas should be supported. Research suggests that the paths that lead to high school withdrawal begin long before high school (Brownell et al., 2006). Children who enter school already behind their peers tend to fall further behind, and being behind in school can lead to discouragement and disengagement. Efforts to support children from low socioeconomic situations need to be provided at all ages, from preschool through high school (Heckman, 2006).
- Without complete information from band–operated schools, it is difficult to provide accurate estimates of high school completion in areas where students attend band–operated schools. Previous work (Mendelson, 2006) has shown that aboriginal children and youths face significant challenges in primary and secondary school. High school completion rates are lower than those of their non–aboriginal counterparts. Therefore, in Manitoba, accurate estimates of school performance would assist in quantifying the extent of the problem as well as monitoring progress and identifying programs that are effective at keeping aboriginal children and youths engaged in and doing well in school.

Figure 4.9: High School Completion (Including Band-Operated Schools) Rates Over Time by Rural Income Quintile
Adjusted for (2002) sex, percent of Grade 9 students who graduated within six years from time period



	T1: 1996	T2: 1997	T3: 1998	T4: 1999	T5: 2000	T6: 2001	T7: 2002
NF (Not displayed)	39.02	40.74	36.87	0.00	51.99	50.59	57.47
R1 (lowest income)	49.17	58.24	60.81	56.92	54.06	54.38	52.01
R2	70.65	71.38	71.97	76.51	75.82	69.03	76.29
R3	76.01	79.61	79.84	78.84	76.82	83.14	75.47
R4	77.64	77.74	81.42	80.10	78.68	82.98	80.47
R5 (highest income)	77.67	81.55	80.30	81.73	85.27	83.68	85.98
Disparity Rate Ratios (R1/R5)	0.63	0.71	0.76	0.70	0.70	0.65	0.60
Disparity Rate Differences (R1-R5)	-28.50	-23.31	-19.49	-24.81	-31.21	-29.30	-33.97

Time Period (years)

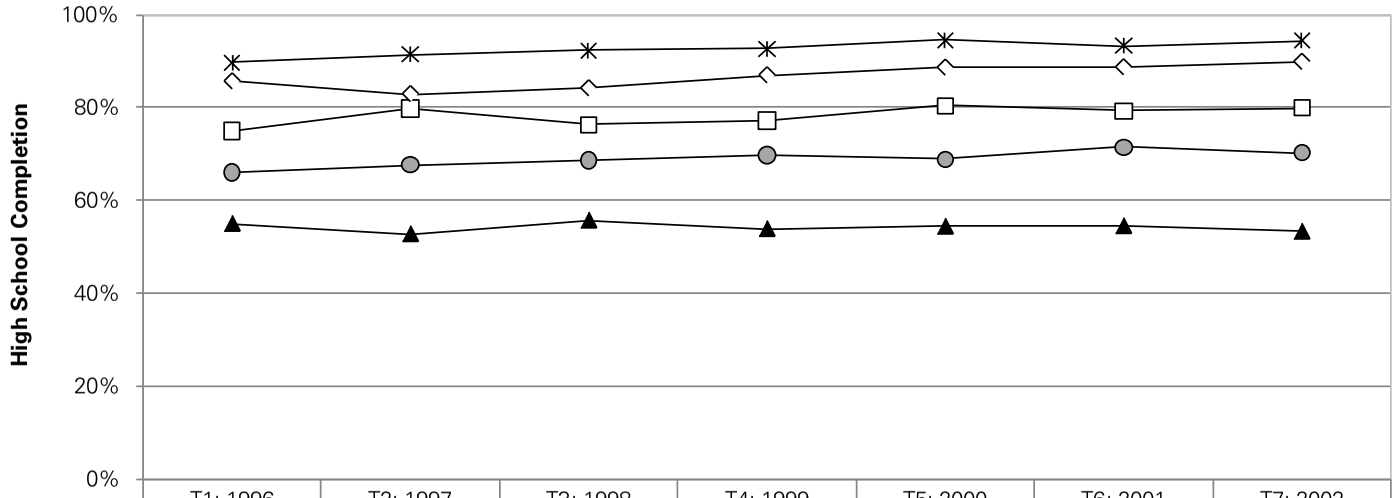
Comparison of Disparity Rate Ratios T7 to T1: 0.96 (95% CI 0.87, 1.05) NS

Comparison of Disparity Rate Differences T7 to T1: 1.19, p< .05

Source: Manitoba Centre for Health Policy, 2010

Figure 4.10: High School Completion (Including Band-Operated Schools) Rates Over Time by Urban Income Quintile

Adjusted for (2002) sex, percent of Grade 9 students who graduated within six years from time period



	T1: 1996	T2: 1997	T3: 1998	T4: 1999	T5: 2000	T6: 2001	T7: 2002
NF (Not displayed)	39.02	40.74	36.87	0.00	51.99	50.59	57.47
U1 (lowest income)	55.01	52.74	55.74	53.86	54.39	54.51	53.29
U2	66.07	67.67	68.64	69.73	68.85	71.48	70.24
U3	74.98	79.75	76.31	77.16	80.38	79.30	79.86
U4	85.66	82.91	84.16	86.97	88.63	88.71	89.88
U5 (highest income)	89.68	91.44	92.28	92.62	94.46	93.25	94.36
Disparity Rate Ratios (U1/U5)	0.61	0.58	0.60	0.58	0.58	0.58	0.56
Disparity Rate Differences (U1-U5)	-34.67	-38.70	-36.55	-38.76	-40.07	-38.74	-41.07

Time Period (years)

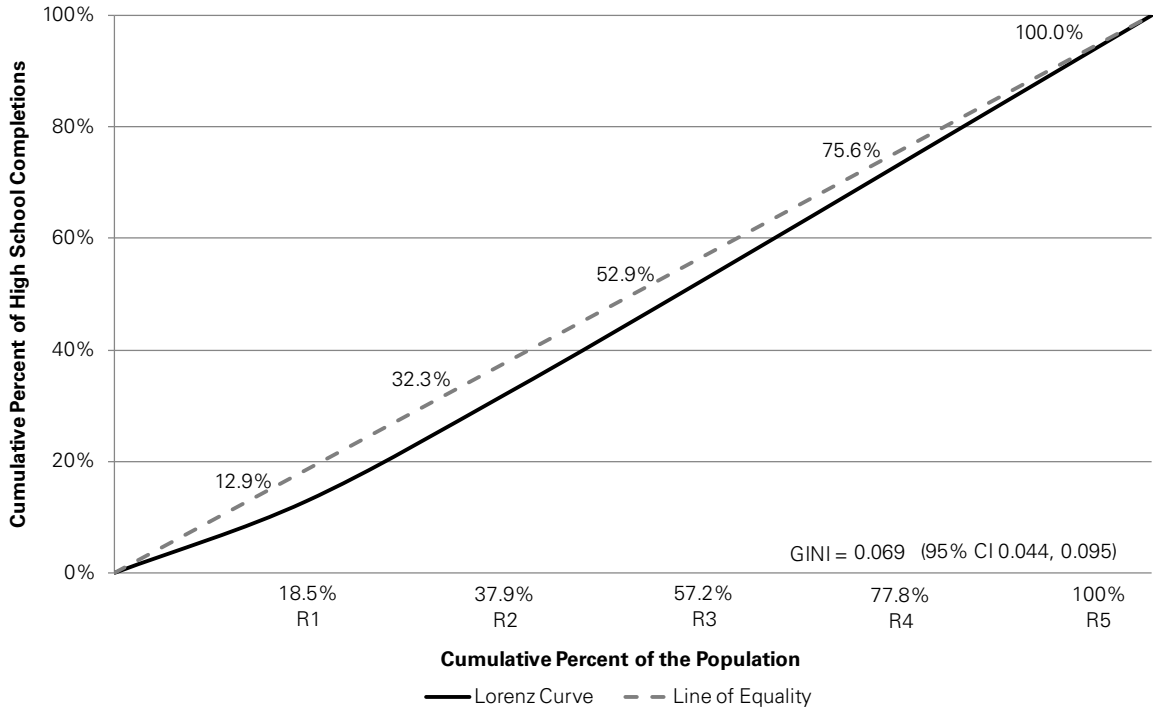
Comparison of Disparity Rate Ratios T7 to T1: 0.92 (95% CI 0.85, 1.00), p< .05

Comparison of Disparity Rate Differences T7 to T1: 1.18, p< .01

Source: Manitoba Centre for Health Policy, 2010

Figure 4.11: Adjusted Lorenz Curve for High School Completion (Including Band-Operated Schools) in Rural Areas 1996

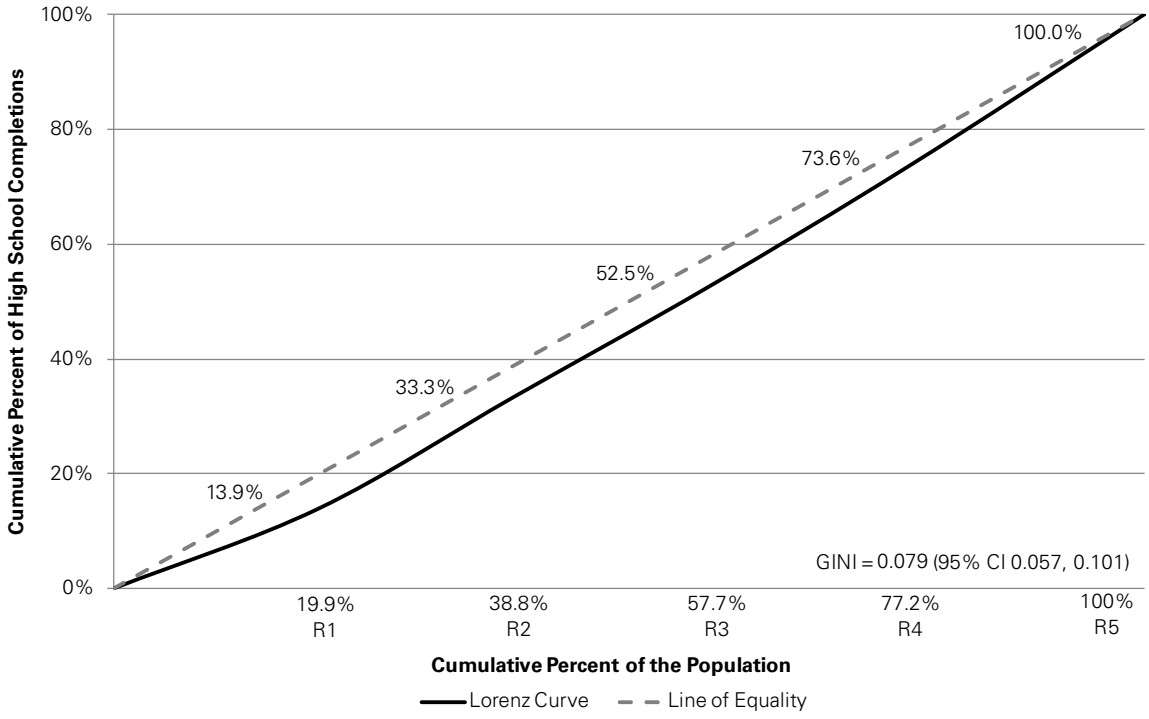
Adjusted for (2002) sex, percent of Grade 9 students who graduated within six years from time period



Source: Manitoba Centre for Health Policy, 2010

Figure 4.12: Adjusted Lorenz Curve for High School Completion (Including Band-Operated Schools) in Rural Areas 2002

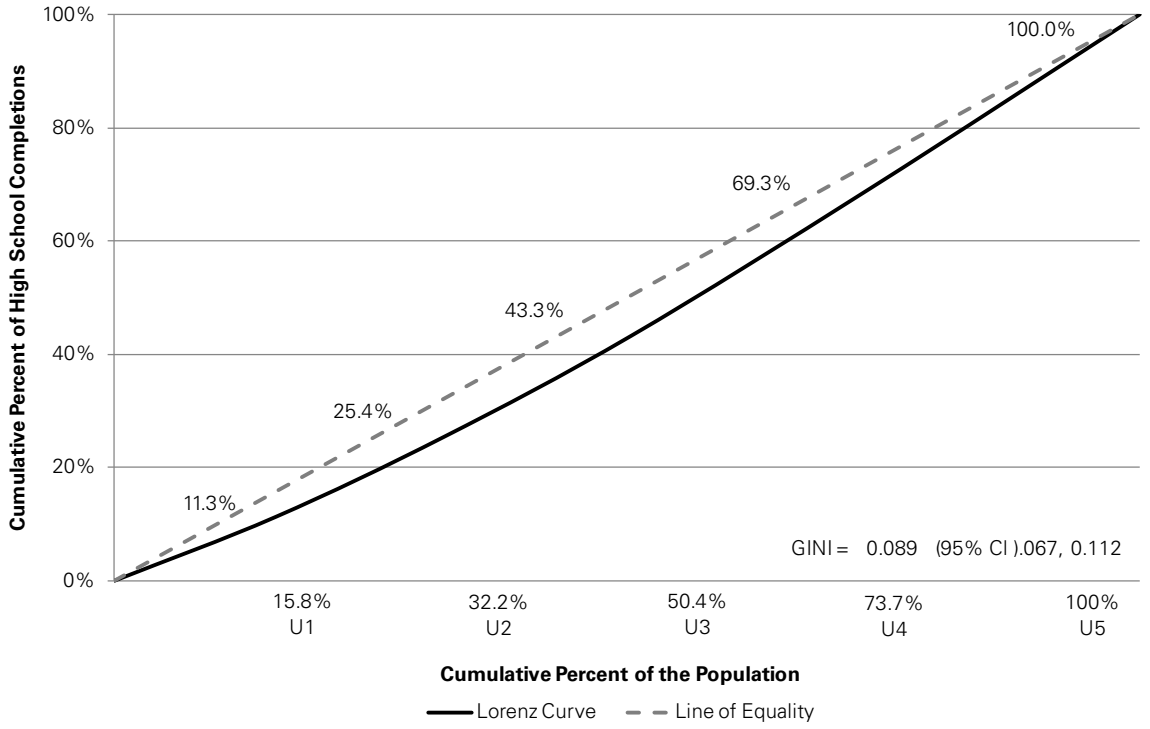
Adjusted for (2002) sex, percent of Grade 9 students who graduated within six years from time period



Source: Manitoba Centre for Health Policy, 2010

Figure 4.13: Adjusted Lorenz Curve for High School Completion (Including Band-Operated Schools) in Urban Areas 1996

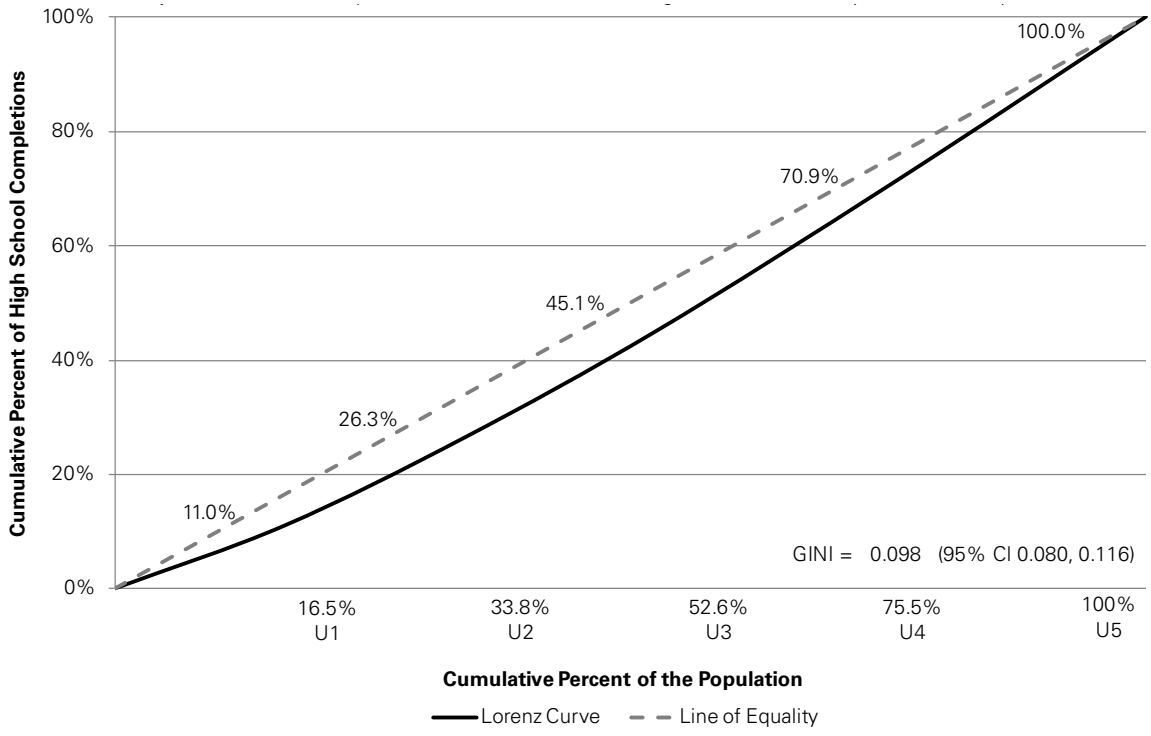
Adjusted for (2002) sex, percent of Grade 9 students who graduated within six years from time period



Source: Manitoba Centre for Health Policy, 2010

Figure 4.14: Adjusted Lorenz Curve for High School Completion (Including Band-Operated Schools) in Urban Areas 2002

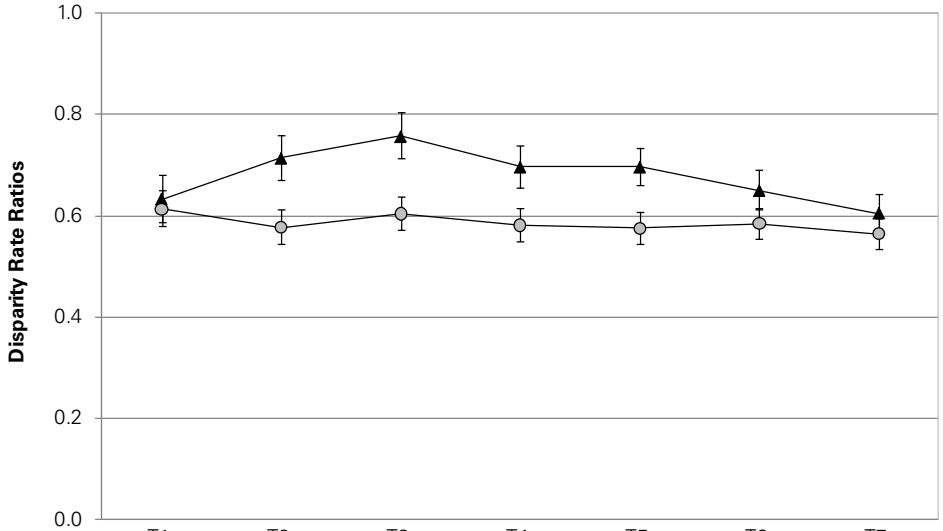
Adjusted for (2002) sex, percent of Grade 9 students who graduated within six years from time period



Source: Manitoba Centre for Health Policy, 2010

Figure 4.15: High School Completion (Including Band-Operated Schools) Disparity Rate Ratios by Urban and Rural Income Quintile

Adjusted by (2002) age, percent of Grade 9 students who graduated within six years from time period



	T1: 1996	T2: 1997	T3: 1998	T4: 1999	T5: 2000	T6: 2001	T7: 2002
Rural Disparity Rate Ratios	0.63	0.71	0.76	0.70	0.70	0.65	0.60
Urban Disparity Rate Ratios	0.61	0.58	0.60	0.58	0.58	0.58	0.56

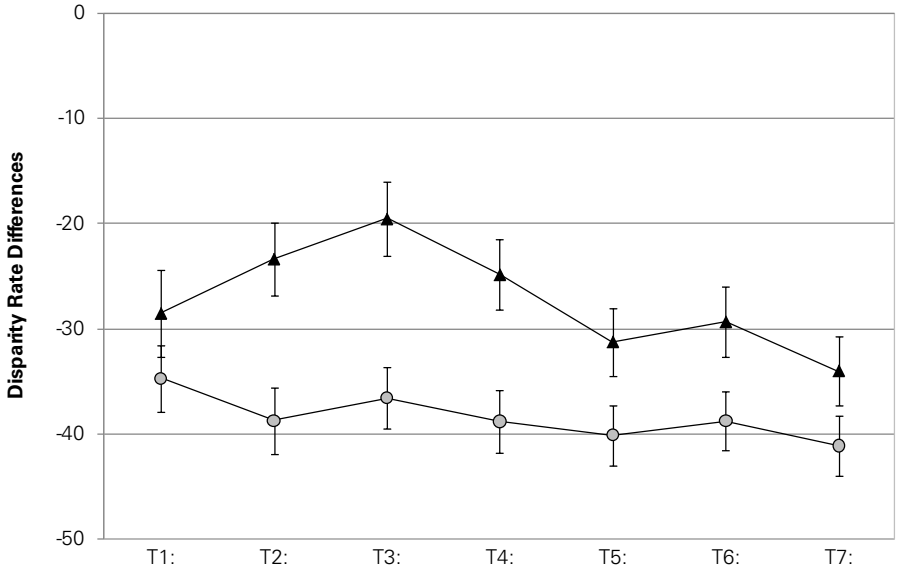
Time Period (years)

Urban Disparity Rate Ratios T7 to T1: 0.92 (95% CI 0.85, 1.00), p< .05
Rural Disparity Rate Ratios T7 to T1: 0.96 (95% CI 0.87, 1.05) NS

Source: Manitoba Centre for Health Policy, 2010

Figure 4.16: High School Completion (Including Band-Operated Schools) Disparity Rate Differences by Urban and Rural Income Quintile

Adjusted by (2002) sex, percent of Grade 9 students who graduated within six years from time period



	T1: 1996	T2: 1997	T3: 1998	T4: 1999	T5: 2000	T6: 2001	T7: 2002
Rural Disparity Rate Differences	-28.50	-23.31	-19.49	-24.81	-31.21	-29.30	-33.97
Urban Disparity Rate Differences	-34.67	-38.70	-36.55	-38.76	-40.07	-38.74	-41.07

Time Period (years)

Urban Disparity Rate Differences T7 to T1: 1.18, p< .01
Rural Disparity Rate Differences T7 to T1: 1.19, p< .05

Source: Manitoba Centre for Health Policy, 2010

Dental Extraction

Definition

The removal of a tooth from the mouth. In this report, hospital–based **dental extraction** rates are examined for children up to five years of age, when severe tooth decay is the most common reason for dental extractions. This is the average annual rate of hospitalizations for dental extractions per 1,000 children aged birth to five years. The following codes to identify hospital–based dental extractions were used:

ICD–9–CM codes: 23.01 (extraction of deciduous tooth), 23.09 (extraction of other tooth), 23.11 (removal of residual root), and 23.19 (other surgical extraction of tooth).

ICD–10–CA codes: 1.FE.89 (total excision, includes excision (surgical) tooth, excision tooth (impacted) and enucleation tooth (non erupted)) and 1.FE.57 (tooth extraction, includes tooth removal, using forceps).

A limitation with this measure is that dental extractions performed in a surgery clinic or a private dentist's office cannot be identified.

NOTE: Dental Extractions as an indicator may be considered a surrogate for underlying severe tooth decay. This is an instance where the inequality (i.e., higher dental surgery rates in lower socioeconomic groups) may actually be equity (i.e., a fair distribution of health services according to underlying need).

Time Periods	Average annual rate per 1,000
T1: 1984/85–1988/89	5.56
T2: 1989/90–1993/94	5.99
T3: 1994/95–1998/99	8.75
T4: 1999/00–2003/04	12.95
T5: 2004/05–2007/08	17.06

Key Findings: Dental Extractions

Manitoba overall rates:

From the first time period T1 (1984/85–1988/89) to the last time period T5 (2004/05–2007/08), rates of hospital–based dental extractions have increased dramatically in Manitoba, from 5.56 per 1,000 to 17.06 per 1,000 children under age five.

Rates by neighbourhood income quintile over time:

Rural:

- From T1 to T5, the dental extraction rate among rural residents increased for all rural quintiles. The most substantial increases occurred in R1 and R2, the two lowest neighbourhood income quintile groups. R1 went from 19.21 per 1,000 in T1 to 59.51 dental extractions per child under age five in T5. R2 saw an increase of 8.65 per 1,000 in T1 to 37.95 in T5.

- Depending upon the measure used, the disparity between R1 and R5 remained similar or widened between the first time period T1 and the second time period T5 for hospital–based dental extraction rates. The rate ratio of R1 compared to R5 was 4.15 in the first time period and 6.45 in the last time period, but this change was not statistically significant. The absolute difference gap in dental extraction rates comparing R1 to R5 was 14.58 in T1 and 50.28 in T5, an increase of 245% which was statistically significant, and indicates an increase in inequality over time.

Urban:

- From T1 to T5, dental extraction rates increased only slightly for U4 and U5, almost doubled for U3 and U2, and more than doubled for U1.

- Depending upon the measure used, the disparity between U1 and U5 remained similar or widened between the first time period T1 and the second time period T5 for hospital–based dental extraction rates. The rate ratio of U1 compared to U5 was 7.79 in the first time period and 13.09 in the last time period; this increase of 68% in the rate ratio is not statistically significantly different. The absolute difference gap in dental extraction rates comparing U1 to U5 widened, going from 6.82 per 1,000 U1 compared to U5 in the first time period to 16.76 per 1,000 in the last time period for an increase of 146% in the difference, which was statistically significant.

Lorenz Curves:

Rural over time:

- In T1, 53.5% of hospital–based dental extractions were accounted for in the 22.7% of the rural population of children up to age five in the lowest neighbourhood income quintile group (R1), with the Gini coefficient of 0.363 indicating a statistically significant inequality.

- In T5, 53.6% of dental extractions occurred in the 26.0% of the population of children aged birth to five years in the lowest neighbourhood income quintile group (R1), with the Gini coefficient of 0.383 indicating a statistically significant inequality.

- The Gini coefficient from T1 to T5 was not statistically significantly different, showing similar disparity over time.

Urban over time:

- In T1, 47.4% of hospital–based dental extractions occurred in the 21.6% of the urban population of children up to age five in the lowest neighbourhood income quintile group (U1), with the Gini coefficient of 0.356 indicating a statistically significant disparity.

- In T8, 55.9% of dental extractions occurred in the 23.7% of the urban population in the lowest neighbourhood income quintile group (U1), with the Gini coefficient of 0.421 indicating a statistically significant disparity.

- The Gini coefficient was not statistically significantly different from the first to the last time period (0.356 to 0.421, p=.053, NS), although the p–value indicates that this may be due to small numbers and may actually show a trend to an increase. However, there was similar inequality in urban children up to age five having dental extractions over that time period.

Rural compared to urban in most recent time period:

- In the most recent time period T5, there is no statistically significantly difference for Gini coefficient in urban compared to rural (0.421 vs. 0.383, p=0.064, NS), indicating a similar level of inequality in urban Manitoba for hospital–based dental extractions in children aged birth to five years. Because the p–value is so close to 0.05, this may indicate a trend towards greater urban inequality, but this is based upon small numbers.

Disparity measures over time by rural and urban:

- The disparity rate ratios (DRRs) (i.e., the ratio of hospital–based dental extraction rates in the lowest compared to the highest neighbourhood income group) are similar across time for both the rural and urban neighbourhood income quintiles. The disparity rate ratios of urban and rural neighbourhood income quintile groups are quite similar, with the tendency that urban DRRs tend to show higher disparity for most time periods (although not statistically significant).

- The disparity rate differences (DRDs) are widening for both urban and rural neighbourhood income quintiles over time, with statistically significant differences comparing T5 to T1 in both groups. For every time period, the absolute differences between lowest and highest neighbourhood income quintile group are statistically significantly larger in rural compared to urban. In the last time period T5, the DRD for rural children was three times higher than that for urban children.

What is this telling us?

- The rate of hospital–based dental extractions for children up to five years of age is much higher in rural compared to urban areas.

- There is a substantial socioeconomic gap in hospital–based dental extractions in both rural and urban areas, with children in R1, U1, and to a lesser extent R2. These quintiles have much higher rates of this procedure than children with higher socioeconomic status.

- The socioeconomic gap in dental extractions for children from birth to five years is widening over time in rural and urban Manitoba, according to some measures but staying similar according to other indicators. Rate ratios remained similar, whereas rate differences increased in both rural and urban areas.

- The rate ratio in dental extractions by neighbourhood income quintile groups is higher in urban compared to rural areas, whereas the rate difference is higher in rural areas.

- The much higher rates of hospital–based dental extractions for children up to age five in low socioeconomic areas is both a good news and bad news story. The good news is that the children who need this procedure the most appear to be getting it, at much higher rates than their higher socioeconomic counterparts. The bad news is that this invasive procedure is an indication that children from lower socioeconomic status areas, particularly in rural Manitoba, have very poor dental health from a very early age.

Where to from here?

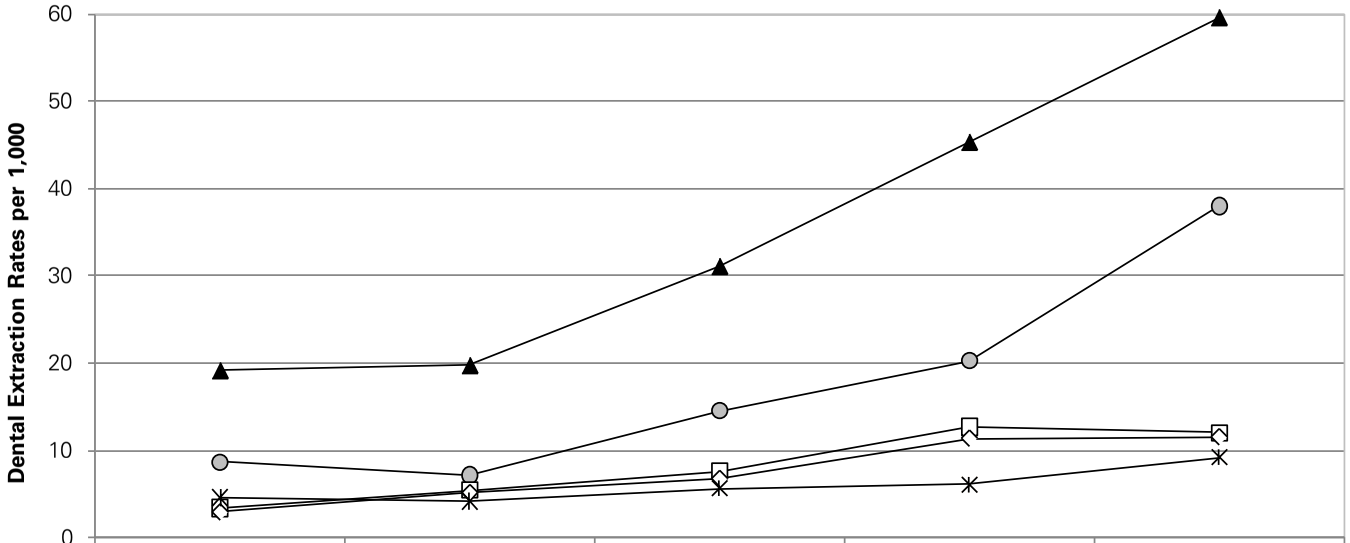
- There are inequalities in hospital–based dental extractions that indicate underlying inequities in dental health. In other words, the inequality in dental extraction rates is a reflection of need (and hence may be considered fair or equitable). That being said, if this indicator is thought of as a surrogate for underlying disparities in poor dental health, then it reflects a serious need for public health action. Efforts to improve early dental health in low socioeconomic areas, particularly in rural Manitoba, should be supported.

- Linking this indicator with the breastfeeding indicator would be useful, as bottle feeding is a risk factor for dental decay (Mobley, 2009; Mohebbi, 2008). Hence public health strategies to decrease bottle feeding may be one approach to decreasing the inequality.

- Linking this indicator with availability of services in rural areas (both preventive and treatment) is also important to know where to target additional resources.

Figure 4.17: Dental Extraction Rates Over Time by Rural Income Quintile

Adjusted by (2004/05-2007/08) age & sex, annual rate per 1,000 children aged 0-5



	T1: 1984/85-1988/89	T2: 1989/90-1993/94	T3: 1994/95-1998/99	T4: 1999/00-2003/04	T5: 2004/05-2007/08
NF (Not displayed)	s	5.87	7.29	46.29	23.46
R1 (lowest income)	19.21	19.79	31.11	45.29	59.51
R2	8.65	7.19	14.54	20.27	37.95
R3	3.44	5.45	7.64	12.67	12.04
R4	3.01	5.19	6.79	11.35	11.51
R5 (highest income)	4.63	4.19	5.65	6.12	9.23
Disparity Rate Ratios (R1/R5)	4.15	4.73	5.51	7.40	6.45
Disparity Rate Differences (R1-R5)	14.58	15.61	25.46	39.17	50.28

Time Period (fiscal years)

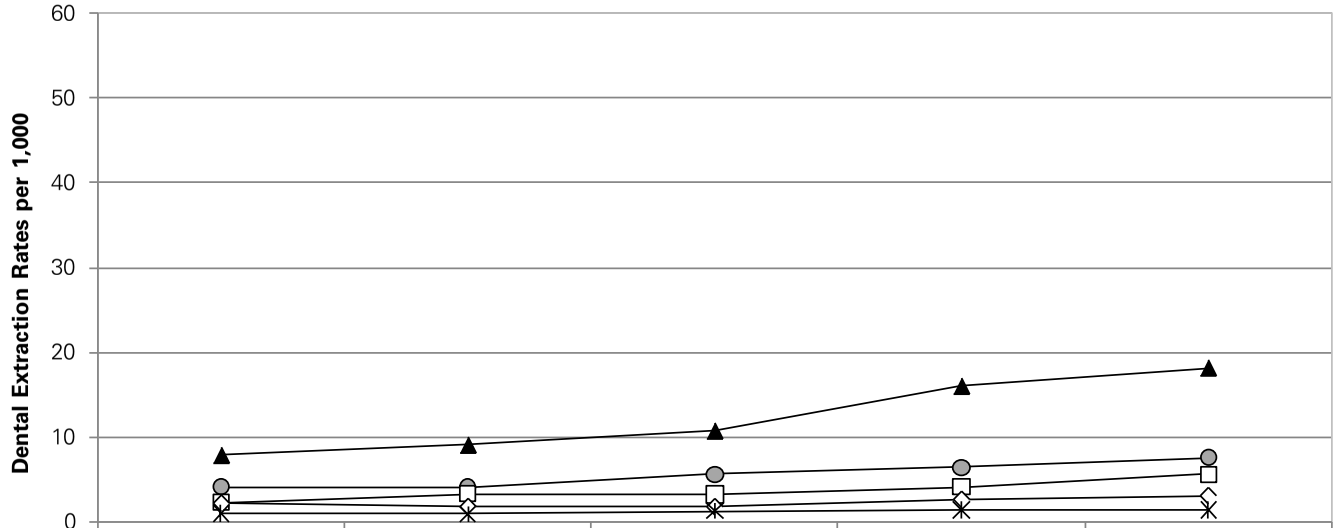
Comparison of Disparity Rate Ratios T5 to T1: 1.55 (95% CI 0.59, 4.10) NS

Comparison of Disparity Rate Differences T5 to T1: 3.45, p<.001

Source: Manitoba Centre for Health Policy, 2010

Figure 4.18: Dental Extraction Rates Over Time by Urban Income Quintile

Adjusted by (2004/05-2007/08) age & sex, annual rate per 1,000 children aged 0-5



	T1: 1984/85-1988/89	T2: 1989/90-1993/94	T3: 1994/95-1998/99	T4: 1999/00-2003/04	T5: 2004/05-2007/08
NF (Not displayed)	s	5.87	7.29	46.29	23.46
U1 (lowest income)	7.83	9.03	10.70	15.98	18.14
U2	4.09	4.01	5.60	6.42	7.59
U3	2.28	3.31	3.22	4.10	5.59
U4	2.20	1.81	1.80	2.64	3.07
U5 (highest income)	1.00	0.92	1.28	1.40	1.39
Disparity Rate Ratios (U1/U5)	7.79	9.82	8.33	11.38	13.09
Disparity Rate Differences (U1-U5)	6.82	8.11	9.41	14.58	16.76

Time Period (fiscal years)

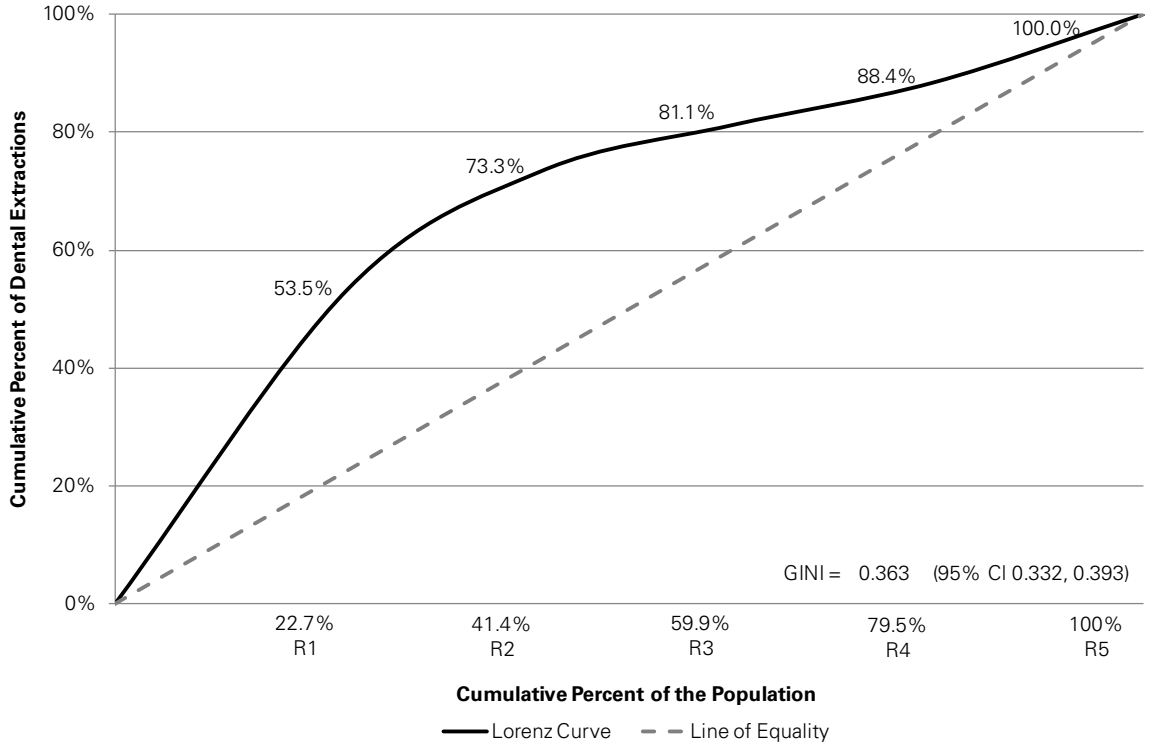
Comparison of Disparity Rate Ratios T5 to T1: 1.68(95% CI 0.58, 4.86) NS

Comparison of Disparity Rate Differences T5 to T1:2.46, p<.001

Source: Manitoba Centre for Health Policy, 2010

Figure 4.19: Adjusted Lorenz Curve for Dental Extractions in Rural Areas 1984/85-1988/89

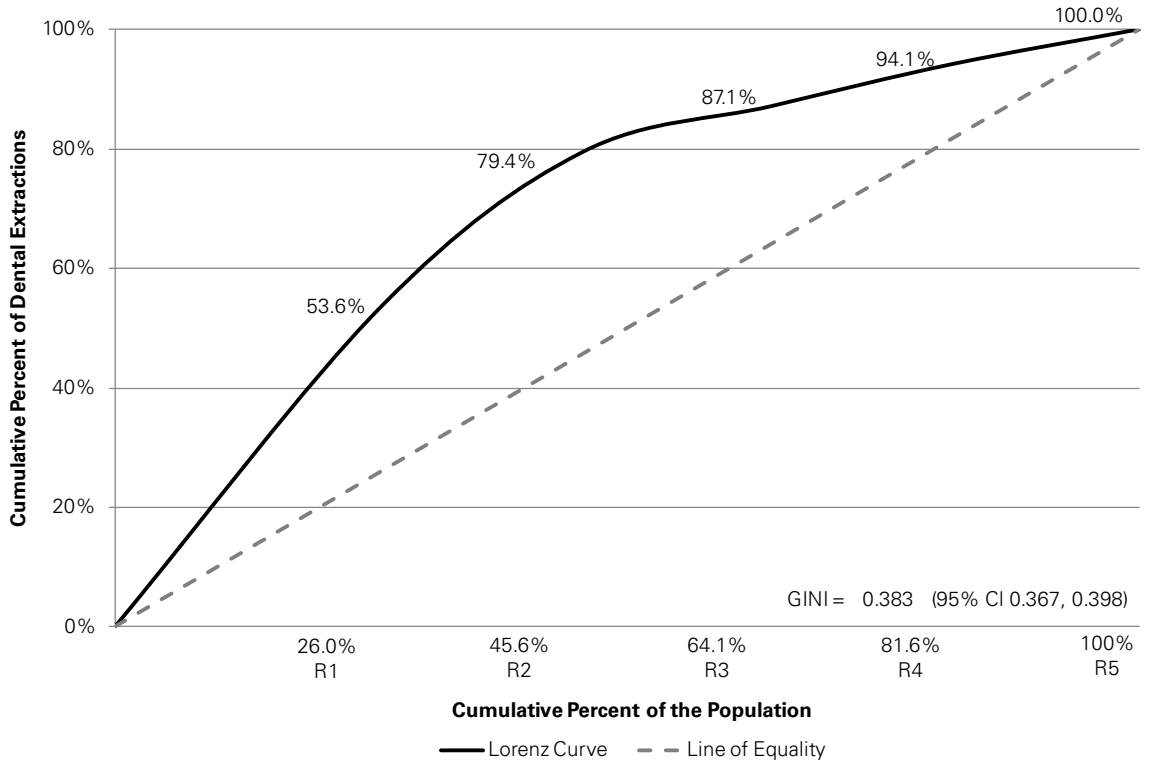
Adjusted by (2004/05-2007/08) age & sex, children aged 0-5



Source: Manitoba Centre for Health Policy, 2010

Figure 4.20: Adjusted Lorenz Curve for Dental Extractions in Rural Areas 2004/05-2007/08

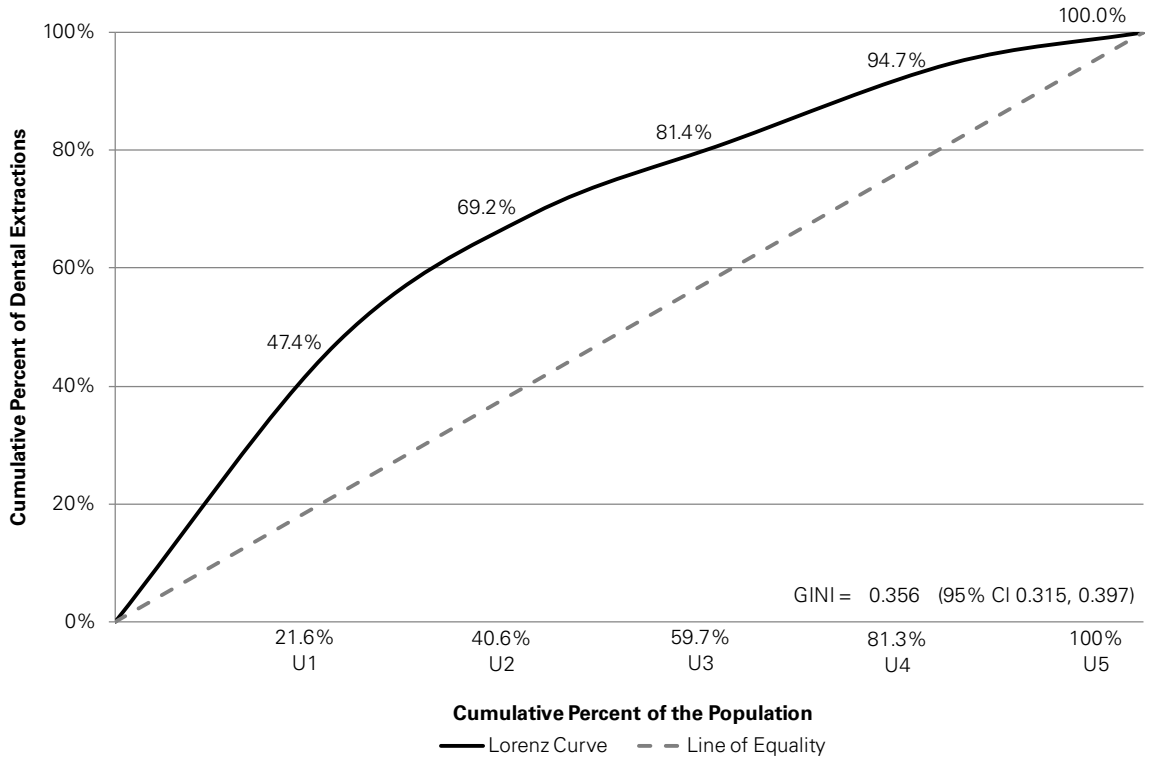
Adjusted by (2004/05-2007/08) age & sex, children aged 0-5



Source: Manitoba Centre for Health Policy, 2010

Figure 4.21: Adjusted Lorenz Curve for Dental Extractions in Urban Areas 1984/85-1988/89

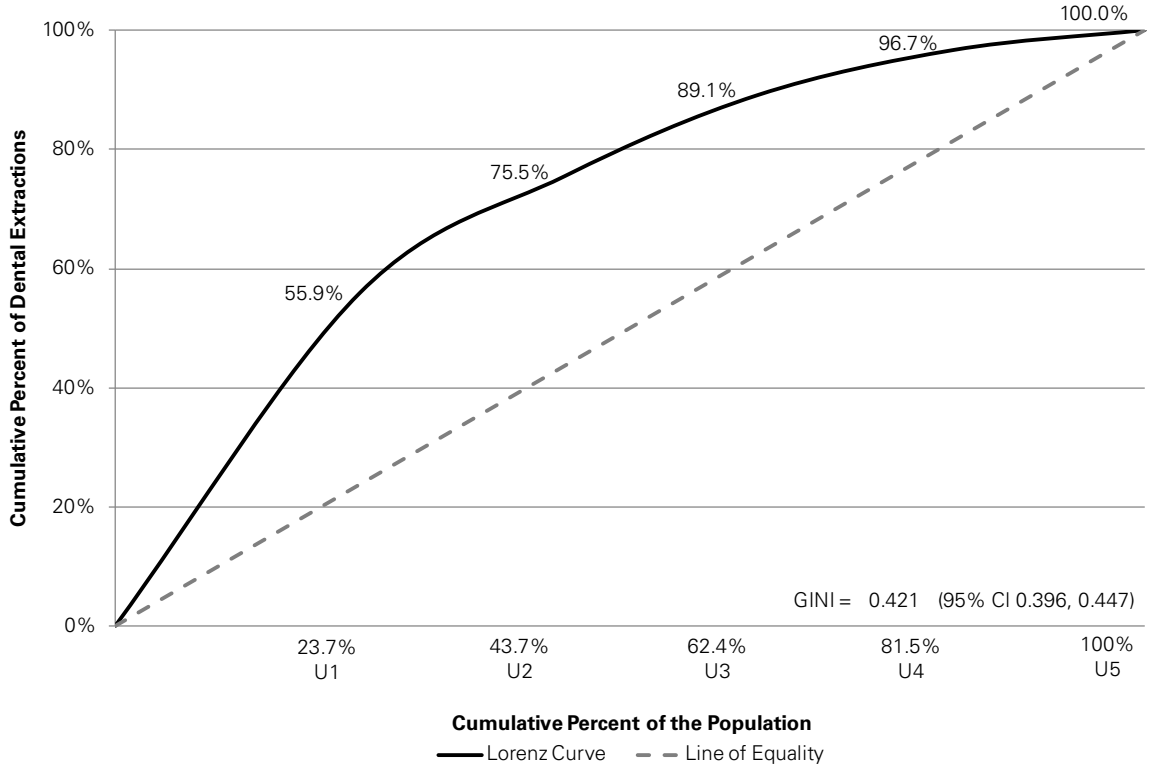
Adjusted by (2004/05-2007/08) age & sex, children aged 0-5



Source: Manitoba Centre for Health Policy, 2010

Figure 4.22: Adjusted Lorenz Curve for Dental Extractions in Urban Areas 2004/05-2007/08

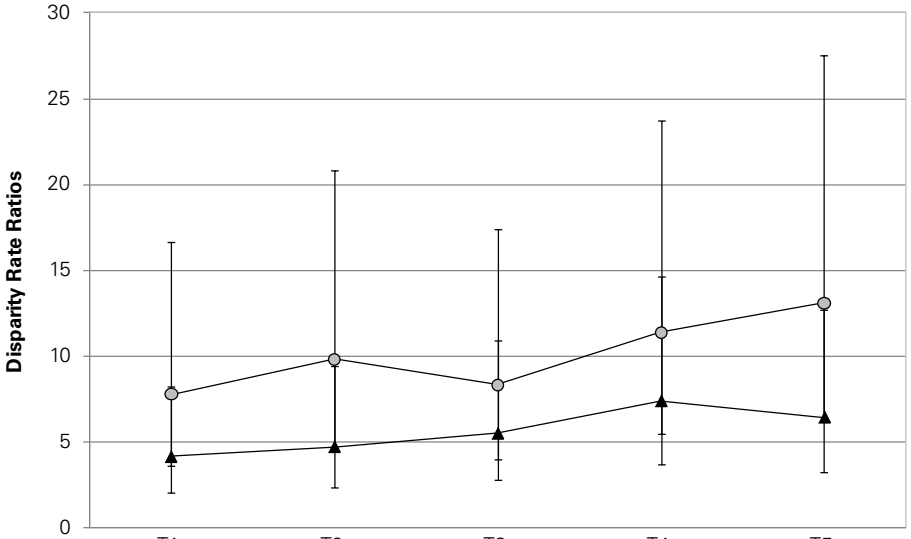
Adjusted by (2004/05-2007/08) age & sex, children aged 0-5



Source: Manitoba Centre for Health Policy, 2010

Figure 4.23: Dental Extraction Disparity Rate Ratios by Urban and Rural Income Quintile

Adjusted by (2004/05-2007/08) age & sex, per 1,000 children aged 0-5



	T1: 1984/85-1988/89	T2: 1989/90-1993/94	T3: 1994/95-1998/99	T4: 1999/00-2003/04	T5: 2004/05-2007/08
Urban Disparity Rate Ratios	7.79	9.82	8.33	11.38	13.09
Rural Disparity Rate Ratios	4.15	4.73	5.51	7.40	6.45

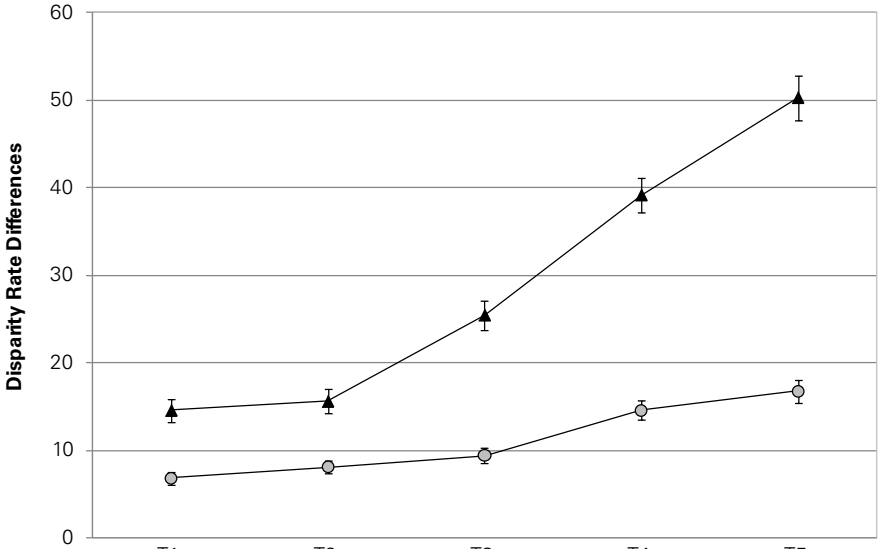
Time Period (fiscal years)

Urban Disparity Rate Ratios T5 to T1: 1.68 (95% CI 0.58, 4.86) NS
Rural Disparity Rate Ratios T5 to T1: 1.55 (95% CI 0.59, 4.10) NS

Source: Manitoba Centre for Health Policy, 2010

Figure 4.24: Dental Extraction Disparity Rate Differences by Urban and Rural Income Quintile

Adjusted by (2004/05-2007/08) age & sex, per 1,000 children aged 0-5



	T1: 1984/85-1988/89	T2: 1989/90-1993/94	T3: 1994/95-1998/99	T4: 1999/00-2003/04	T5: 2004/05-2007/08
Rural Disparity Rate Differences	14.58	15.61	25.46	39.17	50.28
Urban Disparity Rate Differences	6.82	8.11	9.41	14.58	16.76

Time Period (fiscal years)

Urban Disparity Rate Differences T5 to T1: 2.46, p<.001
Rural Disparity Rate Differences T5 to T1: 3.45, p<.001

Source: Manitoba Centre for Health Policy, 2010

Breastfeeding Initiation Rates

Definition

This indicates whether or not a newborn was breastfeeding upon discharge from the hospital. It is calculated for any live born newborn hospitalization (newborn hospitalizations are defined with ICD–9–CM codes V30 to V39) by using the hospital discharge abstract with its field indicating whether a baby was being breastfed (either partial or exclusive breastfeeding) or not at discharge. This is the average annual percentage of live newborns who initiated breastfeeding.

Note that only breastfeeding initiation (as defined by newborn breastfeeding) is available for the entire population of Manitoba. Breastfeeding duration information is not available in the Repository housed at MCHP, but only through national surveys which are samples (not the whole population) and exclude on–reserve First Nations populations.

Time Periods	Average annual percentage of newborns
T1: 1987/88–1989/90	72.50
T2: 1990/91–1992/93	73.00
T3: 1993/94–1995/96	77.89
T4: 1996/97–1998/99	80.19
T5: 1999/00–2001/02	81.65
T6: 2002/03–2004/05	81.84
T7: 2005/06–2007/08	80.13

Key findings: Breastfeeding Initiation Rates

Manitoba overall rates:

From the first time period T1 (1987/88–1989/90) to the last time period T7 (2005/06–2007/08), breastfeeding initiation rates increased from 72.5% to 80.1% provincially.

Rates by neighbourhood income quintile over time:

Rural:

- From T1 to T7, the breastfeeding initiation rates of rural neighbourhood income quintile groups R3 to R5 increased steadily, whereas the breastfeeding initiation rate of the lowest rural neighbourhood income quintile R1 plateaued. R2 appeared to increase initially, and then plateau from 1999 onward.
- The disparity between R1 and R5 increased substantially. The rate ratio of R1 compared to R5 was 0.82 in the first time period and 0.71 in the last time period, indicating that the lowest neighbourhood income group has statistically lower relative rates (13% lower) in the second time period. The absolute difference gap of PMR comparing R1 to R5 statistically significantly increased by 86% over time, from around 14 per 100 fewer breastfed children in the first time period to around 26 per 100 fewer breastfed children in the last time period.

Urban:

- From T1 to T7, the breastfeeding initiation rates of urban neighbourhood income quintile groups U1 to U5 increased steadily.

- The disparity between U1 and U5 decreased significantly. The rate ratio of U1 compared to U5 was 0.76 in the first time period and 0.82 in the last time period, for a statistically significant decrease in inequality. The absolute difference of breastfeeding initiation rates comparing U1 to U5 also statistically significantly decreased over time, from around 20 per 100 fewer breastfeed children in the first time period compared to 16 fewer children per 100 in the last time period.

Lorenz Curves:

Rural over time:

- In the first time period T1, 22.1% of the breastfed newborns were in the 25.5% of the births in the lowest neighbourhood income quintile group R1, with the Gini coefficient of 0.040 indicating a statistically significant disparity.
- In the last time period T7, 22.3% of the breastfed newborns were in the 27.7% of the population in the lowest neighbourhood income quintile group R1, with the Gini coefficient of 0.070 indicating a statistically significant disparity.
- The Gini coefficient increased from the first to the last time period (p=.0004), showing a statistically significant increase in inequality over that time period.

Urban over time:

- In the first time period T1, 20.5% of the breastfed newborns were in the 24.1% of the newborns in the lowest neighbourhood income quintile group U1, with the Gini coefficient of 0.051 indicating a statistically significant disparity.
- In the last time period T7, 23.2% of the breastfed newborns were in the 26.2% of the newborns in the lowest neighbourhood income quintile group U1, with the Gini coefficient of 0.039 indicating a statistically significant disparity.
- The Gini coefficient was statistically similar in the two time points, indicating that the inequality in breastfeeding stayed similar over time in the urban areas.

Rural compared to urban in most recent time period:

- In the most recent time period T7, there is a statistically significantly higher Gini coefficient in rural compared to urban (0.070 vs. 0.039, p<.02), indicating a higher level of inequality in rural Manitoba for breastfeeding initiation rates.

Disparity measures over time by rural and urban:

- The disparity rate ratios (i.e., the ratio of the breastfeeding initiation rates of the lowest compared to the highest neighbourhood income group) are similar in the urban area over time, but increasing over time in the rural area (i.e., the relative risk which is below 1 is getting further away from 1 over time). Although urban and rural rate ratios are similar in the first time period, the rate ratio in rural is statistically greater in the last time period compared to the urban area.
- The disparity rate differences (i.e., the absolute difference of breastfeeding rates between the lowest and highest neighbourhood income group) appear to be increasing over time for the rural area, but decreasing in time for the urban area. However, the absolute differences were greater in the urban area at the first time period and greater in the rural area in the last time period. There is a substantial growing gap in the rural area, but a lessening gap in the urban area.

What is this telling us?

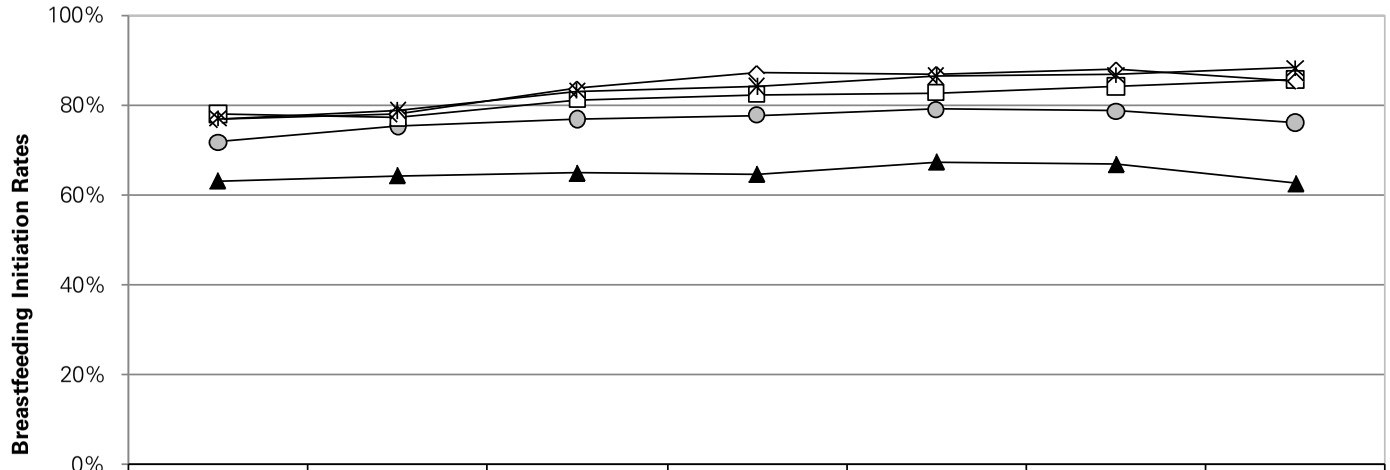
- The socioeconomic gap in breastfeeding initiation rates is widening over time for rural, but lessening in urban Manitoba.
- By all measures, the socioeconomic gap is larger in rural than in urban Manitoba.
- The lowest neighbourhood income group in rural Manitoba shows no improvement in breastfeeding initiation rates over time, whereas the rates increased over time for the lowest neighbourhood income group in urban Manitoba. Most other neighbourhood income quintile groups in rural and urban Manitoba showed improvement in breastfeeding initiation rates over time.
- The largest socioeconomic gap in breastfeeding initiation is seen in rural Manitoba during the most recent time period of 2005/06–2007/08, where around 26 fewer babies per 100 were being breastfed when discharged from hospital in R1 compared to R5.

Where to from here?

- Breastfeeding interventions that work in low neighbourhood income groups need to be promoted in rural R1 areas in particular. The urban "shrink" in inequality in the lowest neighbourhood income quintile could be explored for information about what policies and programs are operating in Winnipeg and Brandon (refer to the 2008 "What Works" deliverable by Martens et al.).

Figure 4.25: Breastfeeding Initiation Rates Over Time by Rural Income Quintile

Adjusted by (2005/06-2007/08) maternal age, annual percent of newborns breastfed at hospital discharge



	T1: 1987/88-1989/90	T2: 1990/91-1992/93	T3: 1993/94-1995/96	T4: 1996/97-1998/99	T5: 1999/00-2001/02	T6: 2002/03-2004/05	T7: 2005/06-2007/08
NF (Not displayed)	69.67	77.47	82.43	70.00	79.35	71.56	69.19
R1 (lowest income)	63.15	64.33	64.83	64.62	67.35	66.78	62.51
R2	71.76	75.29	76.89	77.74	79.10	78.73	76.06
R3	78.07	77.08	81.27	82.34	82.80	84.24	85.70
R4	76.87	78.10	83.65	87.11	86.91	87.90	85.46
R5 (highest income)	76.97	78.81	83.10	84.21	86.48	86.78	88.29
Disparity Rate Ratios (R1/R5)	0.82	0.82	0.78	0.77	0.78	0.77	0.71
Disparity Rate Differences (R1-R5)	-13.83	-14.48	-18.27	-19.59	-19.13	-19.99	-25.78

Time Period (fiscal years)

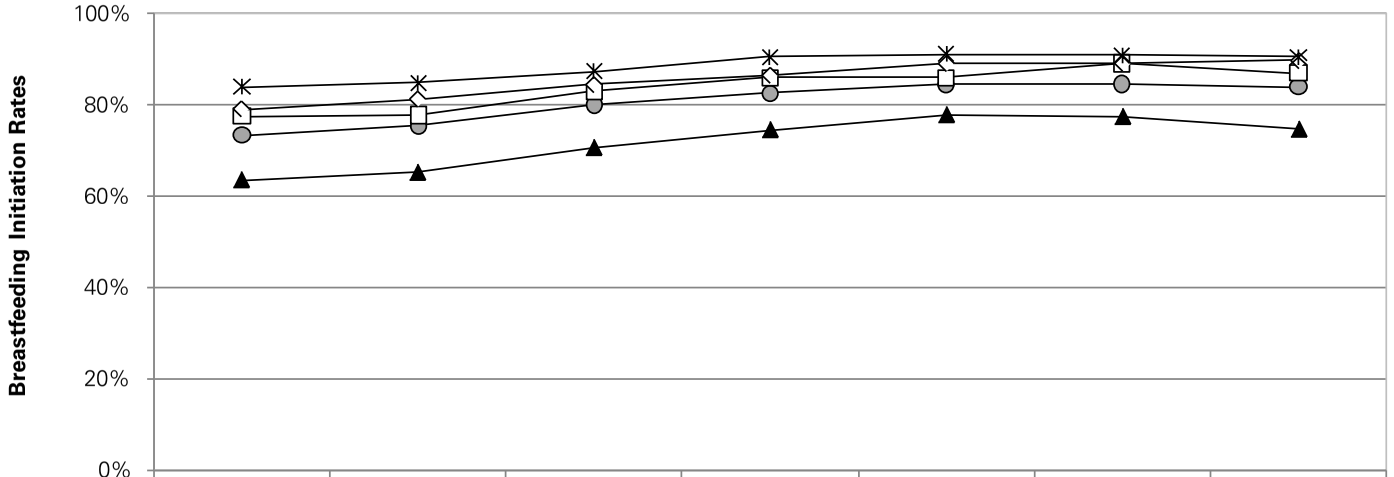
Comparison of Disparity Rate Ratios T7 to T1:0.86 (95% CI0.79 , 0.95) p< .01

Comparison of Disparity Rate Differences T7 to T1:1.86 , p< .001

Source: Manitoba Centre for Health Policy, 2010

Figure 4.26: Breastfeeding Initiation Rates Over Time by Urban Income Quintile

Adjusted by (2005/06-2007/08) maternal age, annual percent of newborns breastfed at hospital discharge



	T1: 1987/88-1989/90	T2: 1990/91-1992/93	T3: 1993/94-1995/96	T4: 1996/97-1998/99	T5: 1999/00-2001/02	T6: 2002/03-2004/05	T7: 2005/06-2007/08
NF (Not displayed)	69.67	77.47	82.43	70.00	79.35	71.56	69.19
U1 (lowest income)	63.57	65.20	70.67	74.60	77.91	77.51	74.71
U2	73.37	75.43	80.11	82.68	84.47	84.60	83.98
U3	77.57	77.87	83.00	86.04	86.02	89.14	87.01
U4	79.08	81.28	84.50	86.60	89.23	89.28	89.87
U5 (highest income)	84.00	84.83	87.40	90.56	91.18	91.01	90.62
Disparity Rate Ratios (U1/U5)	0.76	0.77	0.81	0.82	0.85	0.85	0.82
Disparity Rate Differences (U1-U5)	-20.44	-19.63	-16.74	-15.95	-13.27	-13.50	-15.91

Time Period (fiscal years)

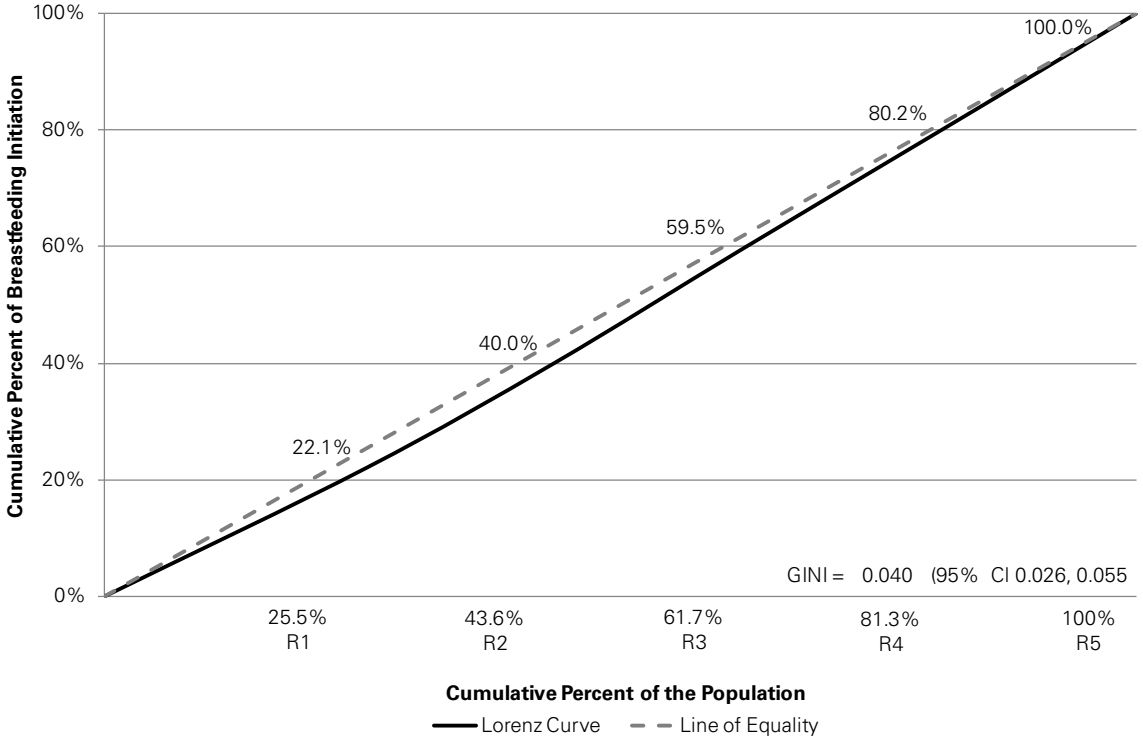
Comparison of Disparity Rate Ratios T7 to T1: 1.09 (95% CI 1.00, 1.19) p< .05

Comparison of Disparity Rate Differences T7 to T1: 0.78, p< .001

Source: Manitoba Centre for Health Policy, 2010

Figure 4.27: Adjusted Lorenz Curve for Breastfeeding Initiation Rates in Rural Areas, 1987/88-1989/90

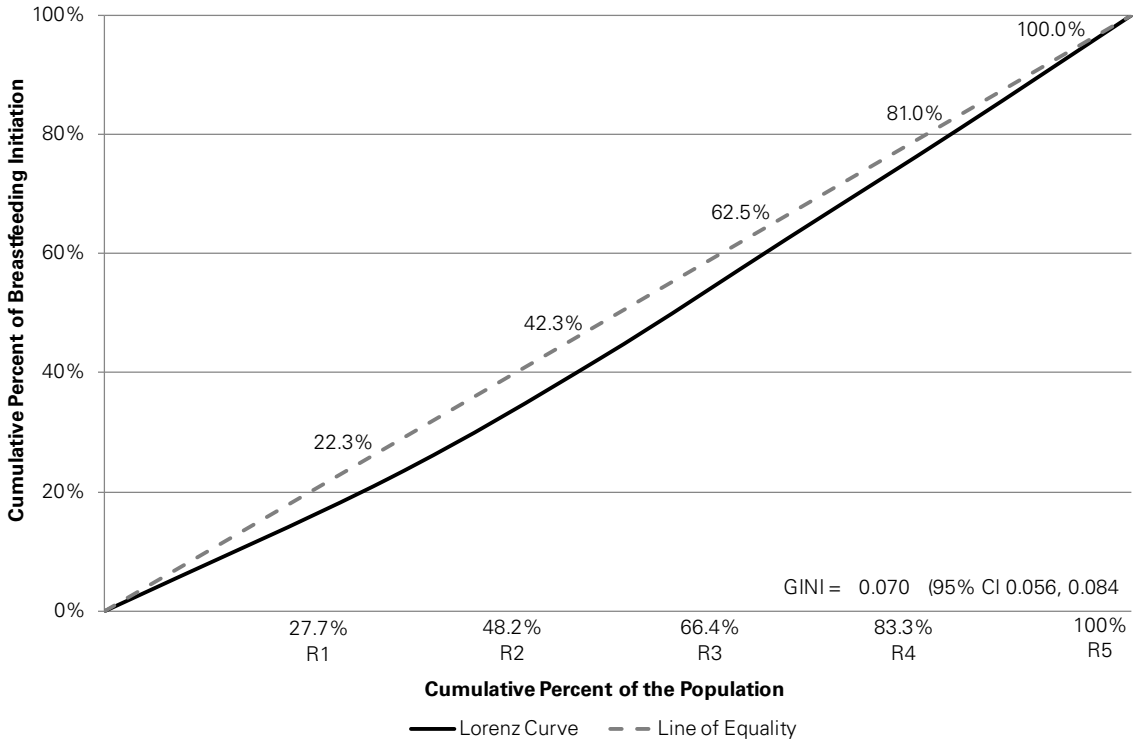
Adjusted by (2005/06-2007/08) maternal age, percent of newborns breastfed at hospital discharge



Source: Manitoba Centre for Health Policy, 2010

Figure 4.28: Adjusted Lorenz Curve for Breastfeeding Initiation Rates in Rural Areas, 2005/06-2007/08

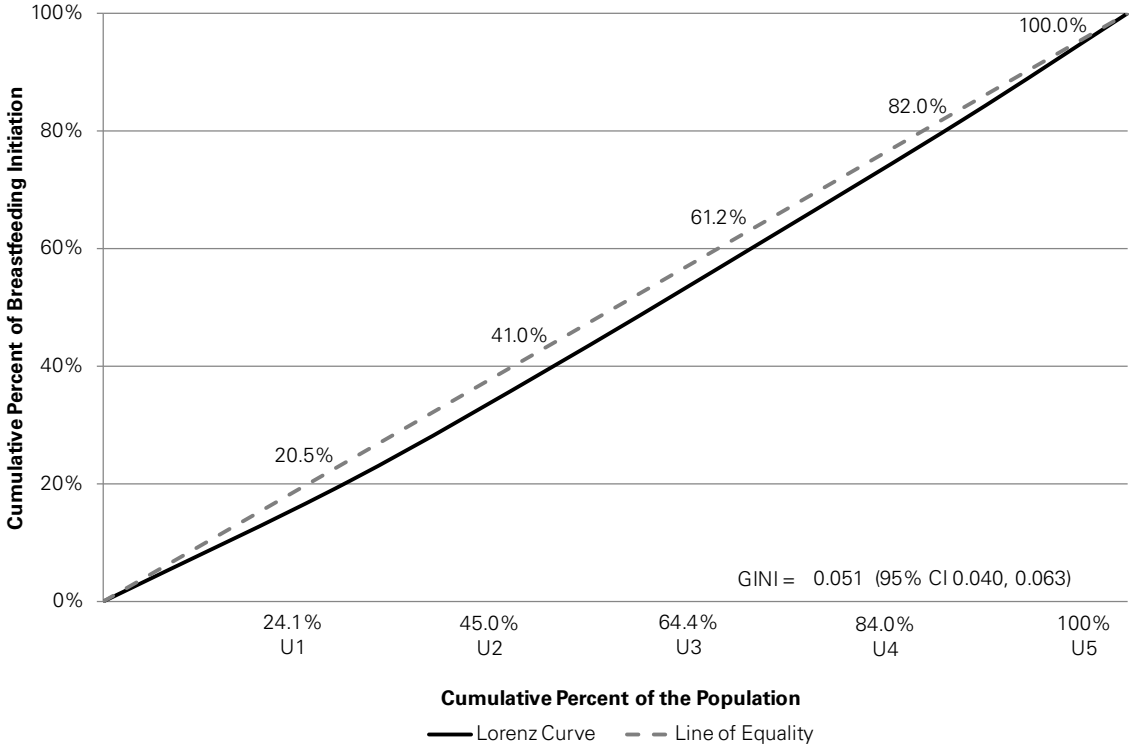
Adjusted by (2005/06-2007/08) maternal age, percent of newborns breastfed at hospital discharge



Source: Manitoba Centre for Health Policy, 2010

Figure 4.29: Adjusted Lorenz Curve for Breastfeeding Initiation Rates in Urban Areas, 1987/88-1989/90

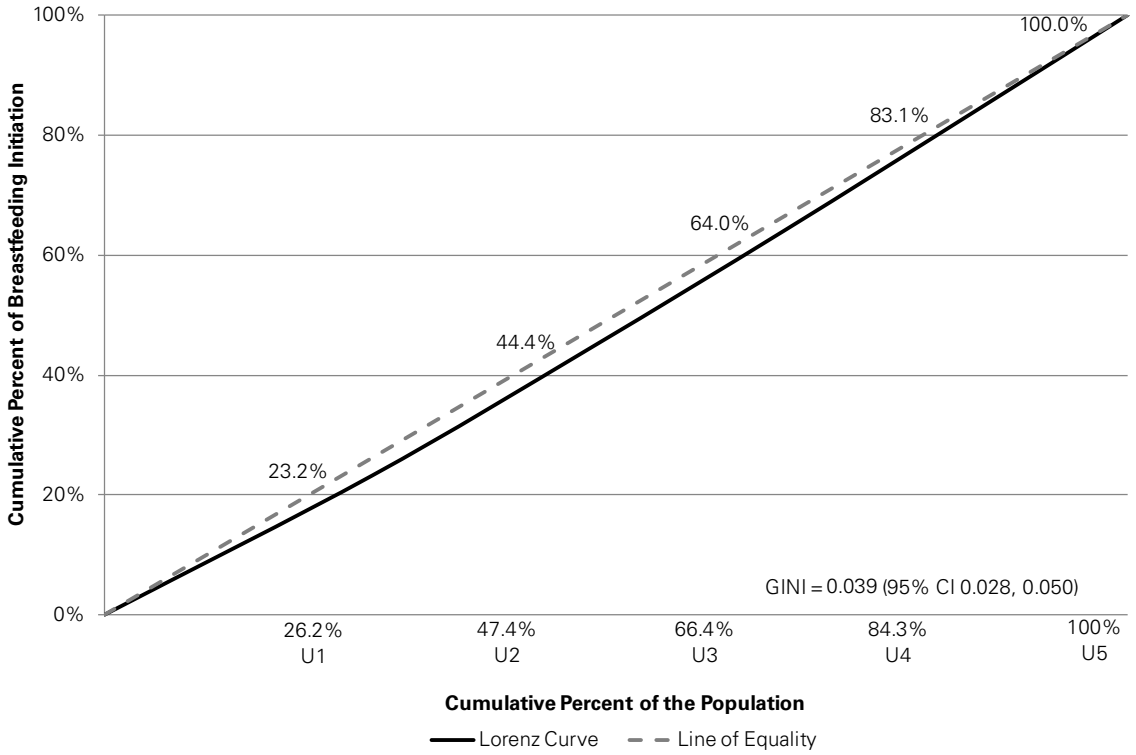
Adjusted by (2005/06-2007/08) maternal age, percent of newborns breastfed at hospital discharge



Source: Manitoba Centre for Health Policy, 2010

Figure 4.30: Adjusted Lorenz Curve for Breastfeeding Initiation Rates in Urban Areas, 2005/06-2007/08

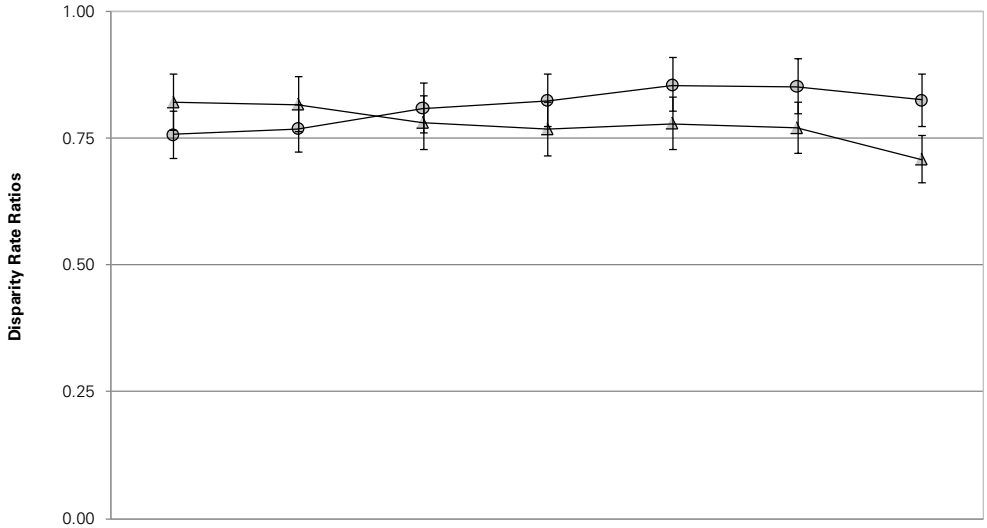
Adjusted by (2005/06-2007/08) maternal age, percent of newborns breastfed at hospital discharge



Source: Manitoba Centre for Health Policy, 2010

Figure 4.31: Breastfeeding Initiation Disparity Rate Ratios by Urban and Rural Income Quintile

Adjusted by (2005/06-2007/08) maternal age, percent of newborns breastfed at hospital discharge



	T1: 1987/88-1989/90	T2: 1990/91-1992/93	T3: 1993/94-1995/96	T4: 1996/97-1998/99	T5: 1999/00-2001/02	T6: 2002/03-2004/05	T7: 2005/06-2007/08
Rural Disparity Rate Ratios	0.82	0.82	0.78	0.77	0.78	0.77	0.71
Urban Disparity Rate Ratios	0.76	0.77	0.81	0.82	0.85	0.85	0.82

Time Period (fiscal years)

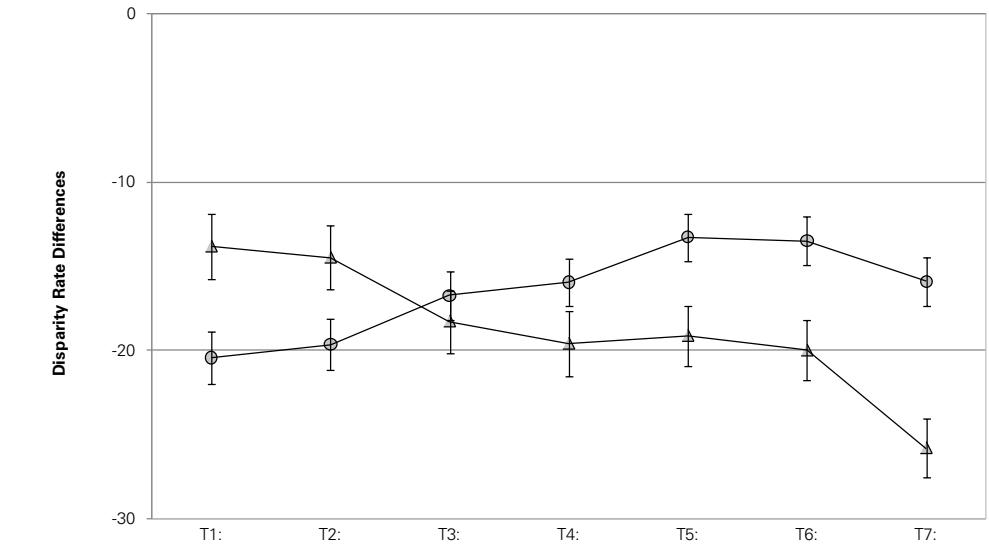
Urban Disparity Rate Ratios T7 to T1: 1.09 (95% CI 1.00, 1.19) p< .05

Rural Disparity Rate Ratios T7 to T1: 0.86 (95% CI 0.79, 0.95) p< .01

Source: Manitoba Centre for Health Policy, 2010

Figure 4.32: Breastfeeding Initiation Disparity Rate Differences by Urban and Rural Income Quintile

Adjusted by (2005/06-2007/08) maternal age, percent of newborns breastfed at hospital discharge



	T1: 1987/88-1989/90	T2: 1990/91-1992/93	T3: 1993/94-1995/96	T4: 1996/97-1998/99	T5: 1999/00-2001/02	T6: 2002/03-2004/05	T7: 2005/06-2007/08
Rural Disparity Rate Differences	-13.83	-14.48	-18.27	-19.59	-19.13	-19.99	-25.78
Urban Disparity Rate Differences	-20.44	-19.63	-16.74	-15.95	-13.27	-13.50	-15.91

Time Period (fiscal years)

Urban Disparity Rate Differences T7 to T1: 0.78, p< .001

Rural Disparity Rate Differences T7 to T1: 1.86, p< .001

Source: Manitoba Centre for Health Policy, 2010

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Chapter 5: Adult Health

Diabetes Prevalence

Definition

Diabetes mellitus is a chronic condition in which the pancreas no longer produces enough insulin (type 1 diabetes) or when cells stop responding to the insulin that is produced (type 2 diabetes), so that glucose in the blood cannot be absorbed into the cells of the body.

In this report, diabetes prevalence was calculated as the proportion of residents aged 19 and older diagnosed with diabetes in a three–year period, by at least two physician visits or one hospitalization with a diagnosis of diabetes (ICD–9–CM code 250; ICD–10–CA codes E10–E14). Because data on prescription medications is not available for all time periods in this analysis, prescription medication used to treat diabetes was not included in the calculation of diabetes prevalence. Note that gestational diabetes is not included.

Time Periods	Three–year period prevalence (%)
T1: 1984/85–1986/87	4.21
T2: 1987/88–1989/90	4.56
T3: 1990/91–1992/93	4.80
T4: 1993/94–1995/96	5.17
T5: 1996/97–1998/99	5.73
T6: 1999/00–2001/02	6.67
T7: 2002/03–2004/05	7.53
T8: 2005/06–2007/08	8.17

Key Findings: Diabetes Prevalence

Manitoba overall rates:

- From the first time period T1 (1984/85–1986/87) to the last time period T8 (2005/06–2007/08), the overall Manitoba diabetes prevalence for people aged 19 and older increased from 4.21% to 8.17%.

Rates by neighbourhood income quintile over time:
Rural:

- From T1 to T8, diabetes prevalence of all rural neighbourhood income quintile groups increased steadily; diabetes prevalence of the lowest rural neighbourhood income quintile R1 increased the most dramatically and has recently plateaued.
- The disparity between R1 and R5 increased substantially. The rate ratio of R1 compared to R5 was 1.67 in the first time period and 2.08 in the last time period, for a statistically significant increase of 25%. The absolute difference gap in diabetes prevalence comparing R1 to R5 also statistically significantly increased by 187% over time, from 2.54 more persons with diabetes per 100 residents in the first time period (T1) to 7.29 more persons with diabetes per 100 residents in the last time period (T8).

Urban:

- From T1 to T8, diabetes prevalence of all urban neighbourhood income quintile groups increased steadily and seemingly at similar rates over time. There was a much more rapid increase (i.e., steeper slope) from the mid–1990s to the present in all urban neighbourhood income quintile groups compared to the previous decade, where there was a slower increase (i.e., a more gradual slope).

- The disparity between U1 and U5 increased, albeit not substantially. The rate ratio of U1 compared to U5 was 1.54 in the first time period and 1.85 in the last time period, for a statistically significant increase of 20%. The absolute difference gap in diabetes prevalence comparing U1 to U5 also statistically significantly increased by 173% over time, from 1.75 more persons with diabetes per 100 residents in the first time period (1984/85–1986/87) to 4.76 more persons with diabetes per 100 residents in the last time period (2005/06–2007/08).

Lorenz Curves:

Rural over time:

- In T1, 26.3% of persons with diabetes were accounted for in the 18.9% of the population in the lowest neighbourhood income quintile group R1, with the Gini coefficient of 0.097 indicating a statistically significant disparity.

- In T8, 28.8% of persons with diabetes were accounted for in the 18.2% of the population in the lowest neighbourhood income quintile group R1, with the Gini coefficient of 0.143 indicating a statistically significant disparity.

- The Gini coefficient increased from the first to the last time period ($p<.0001$), showing a statistically significant increase in inequality over that time period.

Urban over time:

- In 1984/85–1986/87, 25.9% of persons with diabetes were accounted for in the 20.4% of the population in the lowest neighbourhood income quintile group U1, with the Gini coefficient of 0.092 indicating a statistically significant disparity.

- In 2005/06–2007/08, 27.4% of persons with diabetes were accounted for in the 20.2% of the population in the lowest neighbourhood income quintile group U1, with the Gini coefficient of 0.119 indicating a statistically significant disparity.

- The Gini coefficient increased from the first to the last time period ($p<.0007$), showing a statistically significant increase in inequality over that time period.

Rural compared to urban in most recent time period:

- In the most recent time period T8, there is a statistically significantly higher Gini coefficient in rural compared to urban (0.143 vs. 0.199, $p<.0002$), indicating a higher level of inequality in rural Manitoba for diabetes.

Disparity measures over time by rural and urban:

- The disparity rate ratios (i.e., the ratio of the diabetes prevalence in the lowest compared to the highest neighbourhood income group) are increasing over time for both rural and urban Manitoba. Although the ratios appear to be similar or slightly higher in rural, indicative of a larger rate ratio compared to urban, these are not statistically significantly different between urban and rural. Both rural and urban rate ratios (DRRs) appear to have plateaued after the mid–1990s.

- The disparity rate differences (i.e., the absolute difference of diabetes prevalence between the lowest and highest neighbourhood income group) are increasing over time. However, the absolute differences are consistently statistically significantly higher in rural, indicating a larger rate difference between lowest and highest neighbourhood income groups in rural Manitoba. The rate difference differences may be plateauing in both rural and urban neighbourhood income groups since the late 1990s.

What is this telling us?

- The socioeconomic gap in diabetes prevalence is widening over time for both rural and urban Manitobans.
- By all measures, the socioeconomic gap is larger in rural than in urban Manitoba.
- All neighbourhood income groups in both rural and urban Manitoba show increasing diabetes prevalence over time.
- The largest socioeconomic gap in diabetes prevalence is seen in the time period T6 (1999/00–2001/02) for rural Manitoba, where 31.8% of the diabetes is experienced by the lowest rural neighbourhood income group representing 18.0% of the rural population[3], and the Gini coefficient is 0.161.

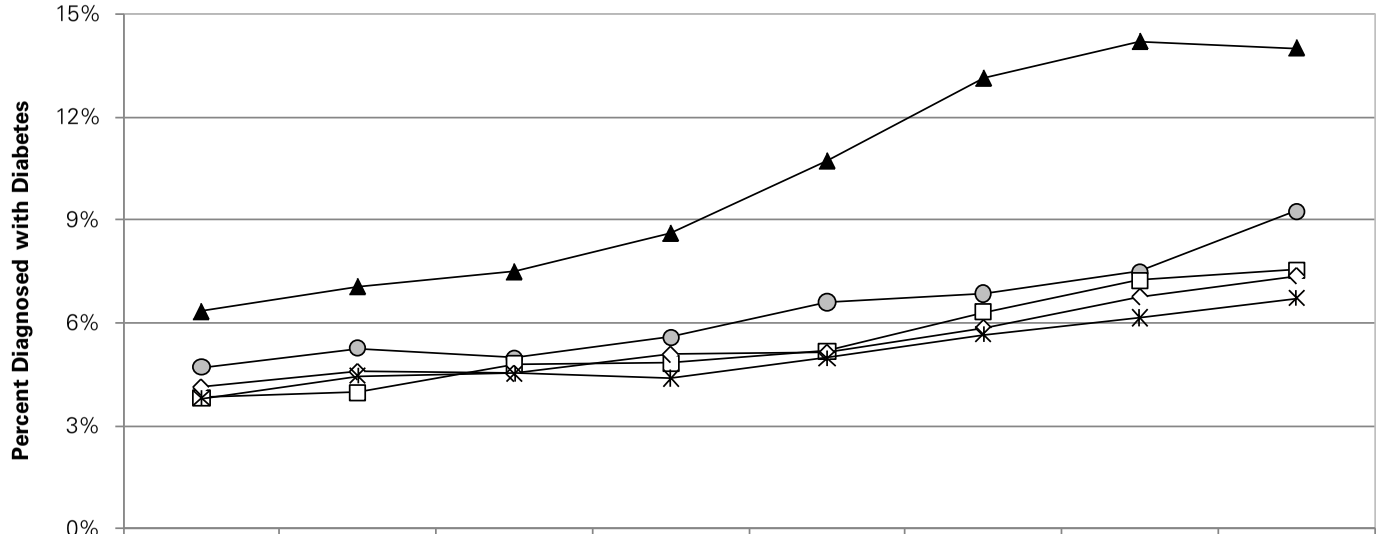
Where to from here?

- Although diabetes disparity exists, the Lorenz curves are not as steeply bent as would be expected given the high profile of diabetes in the lower socioeconomic groups in Manitoba. So although targeted interventions should occur for the lowest neighbourhood income quintile groups, universal approaches need to reduce the burden of diabetes throughout the entire population.
- In both rural and urban neighbourhood income quintiles, the slope of increase becomes larger around T4 (the mid–1990s). This may reflect better surveillance to detect diabetes in the population, given greater incidence rates. As well, possibly greater longevity of people with diabetes due to improved treatment would also increase prevalence due to decreased mortality.
- Diabetes prevalence has almost doubled in rural and urban Manitoba in 20 years and the prevalence rates are higher in rural Manitoba. However, the largest rate difference between lowest and highest neighbourhood income group is in rural Manitoba suggesting a need for targeted programs to prevent diabetes in the R1 group especially.

3 Although Gini coefficient and Lorenz curve data are only given for the first and last time periods in this report, these data are available on the MCHP website for all time periods (go to the MCHP website, then to Publications, then to this report, then to Data Extras for all the Excel spreadsheet data).

Figure 5.1: Diabetes Prevalence Over Time by Rural Income Quintile

Adjusted by (2005/06-2007/08) age & sex, percent of residents aged 19+



	T1: 1984/85-1986/87	T2: 1987/88-1989/90	T3: 1990/91-1992/93	T4: 1993/94-1995/96	T5: 1996/97-1998/99	T6: 1999/00-2001/02	T7: 2002/03-2004/05	T8: 2005/06-2007/08
NF (Not displayed)	5.58	5.54	6.26	7.15	6.39	8.87	10.44	11.24
R1 (lowest income)	6.34	7.07	7.50	8.62	10.72	13.13	14.20	14.01
R2	4.71	5.26	4.98	5.58	6.60	6.85	7.48	9.24
R3	3.82	3.96	4.78	4.83	5.18	6.31	7.23	7.54
R4	4.14	4.59	4.54	5.09	5.14	5.86	6.76	7.36
R5 (highest income)	3.80	4.46	4.52	4.39	4.97	5.66	6.14	6.72
Disparity Rate Ratios (R1/R5)	1.67	1.59	1.66	1.96	2.16	2.32	2.31	2.08
Disparity Rate Differences (R1-R5)	2.54	2.61	2.98	4.23	5.75	7.47	8.06	7.29

Time Period (fiscal years)

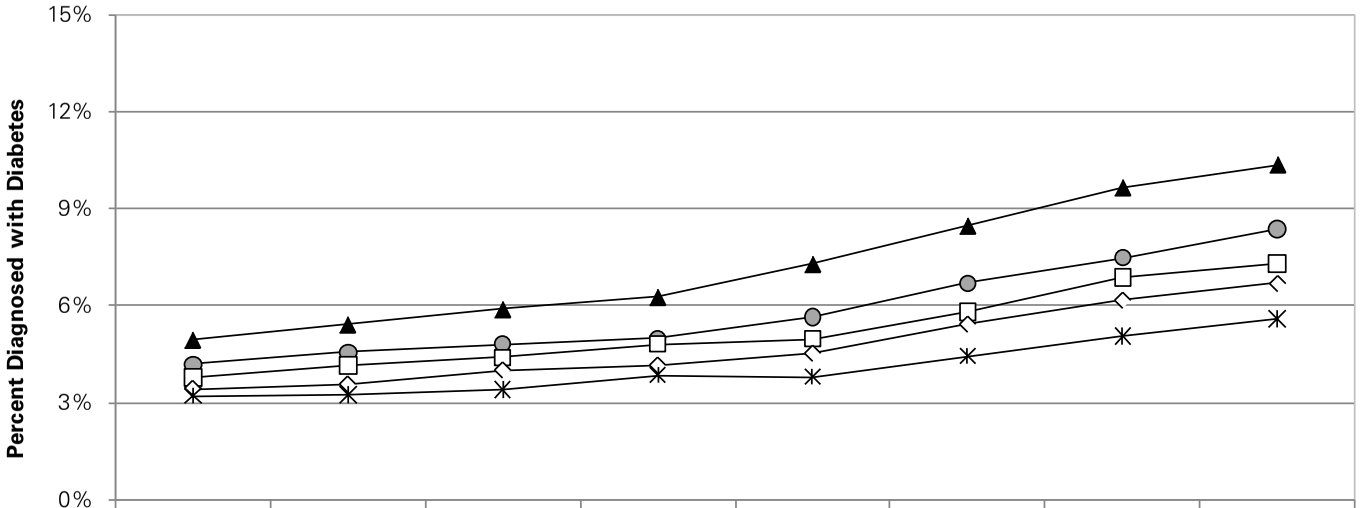
Comparison of Disparity Rate Ratios T8 to T1:1.25 (95% CI 1.08 ,1.44) p< .01

Comparison of Disparity Rate Differences T8 to T1: 2.87, p<.001

Source: Manitoba Centre for Health Policy, 2010

Figure 5.2: Diabetes Prevalence Over Time by Urban Income Quintile

Adjusted by (2005/06-2007/08) age & sex, percent of residents aged 19+



	T1: 1984/85-1986/87	T2: 1987/88-1989/90	T3: 1990/91-1992/93	T4: 1993/94-1995/96	T5: 1996/97-1998/99	T6: 1999/00-2001/02	T7: 2002/03-2004/05	T8: 2005/06-2007/08
NF (Not displayed)	5.58	5.54	6.26	7.15	6.39	8.87	10.44	11.24
U1 (lowest income)	4.95	5.42	5.89	6.27	7.29	8.47	9.65	10.36
U2	4.19	4.56	4.80	4.99	5.64	6.69	7.48	8.36
U3	3.78	4.15	4.40	4.80	4.97	5.81	6.86	7.29
U4	3.43	3.56	4.00	4.15	4.52	5.43	6.18	6.70
U5 (highest income)	3.21	3.24	3.40	3.84	3.80	4.44	5.06	5.59
Disparity Rate Ratios (U1/U5)	1.54	1.67	1.73	1.63	1.92	1.91	1.91	1.85
Disparity Rate Differences (U1-U5)	1.75	2.18	2.49	2.43	3.49	4.03	4.59	4.76

Time Period (fiscal years)

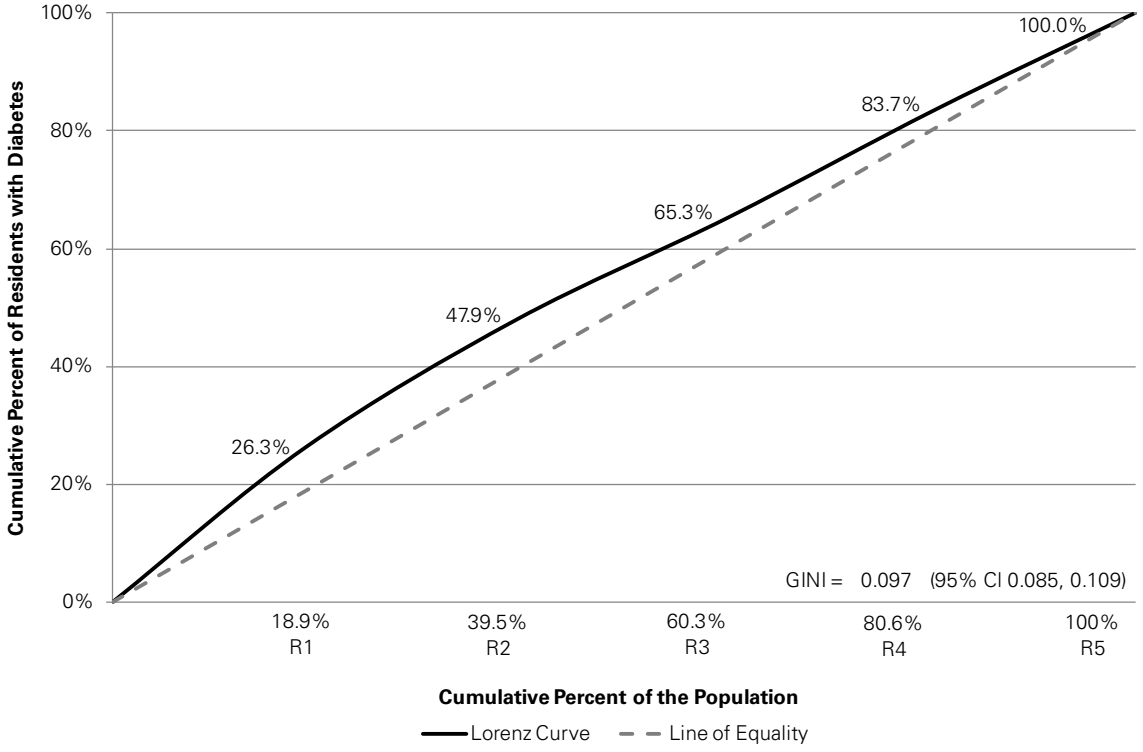
Comparison of Disparity Rate Ratios T8 to T1:1.20 (95% CI 1.04 , 1.38) p< .05

Comparison of Disparity Rate Differences T8 to T1: 2.73, p<.001

Source: Manitoba Centre for Health Policy, 2010

Figure 5.3: Adjusted Lorenz Curve for Diabetes in Rural Areas 1984/85-1986/87

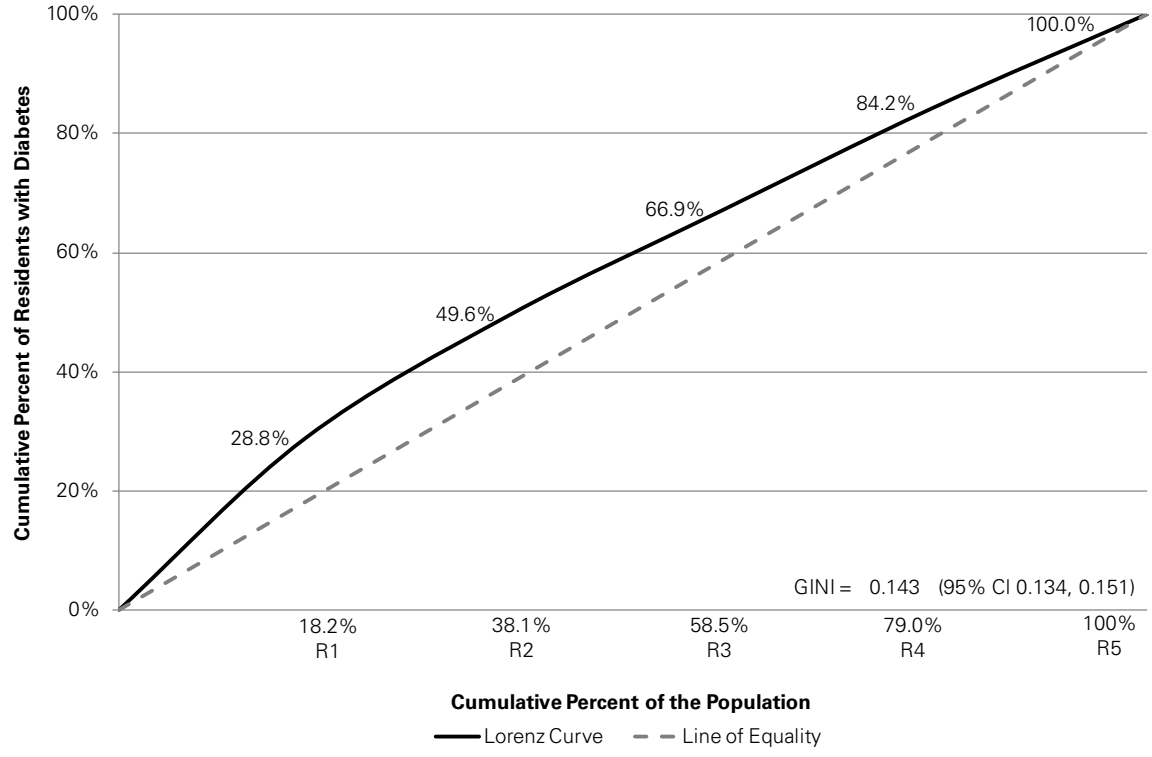
Adjusted by (2005/06-2007/08) age & sex, percent of residents aged 19+



Source: Manitoba Centre for Health Policy, 2010

Figure 5.4: Adjusted Lorenz Curve for Diabetes in Rural Areas 2005/06-2007/08

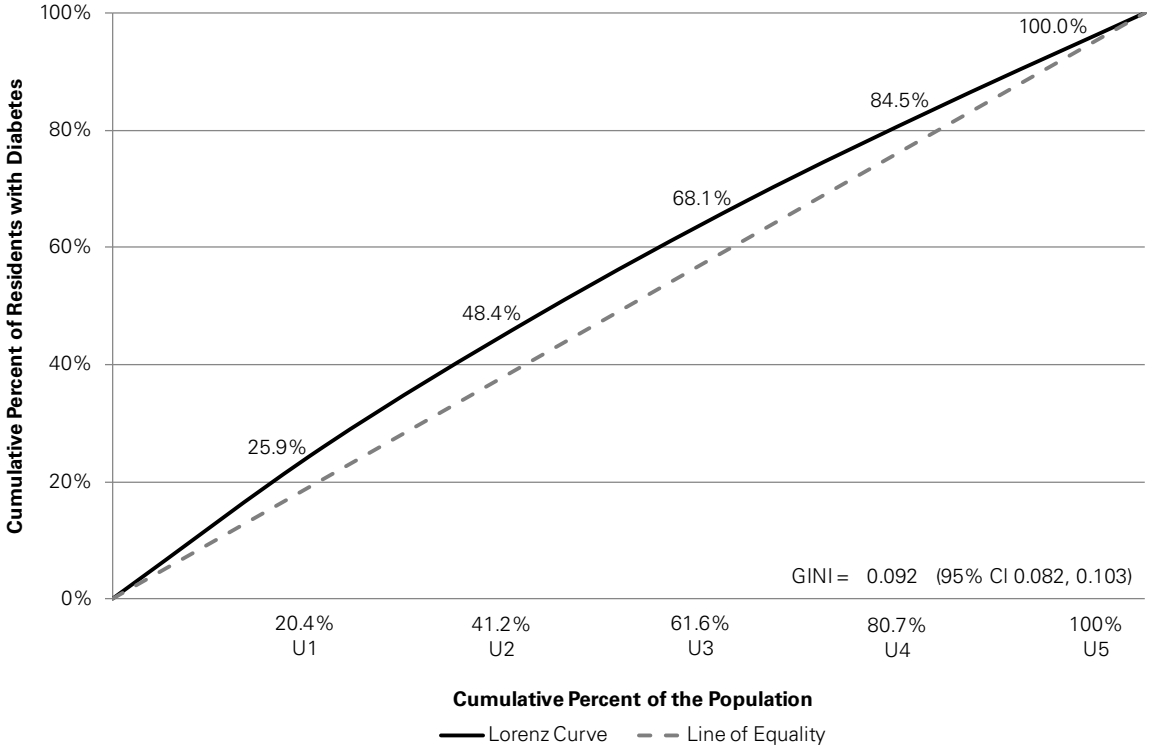
Adjusted by (2005/06-2007/08) age & sex, percent of residents aged 19+



Source: Manitoba Centre for Health Policy, 2010

Figure 5.5: Adjusted Lorenz Curve for Diabetes in Urban Areas 1984/85-1986/87

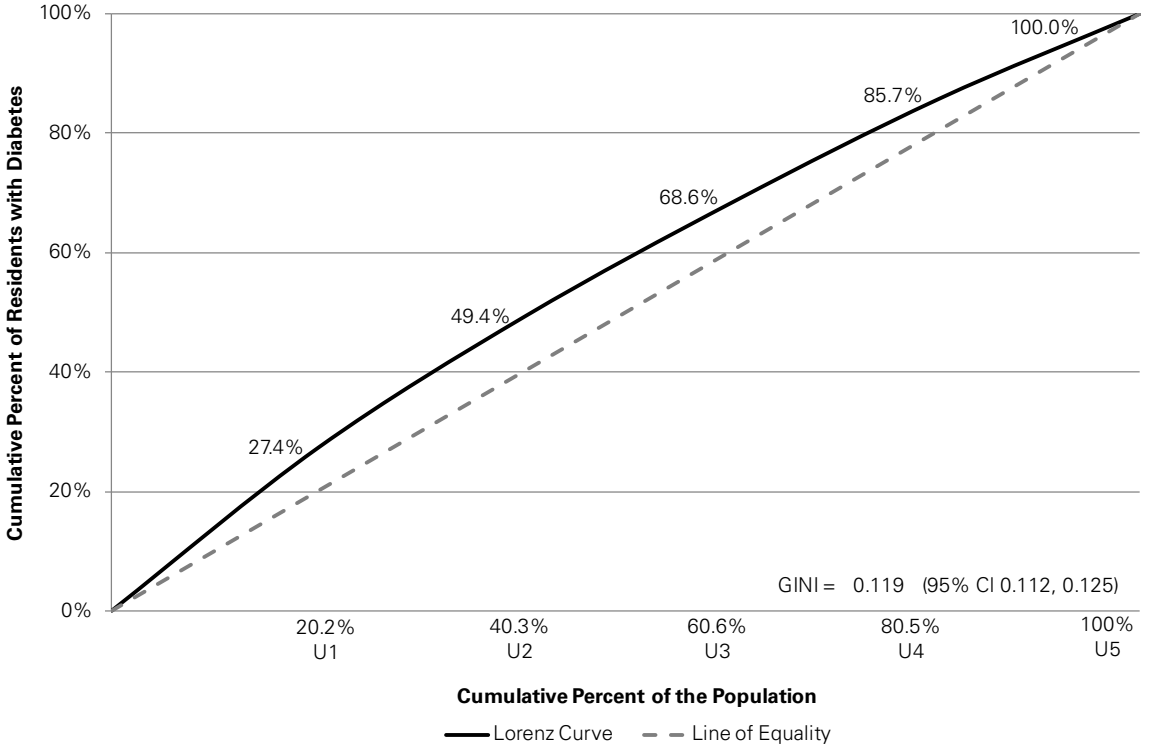
Adjusted by (2005/06-2007/08) age & sex, percent of residents aged 19+



Source: Manitoba Centre for Health Policy, 2010

Figure 5.6: Adjusted Lorenz Curve for Diabetes in Urban Areas 2005/06-2007/08

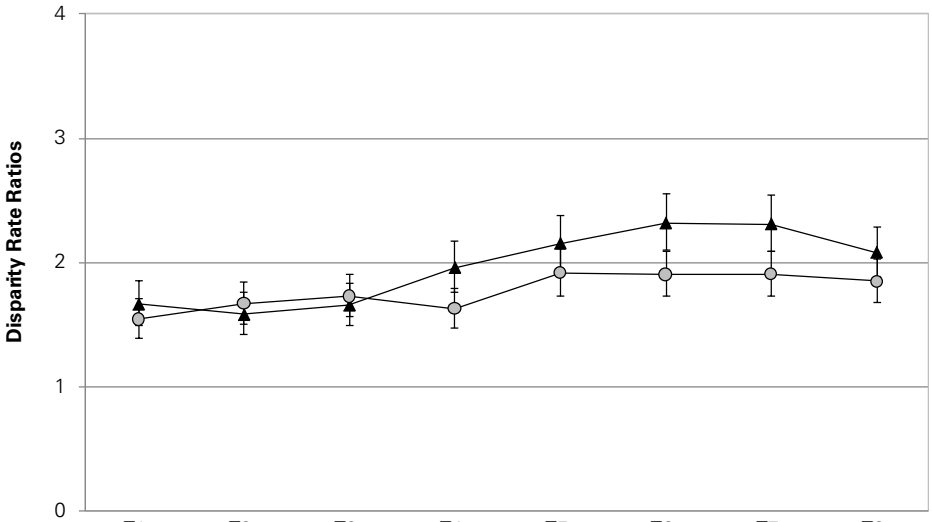
Adjusted by (2005/06-2007/08) age & sex, percent of residents aged 19+



Source: Manitoba Centre for Health Policy, 2010

Figure 5.7: Diabetes Disparity Rate Ratios by Urban and Rural Income Quintile

Adjusted by (2005/06-2007/08) age & sex, percent of residents aged 19+



	T1: 1984/85-1986/87	T2: 1987/88-1989/90	T3: 1990/91-1992/93	T4: 1993/94-1995/96	T5: 1996/97-1998/99	T6: 1999/00-2001/02	T7: 2002/03-2004/05	T8: 2005/06-2007/08
Rural Disparity Rate Ratios	1.67	1.59	1.66	1.96	2.16	2.32	2.31	2.08
Urban Disparity Rate Ratios	1.54	1.67	1.73	1.63	1.92	1.91	1.91	1.85

Time Period (fiscal years)

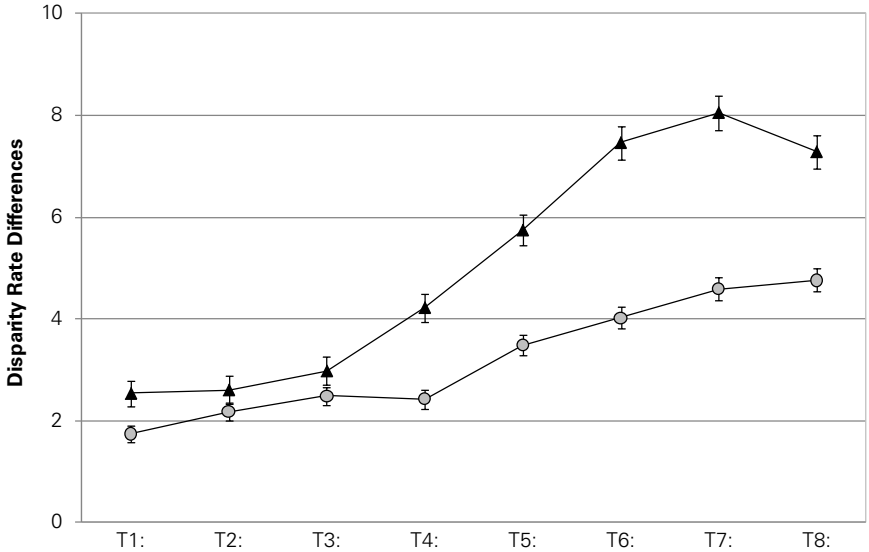
Urban Disparity Rate Ratios T8 to T1: 1.20 (95% CI 1.04 , 1.38) p< .001

Rural Disparity Rate Ratios T8 to T1: 1.25 (95% CI 1.08 , 1.44) p< .001

Source: Manitoba Centre for Health Policy, 2010

Figure 5.8: Diabetes Disparity Rate Differences by Urban and Rural Income Quintile

Adjusted by (2005/06-2007/08) age & sex, percent of residents aged 19+



	T1: 1984/85-1986/87	T2: 1987/88-1989/90	T3: 1990/91-1992/93	T4: 1993/94-1995/96	T5: 1996/97-1998/99	T6: 1999/00-2001/02	T7: 2002/03-2004/05	T8: 2005/06-2007/08
Rural Disparity Rate Differences	2.54	2.61	2.98	4.23	5.75	7.47	8.06	7.29
Urban Disparity Rate Differences	1.75	2.18	2.49	2.43	3.49	4.03	4.59	4.76

Time Period (fiscal years)

Urban Disparity Rate Differences T8 to T1: 2.73, p<.001

Rural Disparity Rate Differences T8 to T1: 2.87, p<.001

Source: Manitoba Centre for Health Policy, 2010

Amputations Among People with Diabetes

Definition

Prevalence of amputation was calculated for people with diabetes (aged 19 and older) who had a lower limb amputation (below or including the knee) in a three–year period. See the previous indicator for the definition of diabetes. Amputation was defined by ICD–9–CM procedure codes 84.1–84.17 (ICD–10–CCI codes: 1.VC.93, 1.VG.93, 1.VQ.93, 1.WA.93, 1.WE.93, 1.WJ.93, 1.WL.93, 1.WM.93) in any procedure field. Amputations associated with accidental injury were excluded (see below for codes).

Average annual rates of amputation per 1,000 residents with diabetes were calculated for eight three–year periods, the first time period T1 being 1984/85–1986/87 to the last time period T8 being 2005/06–2007/08. Rates were age– and sex–adjusted to the Manitoba population age 19 and older in the last time period. Exclusions for accidental injury included ICD–9–CM diagnosis codes 895, 896, 897 or ICD–10–CA codes S78, S88, S98, T05.3, T05.4, T05.5, T13.6.

Time Periods	Average annual rate per 1,000 people with diabetes
T1: 1984/85–1986/87	15.37
T2: 1987/88–1989/90	14.83
T3: 1990/91–1992/93	14.52
T4: 1993/94–1995/96	16.78
T5: 1996/97–1998/99	16.55
T6: 1999/00–2001/02	14.12
T7: 2002/03–2004/05	12.61
T8: 2005/06–2007/08	11.58

Key Findings: Amputations Among People With Diabetes

Manitoba overall rates:

- From the first time period T1 (1984/85–1986/87) to the last time period T8 (2005/06–2007/08), people with diabetes (aged 19 and older who had a lower limb amputation in a three–year period decreased from 15.37 to 11.58 per 1,000. However, amputation rates first increased to the mid–1990s (up to 16.78 in the mid–1990s), and then decreased to T8.

Rates by neighbourhood income quintile over time:

Rural:

- Comparing only T1 to T8, the rate of amputations among rural residents with diabetes remained similar in most rural quintiles. However, rates in R1 increased substantially to the mid–1990s and then decreased again.

- The disparity between R1 and R5 remained similar between the first time period and the last time period. The rate ratio of R1 compared to R5 was 2.00 in the first time period and 3.38 in the last time period, however this was not a statistically significantly increase. The absolute difference gap in **amputations among residents with diabetes** comparing R1 to R5 was 13.85 more amputations per 1,000 people with diabetes in T1 and 18.32 more per 1,000 in T8 and these gaps over time were not statistically significantly different (i.e., they are considered similar).

Urban:

- From T1 to T8, rates of amputations among residents with diabetes of all urban neighbourhood income quintile groups remained relatively stable over time.
- The disparity between U1 and U5 remained similar between the first time period T1 and the last time period T8. The rate ratio of U1 compared to U5 was 2.53 in the first time period and 2.77 in the last time period; these are not statistically significantly different. The absolute difference gap in amputations among residents with diabetes comparing U1 to U5 also did not statistically change; 11.26 per 1,000 more amputations in U1 compared to U5 in the first time period and 9.92 more per 1,000 in the last time period.

Lorenz Curves:

Rural over time:

- In T1, 40.2% of amputations in residents with diabetes were accounted for in the 25.4% of the rural population in the lowest neighbourhood income quintile group (R1), with the Gini coefficient of 0.138 indicating a statistically significant disparity.
- In T8, 45.9% of amputations in residents with diabetes were accounted for in the 26.2% of the population in the lowest neighbourhood income quintile group (R1), with the Gini coefficient of 0.255 indicating a statistically significant disparity.
- The Gini coefficient for rural areas showed a statistically significant increase from .138 to .255 ($p<.02$) from T1 to T8, so inequality increased.

Urban over time:

- In T1, 39.2% of amputations in residents with diabetes were accounted for in the 27.1% of the urban population in the lowest neighbourhood income quintile group (U1), with the Gini coefficient of 0.170 indicating a statistically significant disparity.
- In T8, 44.9% of amputations in residents with diabetes were accounted for in the 26.0% of the urban population in the lowest neighbourhood income quintile group (U1), with the Gini coefficient of 0.211 indicating a statistically significant disparity.
- The Gini coefficient for urban areas were not statistically significantly different from the first to the last time period ($p=.58$, NS), indicating that disparity remained similar from T1 to T8.

Rural compared to urban in most recent time period:

- In the most recent time period T8, there is no statistically significant difference between the rural and urban Gini coefficients ($p=0.48$), so the disparity in rural and urban areas is similar.

Disparity measures over time by rural and urban:

- The disparity rate ratios (i.e., the ratio of the amputations among residents with diabetes in the lowest compared to the highest neighbourhood income group) are not increasing or decreasing over time for both rural and urban Manitoba. However, the rates are consistently about double between lowest and highest neighbourhood income groups in both rural and urban Manitoba.
- The disparity rate differences (i.e., the absolute difference of amputations among residents with diabetes between the lowest and highest neighbourhood income group) are not changing significantly over time.

What is this telling us?

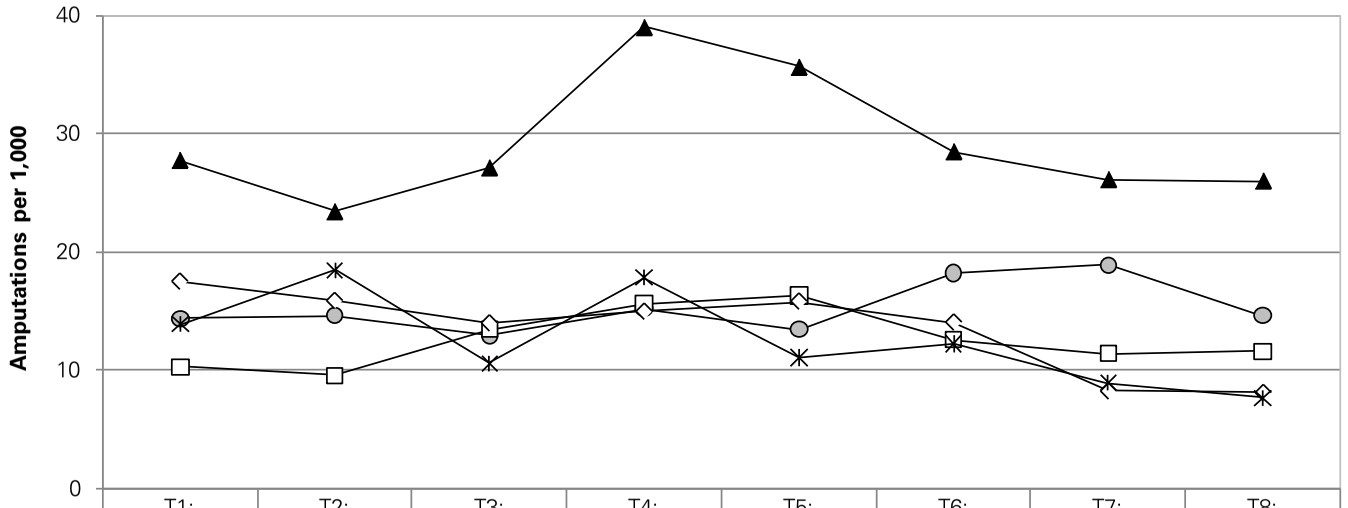
- The socioeconomic gap in amputations among residents with diabetes is not widening over time, according to most measures. There is the exception of the Gini coefficients, which indicate increasing disparity in the urban neighbourhood income quintile groups over time.
- The rate ratio in amputation rates by neighbourhood income quintile groups is similar in rural and urban and over time. However, the rate difference is much greater in rural neighbourhood income quintiles.
- Most neighbourhood income groups in both rural and urban Manitoba show similar or decreasing amputation rates among residents with diabetes over time. The R1 pattern, however, show substantial and rapid increase to the mid–1990s and decrease thereafter to the last time period.
- The largest socioeconomic gap in amputations among residents with diabetes is seen in the most recent time period 2005–2008 for both urban and rural Manitoba, where almost over 44% of amputations in residents with diabetes are experienced by the lowest neighbourhood income group representing 26% of both rural and urban populations.

Where to from here?

- Amputation rates among residents with diabetes have remained similar or have decreased in rural and urban Manitoba over time. People with diabetes who are in the lowest neighbourhood income quintile in both rural and urban areas experience an inordinate burden for amputation, indicating the need for continued surveillance and targeted diabetes care to prevent adverse outcomes of diabetes.

Figure 5.9: Amputations Among Residents with Diabetes Over Time by Rural Income Quintile

Adjusted by (2005/06-2007/08) age & sex, annual rate per 1,000 residents with diabetes (aged 19+) who had an amputation



	T1: 1984/85-1986/87	T2: 1987/88-1989/90	T3: 1990/91-1992/93	T4: 1993/94-1995/96	T5: 1996/97-1998/99	T6: 1999/00-2001/02	T7: 2002/03-2004/05	T8: 2005/06-2007/08
NF (Not displayed)	42.29	31.44	26.36	32.62	24.71	26.29	27.82	20.12
R1 (lowest income)	27.76	23.40	27.12	39.02	35.65	28.49	26.12	26.01
R2	14.39	14.60	12.92	15.19	13.47	18.23	18.87	14.60
R3	10.27	9.54	13.45	15.65	16.34	12.60	11.44	11.63
R4	17.47	15.86	13.99	14.96	15.81	14.06	8.31	8.17
R5 (highest income)	13.90	18.43	10.57	17.83	11.07	12.22	8.93	7.69
Disparity Rate Ratios (R1/R5)	2.00	1.27	2.56	2.19	3.22	2.33	2.93	3.38
Disparity Rate Differences (R1-R5)	13.85	4.96	16.55	21.19	24.58	16.27	17.19	18.32

Time Period (fiscal years)

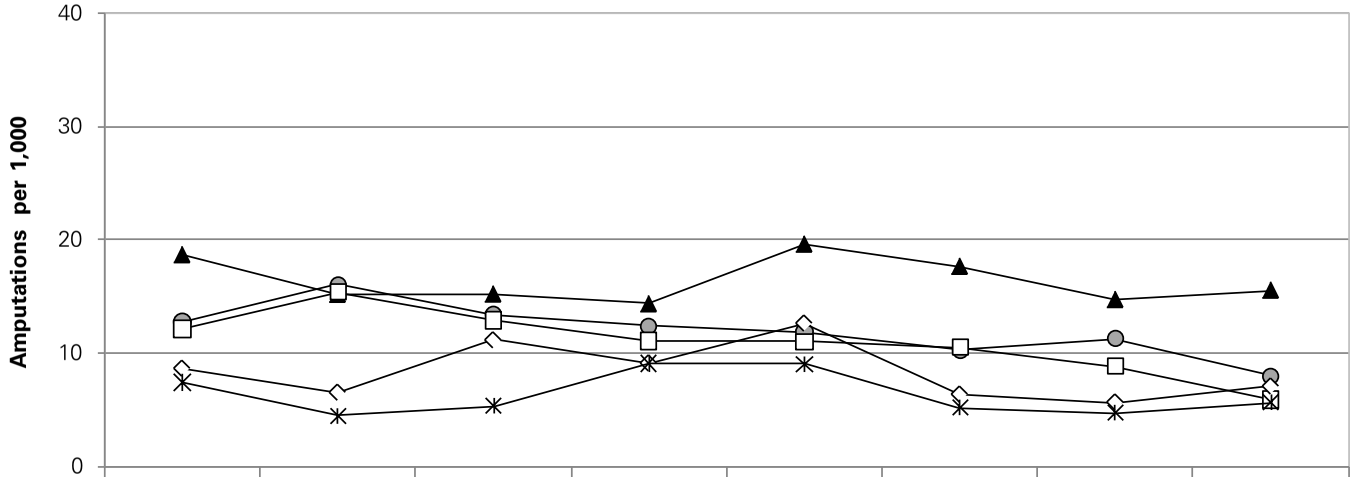
Comparison of Disparity Rate Ratios T8 to T1: 1.69 (95% CI 0.89, 3.22), NS

Comparison of Disparity Rate Differences T8 to T1: 1.32, NS

Source: Manitoba Centre for Health Policy, 2010

Figure 5.10: Amputations Among Residents with Diabetes Over Time by Urban Income Quintile

Adjusted by (2005/06-2007/08) age & sex, annual rate per 1,000 residents with diabetes (aged 19+) who had an amputation



	T1: 1984/85-1986/87	T2: 1987/88-1989/90	T3: 1990/91-1992/93	T4: 1993/94-1995/96	T5: 1996/97-1998/99	T6: 1999/00-2001/02	T7: 2002/03-2004/05	T8: 2005/06-2007/08
NF (Not displayed)	42.29	31.44	26.36	32.62	24.71	26.29	27.82	20.12
U1 (lowest income)	18.64	15.17	15.19	14.34	19.56	17.62	14.71	15.53
U2	12.74	16.01	13.40	12.35	11.86	10.26	11.27	7.93
U3	12.13	15.38	12.89	11.04	11.01	10.47	8.82	5.87
U4	8.61	6.47	11.14	9.09	12.64	6.31	5.60	7.03
U5 (highest income)	7.37	4.42	5.29	9.04	9.01	5.17	4.70	5.61
Disparity Rate Ratios (U1/U5)	2.53	3.43	2.87	1.59	2.17	3.41	3.13	2.77
Disparity Rate Differences (U1-U5)	11.26	10.74	9.90	5.30	10.55	12.45	10.01	9.92

Time Period (fiscal years)

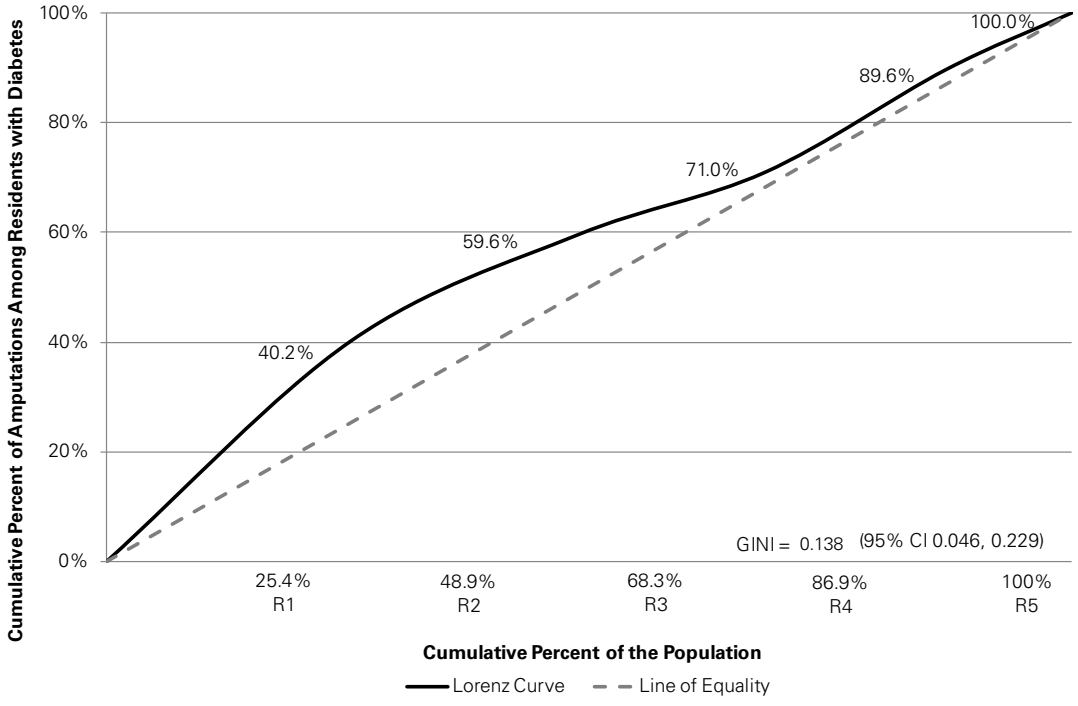
Comparison of Disparity Rate Ratios T8 to T1: 1.10 (95% CI 0.56 , 2.15) NS

Comparison of Disparity Rate Differences T8 to T1: 0.88 , NS

Source: Manitoba Centre for Health Policy, 2010

Figure 5.11: Adjusted Lorenz Curve for Amputations Among Residents with Diabetes in Rural Areas 1984/85-1986/87

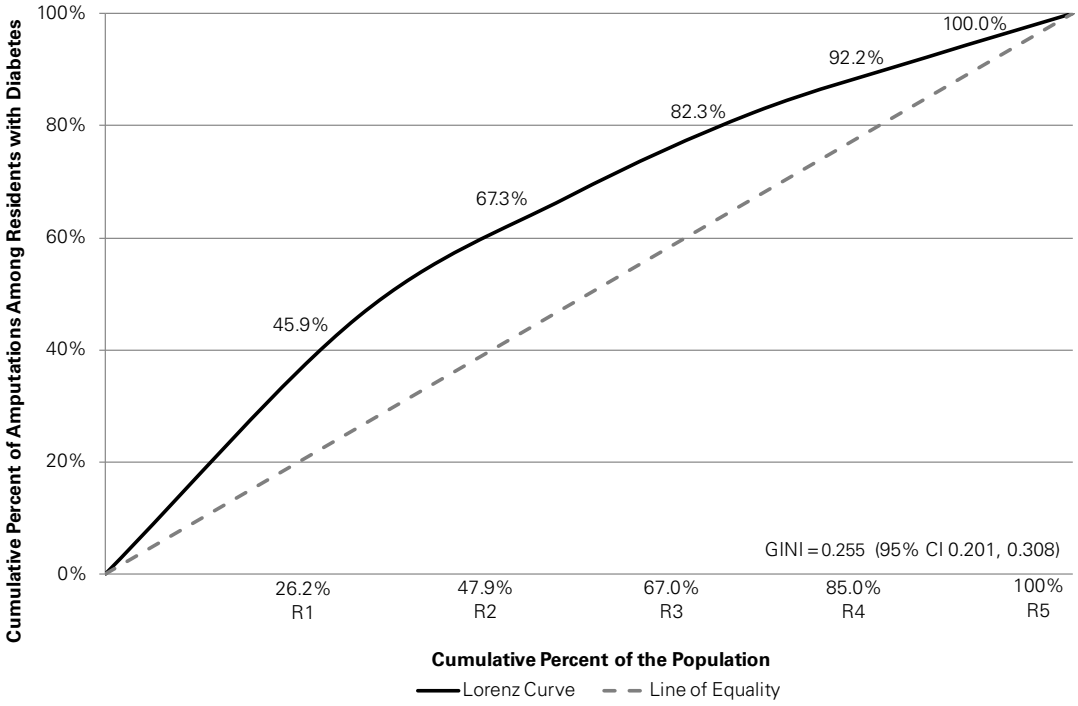
Adjusted by (2005/06-2007/08) age & sex, residents with diabetes (aged 19+) who had an amputation



Source: Manitoba Centre for Health Policy, 2010

Figure 5.12: Adjusted Lorenz Curve for Amputations Among Residents with Diabetes in Rural Areas 2005/06-2007/08

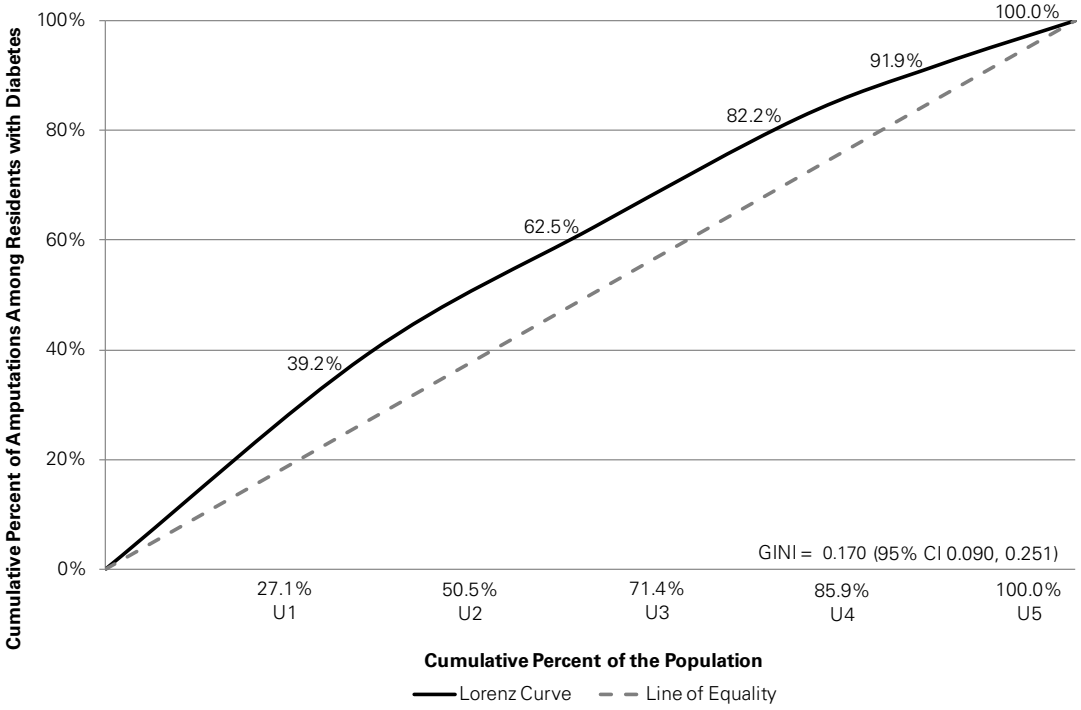
Adjusted by (2005/06-2007/08) age & sex, residents with diabetes (aged 19+) who had an amputation



Source: Manitoba Centre for Health Policy, 2010

Figure 5.13: Adjusted Lorenz Curve for Amputations Among Residents with Diabetes in Urban Areas 1984/85-1986/87

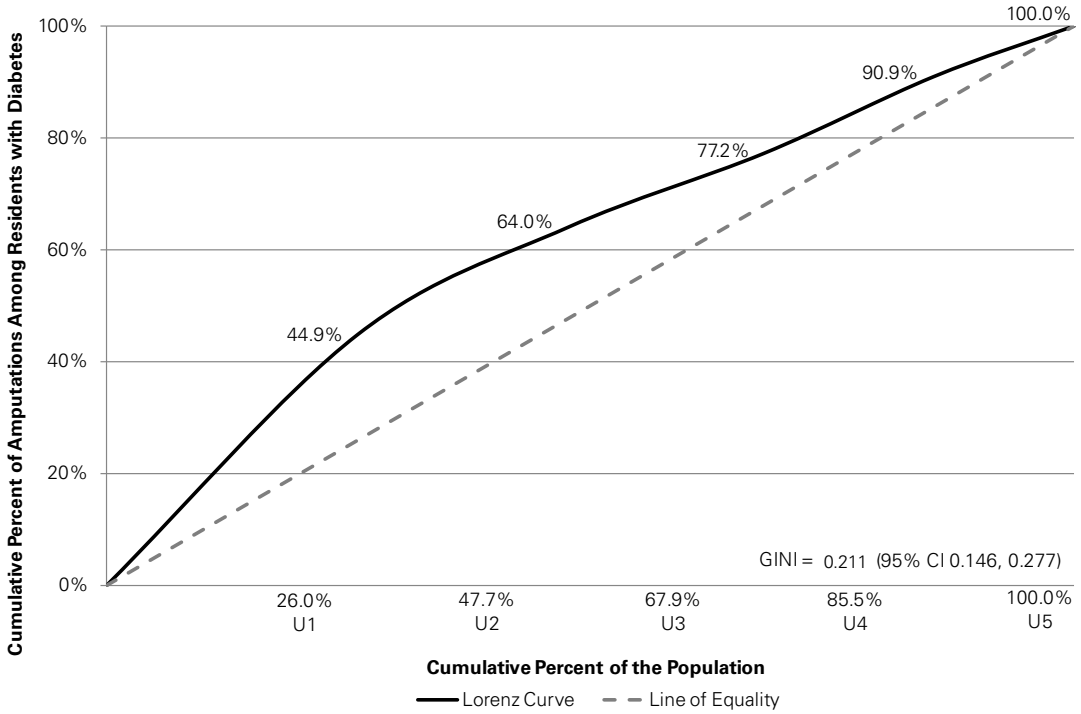
Adjusted by (2005/06-2007/08) age & sex, residents with diabetes (aged 19+) who had an amputation



Source: Manitoba Centre for Health Policy, 2010

Figure 5.14: Adjusted Lorenz Curve for Amputations Among Residents with Diabetes in Urban Areas 2005/06-2007/08

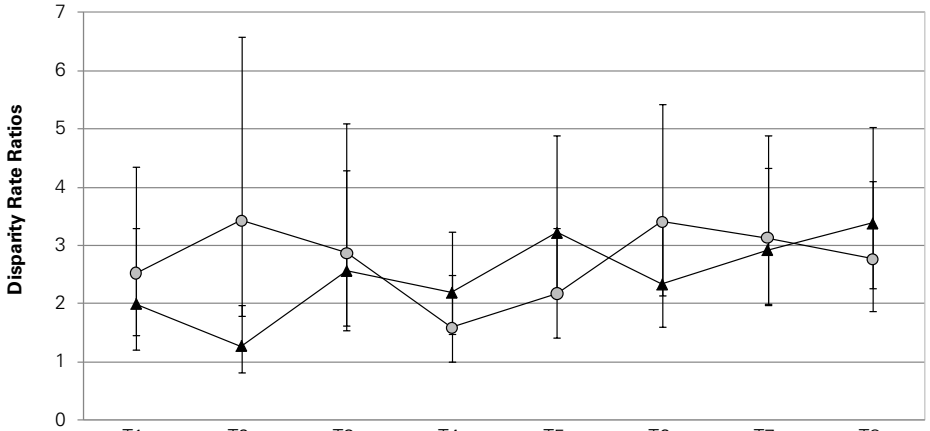
Adjusted by (2005/06-2007/08) age & sex, residents with diabetes (aged 19+) who had an amputation



Source: Manitoba Centre for Health Policy, 2010

Figure 5.15: Amputations Among Residents with Diabetes Disparity Rate Ratios by Urban and Rural Income Quintile

Adjusted by (2005/06-2007/08) age & sex, per 1,000 residents with diabetes (aged 19+) who had an amputation



	T1: 1984/85-1986/87	T2: 1987/88-1989/90	T3: 1990/91-1992/93	T4: 1993/94-1995/96	T5: 1996/97-1998/99	T6: 1999/00-2001/02	T7: 2002/03-2004/05	T8: 2005/06-2007/08
Urban Disparity Rate Ratios	2.53	3.43	2.87	1.59	2.17	3.41	3.13	2.77
Rural Disparity Rate Ratios	2.00	1.27	2.56	2.19	3.22	2.33	2.93	3.38

Time Period (fiscal years)

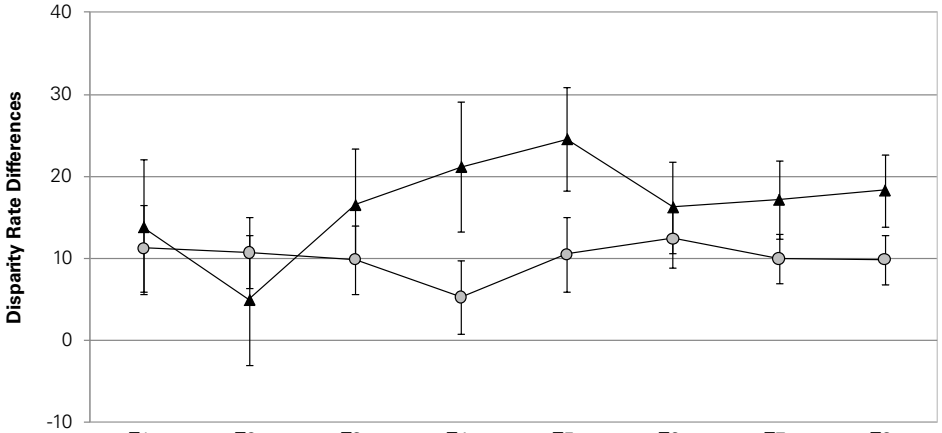
Urban Disparity Rate Ratios T8 to T1: 1.10 (95% CI 0.56 ,2.15) NS

Rural Disparity Rate Ratios T8 to T1: 1.69 (95% CI 0.89 , 3.22) NS

Source: Manitoba Centre for Health Policy, 2010

Figure 5.16: Amputations Among Residents with Diabetes Disparity Rate Differences by Urban and Rural Income Quintile

Adjusted by (2005/06-2007/08) age & sex, per 1,000 residents with diabetes (aged 19+) who had an amputation



	T1: 1984/85-1986/87	T2: 1987/88-1989/90	T3: 1990/91-1992/93	T4: 1993/94-1995/96	T5: 1996/97-1998/99	T6: 1999/00-2001/02	T7: 2002/03-2004/05	T8: 2005/06-2007/08
Rural Disparity Rate Differences	13.85	4.96	16.55	21.19	24.58	16.27	17.19	18.32
Urban Disparity Rate Differences	11.26	10.74	9.90	5.30	10.55	12.45	10.01	9.92

Time Period (fiscal years)

Urban Disparity Rate Differences T8 to T1:0.88, NS

Rural Disparity Rate Differences T8 to T1: 1.32, NS

Source: Manitoba Centre for Health Policy, 2010

Ischemic Heart Disease

Definition

Ischemia (is–KE'me–ah) is a condition in which the blood flow (and thus oxygen) is restricted to a part of the body. Cardiac ischemia is the name for lack of blood flow and oxygen to the heart muscle. Thus, the term **'ischemic heart disease' (IHD)** refers to heart problems caused by narrowed heart arteries. When arteries are narrowed, less blood and oxygen reach the heart muscle. This is also called coronary artery disease and coronary heart disease. It can ultimately lead to heart attack.

In this study, the average annual age– and sex– adjusted prevalence of IHD was measured for residents aged 19 and older over eight 3-year periods. Residents were considered to have IHD if they met one of the following conditions:

- one or more hospitalizations with a diagnosis of IHD: ICD–9–CM codes 410–414; ICD–10–CA codes I20–I22, I24, I25
- two or more physician visits with a diagnosis of IHD (ICD–9–CM codes as above)

The denominator includes all Manitoba residents aged 19 and older in the specified time period.

Time Periods	Average annual prevalence (%)
T1: 1984/85–1986/87	6.37
T2: 1987/88–1989/90	6.19
T3: 1990/91–1992/93	5.81
T4: 1993/94–1995/96	5.61
T5: 1996/97–1998/99	5.59
T6: 1999/00–2001/02	5.67
T7: 2002/03–2004/05	5.23
T8: 2005/06–2007/08	4.47

Key Findings: Ischemic Heart Disease

Manitoba overall rates:

- From the first time period T1 (1984/85–1986/87) to the last time period T8 (2005/06–2007/08), the overall Manitoba ischemic heart disease (IHD) prevalence for people aged 19 and older decreased steadily from 6.37% to 4.47%.

Rates by neighbourhood income quintile over time:

Rural:

- Comparing T1 to T8, IHD prevalence of all rural neighbourhood income quintile groups decreased. The decrease was fairly steady for R2 to R5, whereas the change over time in R1 showed an increase to T6 (1999/2000–2001/02) and a decrease after that for a slight decrease over the study period.

- The disparity between R1 and R5 increased substantially. The rate ratio of R1 compared to R5 was 1.07 in the first time period and 1.55 in the last time period, for a statistically significant increase of 45%. The absolute difference gap in IHD prevalence comparing R1 to R5 also statistically significantly increased by over 400% over time, from 0.50 more persons with IHD per 100 residents in the first time period (T1) to 2.59 more persons with IHD per 100 residents in the last time period (T8).

Urban:

- Comparing T1 to T8, IHD prevalence of all urban neighbourhood income quintile groups decreased over time. The decrease was fairly steady for U2 to U5. It was more variable for U1 where rates decreased to T4, increased to T5, and then decreased to T8.

- The disparity between R1 and R5 was stable by one measure and increased by another measure. The rate ratio of R1 compared to R5 was 1.07 in the first time period and 1.33 in the last time period, but this increase was not statistically significant. The absolute difference gap in IHD prevalence comparing R1 to R5 statistically significantly increased by 196% over time, from 0.51 more persons with IHD per 100 residents in U1 compared to U5 in the first time period (1984/85–1986/87) to 1.51 more persons with IHD per 100 residents in the last time period (2005/06–2006/07).

Lorenz Curves:

Rural over time:

- In T1, 20.5% of persons with IHD were accounted for in the 18.9% of the population in the lowest neighbourhood income quintile group R1, with the Gini coefficient of 0.019 indicating a statistically significant, though small, disparity.

- In T8, 24.4% of persons with IHD were accounted for in the 18.2% of the population in the lowest neighbourhood income quintile group R1, with the Gini coefficient of 0.074 indicating a statistically significant disparity.

- The Gini coefficient increased from the first to the last time period ($p<.0001$), showing a statistically significant increase in inequality over that time period.

Urban over time:

- In T1, 21.3% of persons with IHD were accounted for in the 20.4% of the population in the lowest neighbourhood income quintile group R1, with the Gini coefficient of 0.011 indicating a statistically significant, though very small, disparity.

- In T8, 23.9% of persons with IHD were accounted for in the 20.2% of the population in the lowest neighbourhood income quintile group R1, with the Gini coefficient of 0.057 indicating a statistically significant disparity.

- The Gini coefficient increased from the first to the last time period ($p<.0001$), showing a statistically significant increase in inequality over that time period.

Rural compared to urban in most recent time period:

- In the most recent time period T8, there is no statistically significant difference in Gini coefficients in rural compared to urban (0.074 vs. 0.057, $p=0.13$, NS), indicating a similar level of inequality in rural and urban Manitoba for IHD.

Disparity measures over time by rural and urban:

- The disparity rate ratios (i.e., the ratio of the IHD prevalence in the lowest compared to the highest neighbourhood income group) are increasing over time for rural but not urban Manitoba. The ratios started out the same in T1 for rural and urban, the rate ratio in rural areas increased more than that in urban areas, though there are no statistically significant differences between urban and rural.
- The disparity rate differences (i.e., the absolute difference of IHD prevalence between the lowest and highest neighbourhood income group) are increasing over time. In some years the absolute differences are similar in rural and urban. In T2, the differences were higher in urban compared to rural; and in the last three time periods, the absolute differences are higher in rural compared to urban areas. The disparity rate differences may be plateauing in rural neighbourhood income groups and decreasing slightly in urban neighbourhood income groups since the early 2000s.

What is this telling us?

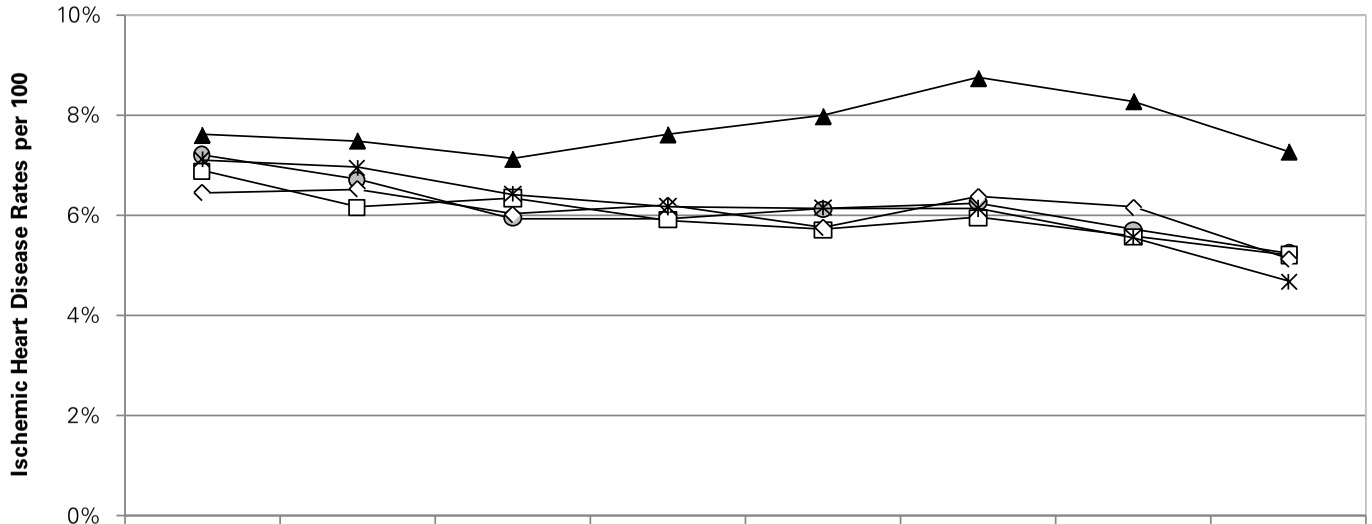
- The socioeconomic gap in IHD prevalence is fairly small.
- The socioeconomic gap in IHD prevalence is widening over time by all measures for rural Manitobans and by some measures for urban Manitobans.
- By all measures, the socioeconomic gap is larger in rural than in urban Manitoba.
- All neighbourhood income groups in both rural and urban Manitoba show decreasing IHD prevalence over time.

Where to from here?

- Although IHD disparity exists, the Lorenz curves are not very steeply bent. So although targeted interventions should occur for the lowest neighbourhood income quintile groups, universal approaches need to reduce the burden of IHD throughout the entire population.
- IHD prevalence has decreased in rural and urban Manitoba in 20 years. Programs focussed on decreasing IHD should continue.

Figure 5.17: Ischemic Heart Disease Prevalence Over Time by Rural Income Quintile

Adjusted by (2005/06-2007/08) age & sex, percent of residents aged 19+



	T1: 1984/85-1986/87	T2: 1987/88-1989/90	T3: 1990/91-1992/93	T4: 1993/94-1995/96	T5: 1996/97-1998/99	T6: 1999/00-2001/02	T7: 2002/03-2004/05	T8: 2005/06-2007/08
NF (Not displayed)	6.73	6.21	6.45	7.18	5.73	6.07	7.16	6.06
R1 (lowest income)	7.61	7.49	7.13	7.62	7.98	8.75	8.29	7.27
R2	7.21	6.72	5.94	5.94	6.13	6.25	5.72	5.24
R3	6.88	6.16	6.35	5.91	5.72	5.95	5.58	5.21
R4	6.46	6.53	6.02	6.20	5.76	6.38	6.16	5.13
R5 (highest income)	7.11	6.95	6.42	6.17	6.15	6.13	5.57	4.68
Disparity Rate Ratios (R1/R5)	1.07	1.08	1.11	1.23	1.30	1.43	1.49	1.55
Disparity Rate Differences (R1-R5)	0.50	0.54	0.70	1.44	1.83	2.61	2.72	2.59

Time Period (fiscal years)

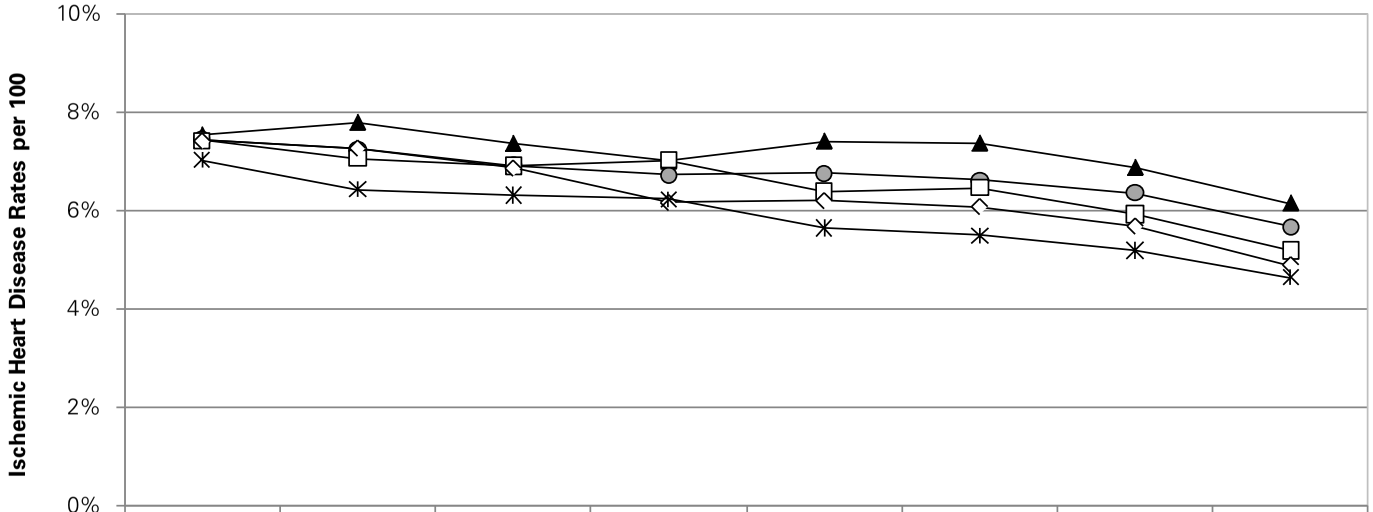
Comparison of Disparity Rate Ratios T8 to T1: 1.45 (95% CI 1.14,1.85) p< .01

Comparison of Disparity Rate Differences T8 to T1: 5.22, p<.001

Source: Manitoba Centre for Health Policy, 2010

Figure 5.18: Ischemic Heart Disease Prevalence Over Time by Urban Income Quintile

Adjusted by (2005/06-2007/08) age & sex, percent of residents aged 19+



	T1: 1984/85-1986/87	T2: 1987/88-1989/90	T3: 1990/91-1992/93	T4: 1993/94-1995/96	T5: 1996/97-1998/99	T6: 1999/00-2001/02	T7: 2002/03-2004/05	T8: 2005/06-2007/08
NF (Not displayed)	6.73	6.21	6.45	7.18	5.73	6.07	7.16	6.06
U1 (lowest income)	7.53	7.79	7.36	6.99	7.40	7.36	6.87	6.14
U2	7.43	7.24	6.91	6.72	6.75	6.60	6.35	5.66
U3	7.41	7.05	6.91	7.02	6.38	6.45	5.92	5.19
U4	7.41	7.27	6.85	6.15	6.19	6.07	5.67	4.87
U5 (highest income)	7.02	6.42	6.30	6.23	5.64	5.48	5.18	4.63
Disparity Rate Ratios (U1/U5)	1.07	1.21	1.17	1.12	1.31	1.34	1.33	1.33
Disparity Rate Differences (U1-U5)	0.51	1.37	1.06	0.77	1.77	1.88	1.68	1.51

Time Period (fiscal years)

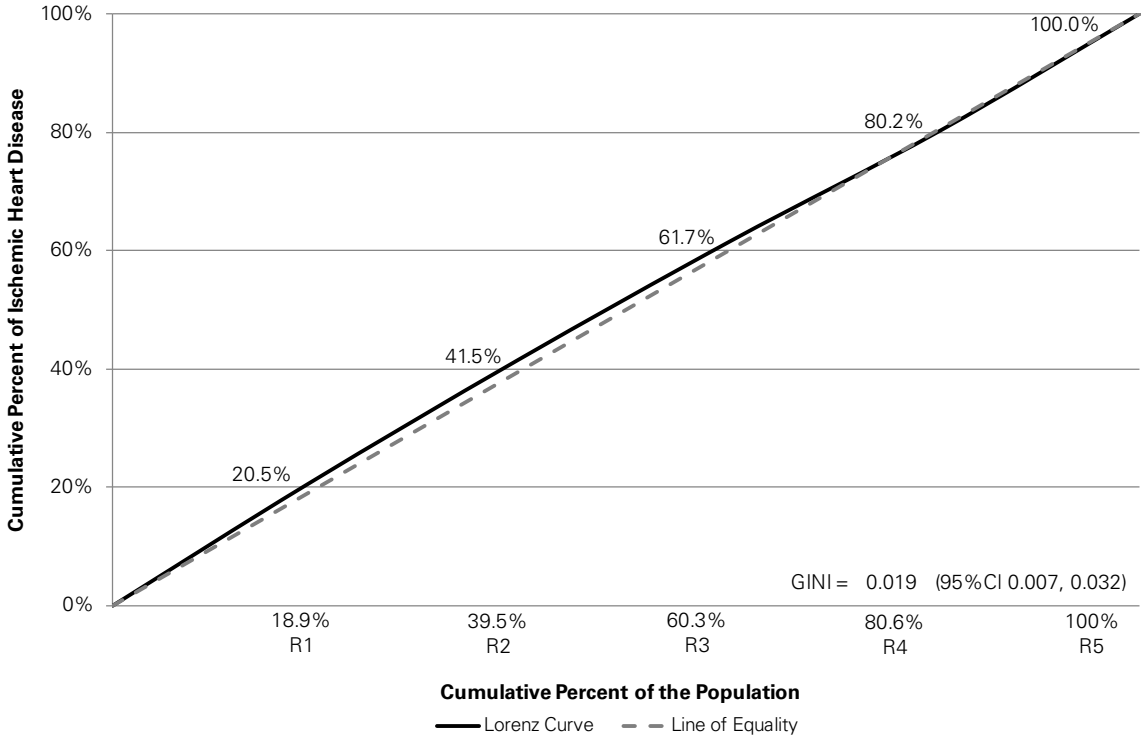
Comparison of Disparity Rate Ratios T8 to T1: 1.24(95% CI 0.98, 1.55) NS

Comparison of Disparity Rate Differences T8 to T1: 2.96, p<.001

Source: Manitoba Centre for Health Policy, 2010

Figure 5.19: Adjusted Lorenz Curve for Ischemic Heart Disease in Rural Areas 1984/85-1986/87

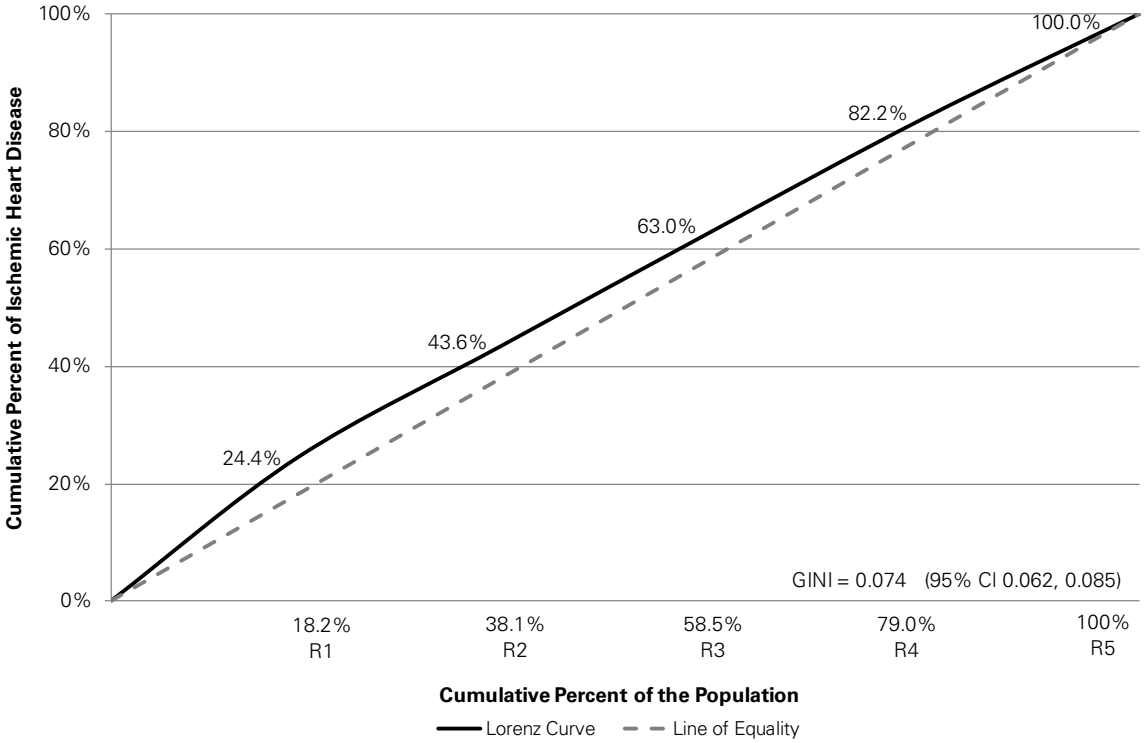
Adjusted by (2005-06/2007-08) age & sex, residents aged 19+



Source: Manitoba Centre for Health Policy, 2010

Figure 5.20: Adjusted Lorenz Curve for Ischemic Heart Disease in Rural Areas 2005/06-2007/08

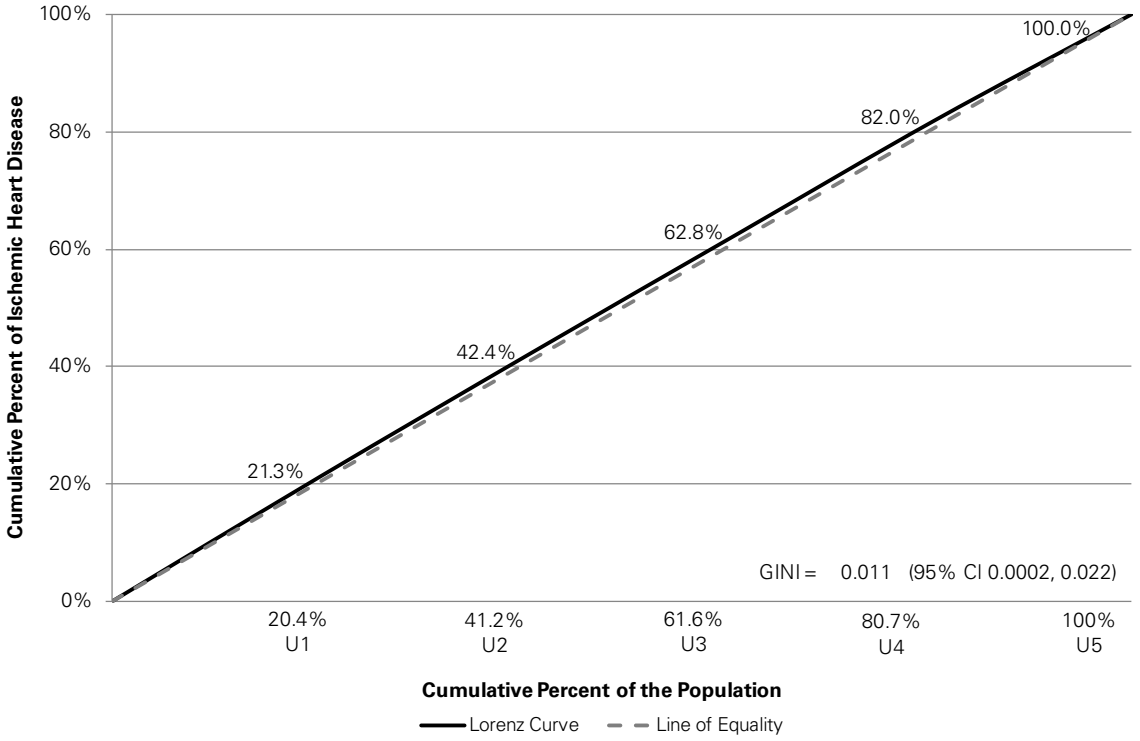
Adjusted by (2005/06-2007/08) age & sex, residents aged 19+



Source: Manitoba Centre for Health Policy, 2010

Figure 5.21: Adjusted Lorenz Curve for Ischemic Heart Disease in Urban Areas 1984/85-1986/87

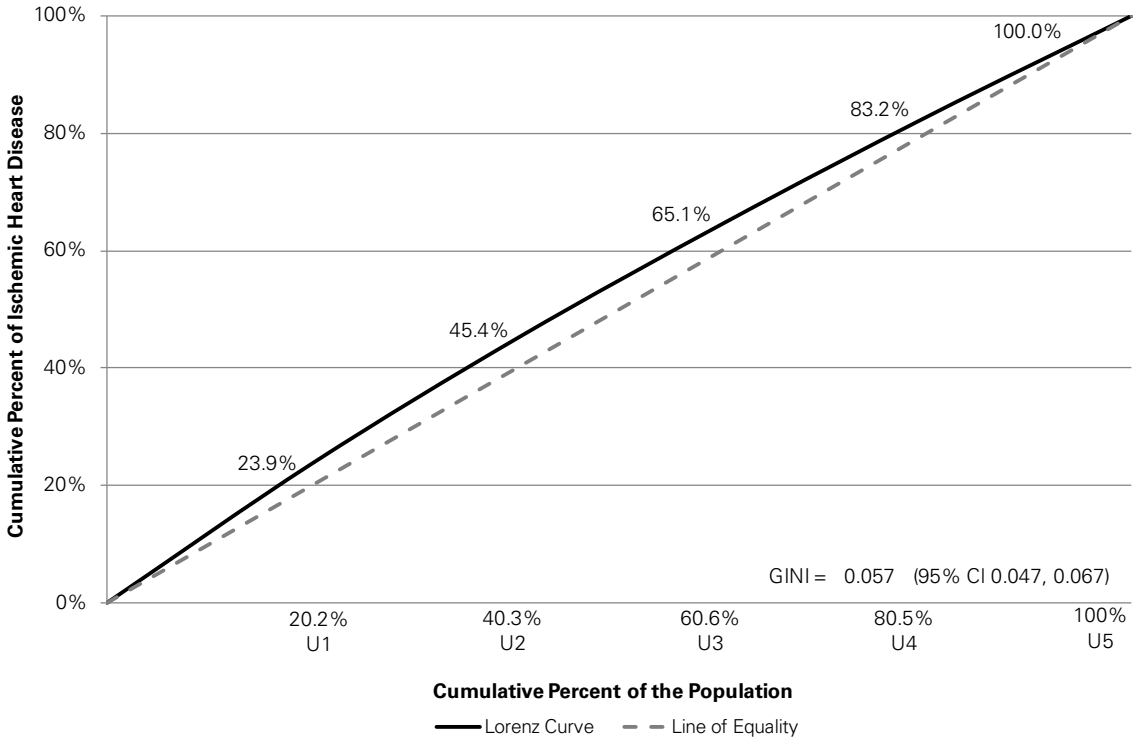
Adjusted by (2005/06-2007/08) age & sex, residents aged 19+



Source: Manitoba Centre for Health Policy, 2010

Figure 5.22: Adjusted Lorenz Curve for Ischemic Heart Disease in Urban Areas 2005-06/2007-08

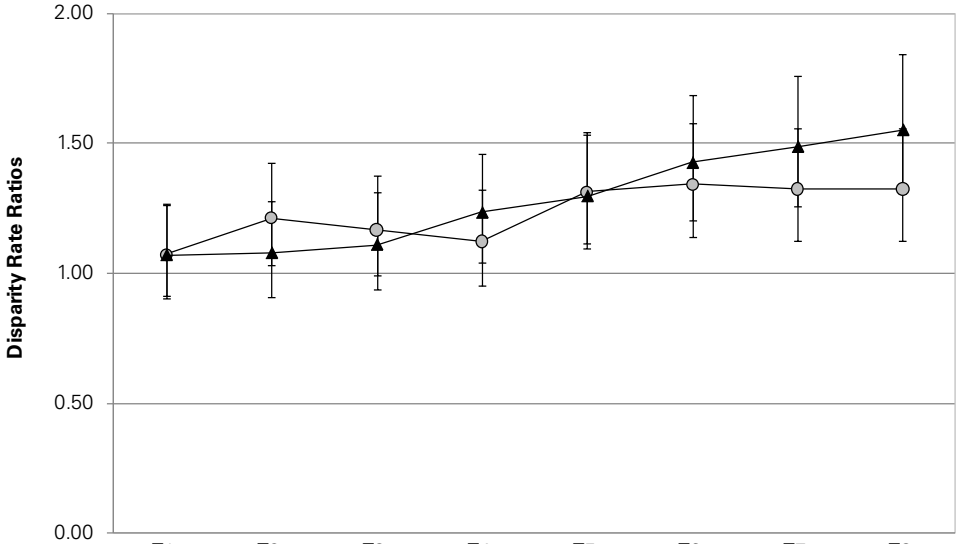
Adjusted by (2005-06/2007-08) age & sex, residents aged 19+



Source: Manitoba Centre for Health Policy, 2010

Figure 5.23: Ischemic Heart Disease Disparity Rate Ratios by Urban and Rural Income Quintile

Adjusted by (2005/06-2007/08) age & sex, percent of residents aged 19+



	T1: 1984/85-1986/87	T2: 1987/88-1989/90	T3: 1990/91-1992/93	T4: 1993/94-1995/96	T5: 1996/97-1998/99	T6: 1999/00-2001/02	T7: 2002/03-2004/05	T8: 2005/06-2007/08
Urban Disparity Rate Ratios	1.07	1.21	1.17	1.12	1.31	1.34	1.33	1.33
Rural Disparity Rate Ratios	1.07	1.08	1.11	1.23	1.30	1.43	1.49	1.55

Time Period (fiscal years)

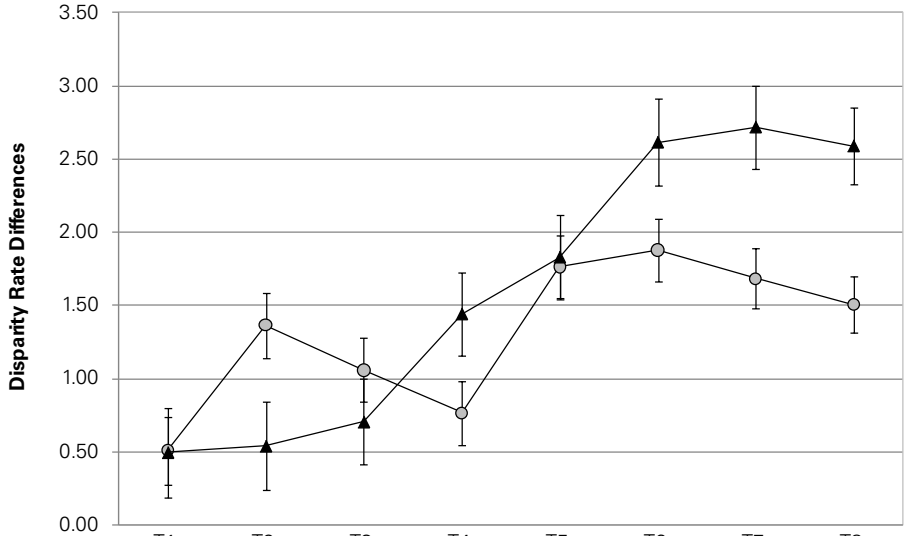
Urban Disparity Rate Ratios T8 to T1: 1.24 (95% CI 0.98, 1.55) NS

Rural Disparity Rate Ratios T8 to T1: 1.45 (95% CI 1.14, 1.85) p< .01

Source: Manitoba Centre for Health Policy, 2010

Figure 5.24: Ischemic Heart Disease Disparity Rate Differences by Urban and Rural Income Quintile

Adjusted by (2005/06-2007/08) age & sex, percent of residents aged 19+



	T1: 1984/85-1986/87	T2: 1987/88-1989/90	T3: 1990/91-1992/93	T4: 1993/94-1995/96	T5: 1996/97-1998/99	T6: 1999/00-2001/02	T7: 2002/03-2004/05	T8: 2005/06-2007/08
Urban Disparity Rate Differences	0.51	1.37	1.06	0.77	1.77	1.88	1.68	1.51
Rural Disparity Rate Differences	0.50	0.54	0.70	1.44	1.83	2.61	2.72	2.59

Time Period (fiscal years)

Urban Disparity Rate Differences T8 to T1: 2.96, p<.001

Rural Disparity Rate Differences T8 to T1: 5.22, p<.001

Source: Manitoba Centre for Health Policy, 2010

Multiple Sclerosis (MS)

Definition

Multiple sclerosis is a degenerative disease of the central nervous system (brain and spinal cord). Its effects are diverse, and may include problems in balance, vision, communication, memory, and movement, as well as more general symptoms such as pain and fatigue. The course of disease varies between people. Some may have long periods of remission between active episodes, while others may have progression of symptoms from the time of onset, and still others may have an initial period of relapses and remissions followed by a progressive course. MS is treatable through a variety of modalities, which have a variable impact on the progress of the disease; however, a cure for MS is not yet available.

MS six–year period prevalence has been calculated as the age– and sex–adjusted number of cases of MS per 100,000 population aged 16 or older in a six–year period. In this report, we identified cases of MS meeting the following criteria: at least three hospital visits, three physician visits, or a combination of these where each visit included a diagnosis code for MS within a period of six years. ICD codes for MS are included in the Glossary.

Time Period	Six–year period prevalence per 100,000
T1: 1984/85–1989/90	245.58
T2: 1990/91–1995/96	252.06
T3: 1996/97–2001/02	278.21
T4: 2002/03–2007/08	275.65

Key Findings: Multiple Sclerosis (MS)

Manitoba overall rates:

- From the first time period T1 (1984/85–1989/90) to the last time period T4 (2002/03–2007/08), the prevalence of diagnosed MS in Manitoba increased gradually overall, from 246 to 276 per 100,000 aged 16 and older.

Rates by neighbourhood income quintile over time:

Rural:

- Comparing T1 to T4, the prevalence of diagnosed MS among rural residents increased in all neighbourhood income quintiles. The greatest increase in prevalence was in the R5 quintile, followed by R2 and R3.
- R1 (lowest neighbourhood income quintile) had the lowest prevalence across all time periods.

- MS prevalence over time is fairly erratic by rural neighbourhood income quintile, where the quintile values change position frequently from lowest to mid to highest. This is somewhat contradictory to most of the indicators in this report, where for the most part, the lowest quintile exhibits the poorest overall rate, and the highest neighbourhood income quintile the best overall rate. Comparing only R1 to R5 at the four time points, the rate ratio (DRR) is not statistically significant in T1 (0.78, NS), but all three other time points show statistically significant rate ratios (0.71 at T2, p<.02; 0.74 at T3, p<.02; and 0.61 at T4, p<.0001).[4]

- The disparity between R1 and R5 did not show a statistically significant difference over time. The rate ratio remained similar at 0.78 in T1 and 0.61 in T4. The rate difference was 45 less diagnosed MS people per 100,000 in R1 compared to R5 in the first time period, and 111 less in R1 compared to R5 in the last time period. This was not a statistically significant difference.

Urban:

- Comparing T1 to T4, the prevalence of diagnosed MS among urban residents also increased among all neighbourhood income quintiles, although not as steeply as in rural areas. The increases over time were similar amongst all urban neighbourhood income quintiles.

- While U1 (lowest neighbourhood income quintile) had the lowest prevalence in three time periods (T2 through T4), there was no consistent relationship of MS prevalence with neighbourhood income quintile in urban residents and no statistically significant association found. In fact, none of the urban neighbourhood income quintile MS prevalence estimates in any time period were statistically significantly different than the overall Manitoba average during that time period.

- There were no significant trends in disparity over time in urban residents. There was no statistically significant difference in the rate ratio between T1 and T4 (0.99 and 0.96 respectively). In addition, there was no statistically significant difference in the rate difference between T1 and T4—in the first time period there were two fewer people diagnosed with MS per 100,000 in U1 compared to U5; and in the last time period, there were 11 fewer in U1 compared to U5.

Lorenz Curves:

Rural over time:

- In T1, 15.1% of the people aged 16 and older diagnosed with MS are accounted for in the 18.9% of the population in R1. In T4, 13.5% of the people diagnosed with MS are accounted for in the 18.4% of the population in R1.

- The Lorenz curve for T1 for rural residents indicates that there was no significant disparity in distribution of MS across neighbourhood income groups, with a non–significant Gini coefficient of 0.042. There was a trend to slightly higher MS rates with higher neighbourhood income, as indicated by the curve running slightly *below* the diagonal (in contrast to most other diseases).

- For the T4 period, the Gini coefficient of 0.054 indicates that the disparity in diagnosed MS rates across neighbourhood income levels just reaches the level of statistical significance, although this relationship remains very weak.

- The increase in Gini coefficient over time in rural areas was not statistically significant (0.042 to 0.054, p=0.60, NS).

4 Please see the MS definition in the Glossary (Appendix 1) for: (a) a table showing the DRR statistical comparison for each time period for this indicator and (b) a table comparing each income quintile prevalence for each time period and how it compares to the Manitoba overall average at that time period.

Urban over time:

- In T1, 19.8% of the people aged 16 and older diagnosed with MS are accounted for in the 20.2% of the population in U1. In T4, 19.0% of the people diagnosed with MS are accounted for in the 19.8% of the population in U1.
- The Lorenz curves for urban residents for both T1 and T4 confirm that there were no significant disparities in distribution of MS prevalence across urban neighbourhood income quintiles for these periods.
- There were no statistically significant changes in Gini coefficients over time for MS in urban populations (p=0.92, NS).

Rural compared to urban in most recent time period:

- Although the Gini coefficient (0.054) for the most recent time period among rural residents indicated a trend to slightly higher MS prevalence in higher neighbourhood income quintiles, this Gini coefficient was not statistically significantly different (p=0.12, NS) from that for urban residents for the same period, confirming no significant differences between these groups in disparities.

Disparity measures over time by rural and urban:

- The disparity rate ratios (DRRs) (i.e., the ratio of MS prevalence in the lowest compared to the highest neighbourhood income group) are similar across time for both rural and urban, showing very little difference both within and between groups. The one exception is in T4, the most recent time, where the DRR indicates greater gap between R1 and R5 in rural (0.61) compared to the urban area where there is little if any gap between U1 and U5 (0.96, close to 1).[5]
- For the first three time periods, the disparity rate differences (DRDs) that measure rate differences are similar in urban and rural areas. However, in the most recent time period T4, rural gaps between R1 and R5 appear to be widening; whereas urban gaps between U1 and U5 appear to be narrowing to the point where there is a statistically significantly greater rate difference in rural compared to urban in the most recent time period T4 (–110.89 vs. –10.73).

What is this telling us?

- There was not a strong relationship observed between neighbourhood income levels and rates of diagnosed MS in Manitoba. There was a weak trend towards higher MS prevalence in higher neighbourhood income quintiles (and low MS prevalence in the lowest neighbourhood income quintile) in rural areas, but this relationship did not persist in urban residents. These observations suggest that factors other than neighbourhood income and access to care are more important in determining MS prevalence. While the cause(s) of MS are still not well understood, and may be "multi–factorial" including a combination of genetic and/or environmental factors (Poppe, Wolfson, & Zhu, 2008; Marie, Yu, Blanchard, Leung, & Elliot, 2010), neighbourhood income and socioeconomic status do not appear to play a prominent role for MS in Manitoba.

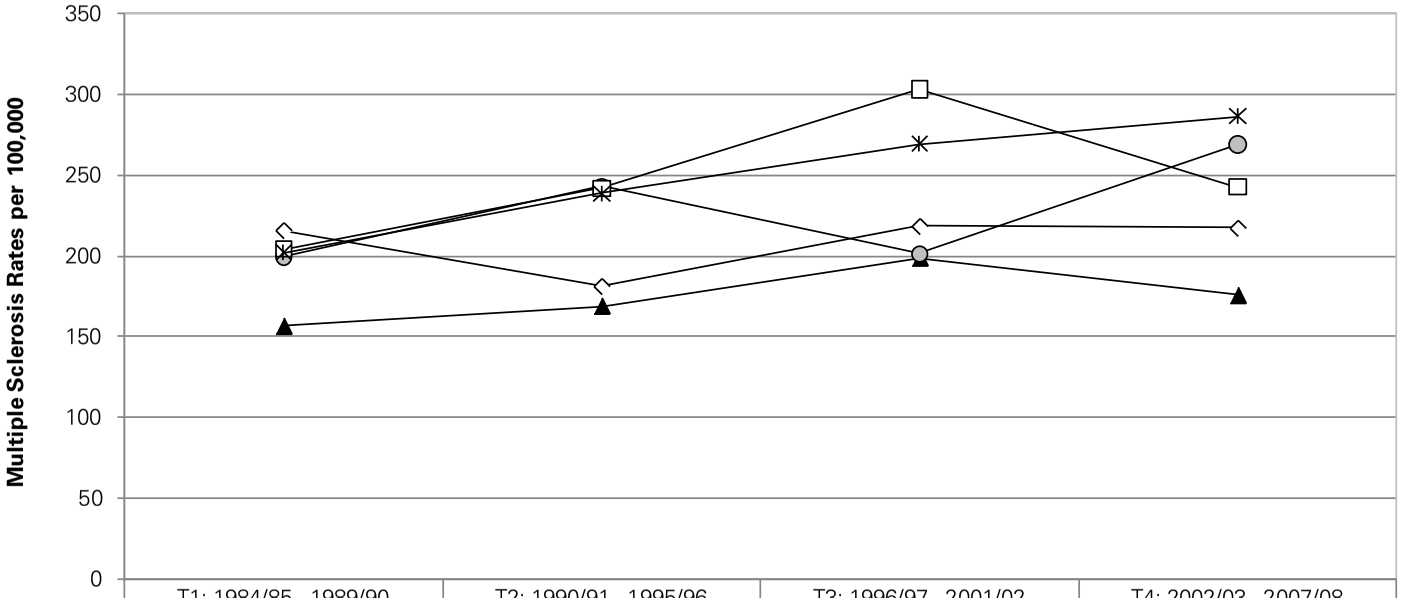
Where to from here?

- The observed high prevalence of diagnosed MS in the NF group may merit further investigation: if many of these individualized are institutionalized due to their MS, it would be important to describe their neighbourhood income and socioeconomic status to ensure no disparities are being masked by lack of information on this group.

5 In the case of certain indicators where fewer events or percentages occur in the lowest compared to the highest quintile (such as in the case of Pap tests), DRRs are below 1 and DRDs are negative—the directions of differences are somewhat non–intuitive. The "lower" the ratio below 1 (for example, 0.7 rather than 0.8), the greater the disparity (i.e., 30% compared to 20% difference). As well, the more negative the difference (for example, –20 compared to –10), the greater the disparity. So what appears as a positive outcome ("lower" disparity) of lower DRRs or lower DRDs on the y–axis is actually a greater disparity.

Figure 5.25: Multiple Sclerosis Prevalence Over Time by Rural Income Quintile

Adjusted by (2004-2007) age & sex, per 100,000 residents aged 16+



	T1: 1984/85 -1989/90	T2: 1990/91 -1995/96	T3: 1996/97 -2001/02	T4: 2002/03 -2007/08
NF (Not displayed)	1766.39	898.32	2064.81	1922.36
R1 (lowest income)	156.77	169.11	198.55	175.63
R2	199.66	243.10	201.31	268.89
R3	204.38	242.17	303.14	242.84
R4	216.04	181.09	218.61	217.48
R5 (highest income)	202.11	238.68	269.25	286.52
Disparity Rate Ratios (R1/R5)	0.78	0.71	0.74	0.61
Disparity Rate Differences (R1-R5)	-45.34	-69.57	-70.69	-110.89

Time Period (fiscal years)

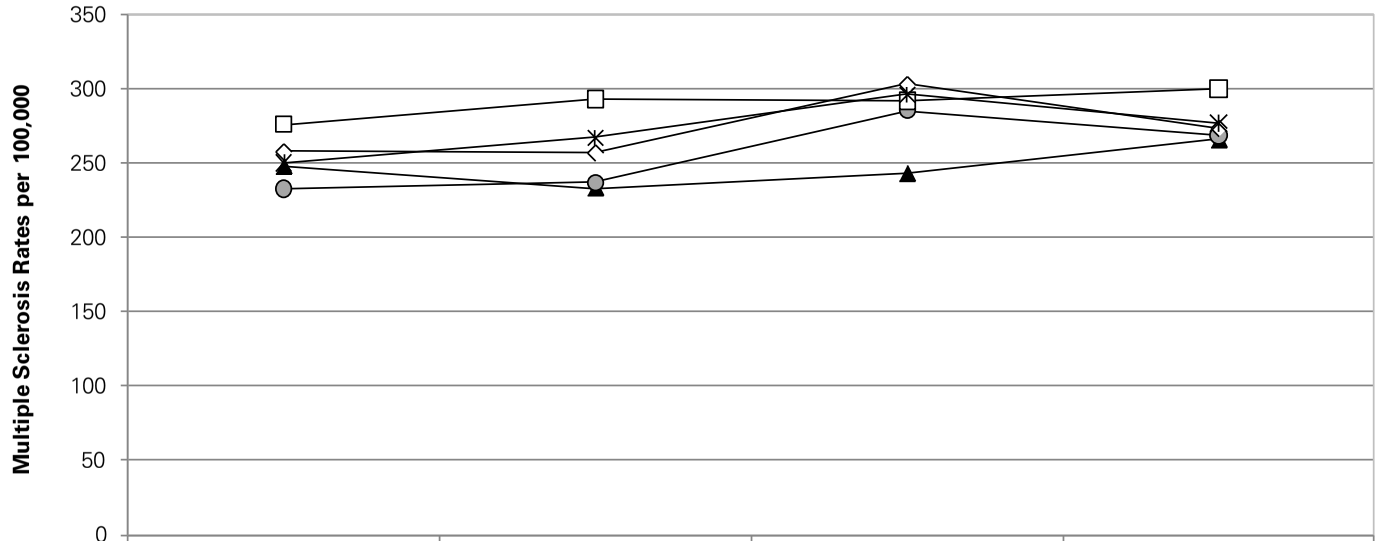
Comparison of Disparity Rate Ratios T4 to T1: 0.79 (95% CI 0.54, 1.15) NS

Comparison of Disparity Rate Differences T4 to T1: 2.45, NS

Source: Manitoba Centre for Health Policy, 2010

Figure 5.26: Multiple Sclerosis Prevalence Over Time by Urban Income Quintile

Adjusted by (2004-2007) age & sex, per 100,000 residents aged 16+



	T1: 1984/85-1989/90	T2: 1990/91 -1995/96	T3: 1996/97 -2001/02	T4: 2002/03 -2007/08
NF (Not displayed)	1766.39	898.32	2064.81	1922.36
U1 (lowest income)	248.26	233.52	243.33	266.33
U2	233.06	237.02	285.43	268.86
U3	276.25	293.52	292.06	300.26
U4	258.26	257.53	303.33	273.96
U5 (highest income)	250.54	267.38	296.41	277.06
Disparity Rate Ratios (U1/U5)	0.99	0.87	0.82	0.96
Disparity Rate Differences (U1-U5)	-2.28	-33.86	-53.08	-10.73

Time Period (fiscal years)

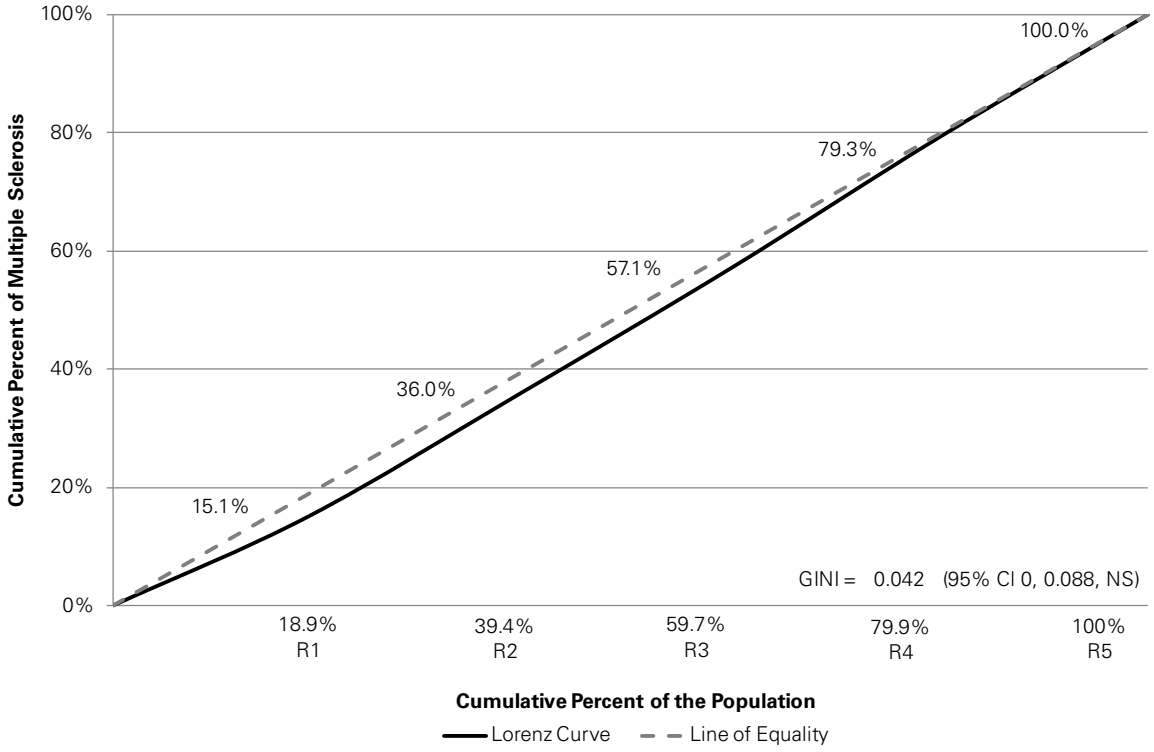
Comparison of Disparity Rate Ratios T4 to T1: 0.97 (95% CI 0.75, 1.25) NS

Comparison of Disparity Rate Differences T4 to T1: 4.70, NS

Source: Manitoba Centre for Health Policy, 2010

Figure 5.27: Adjusted Lorenz Curve for Multiple Sclerosis in Rural Areas 1984/85-1989/90

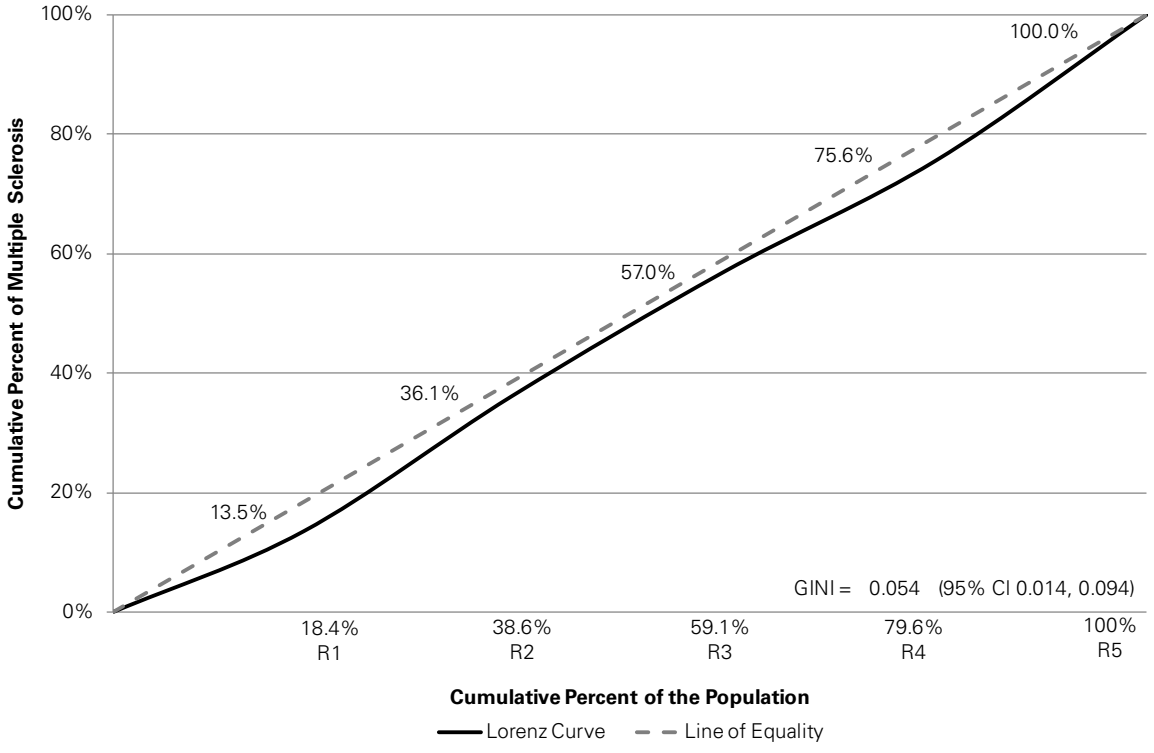
Adjusted by (2004/05-2007/08) age & sex, residents aged 16+



Source: Manitoba Centre for Health Policy, 2010

Figure 5.28: Adjusted Lorenz Curve for Multiple Sclerosis in Rural Areas 2002/03-2007/08

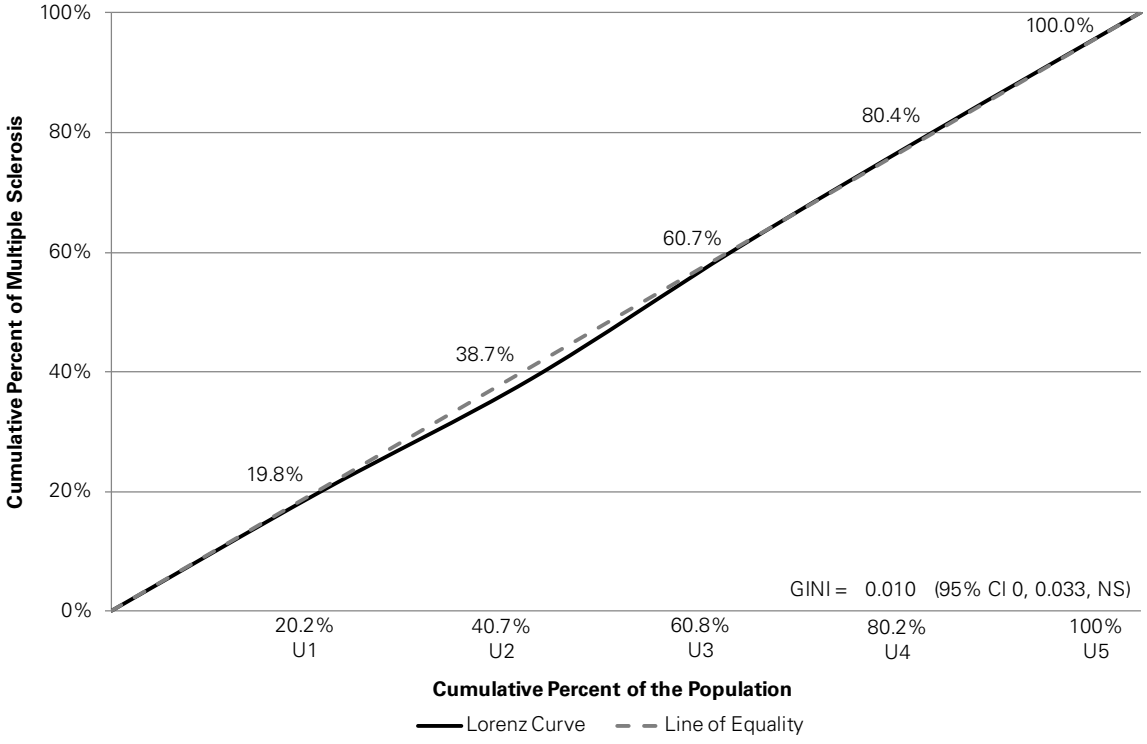
Adjusted by (2004/05-2007/08) age & sex, residents 16+



Source: Manitoba Centre for Health Policy, 2010

Figure 5.29: Adjusted Lorenz Curve for Multiple Sclerosis in Urban Areas 1984/85-1989/90

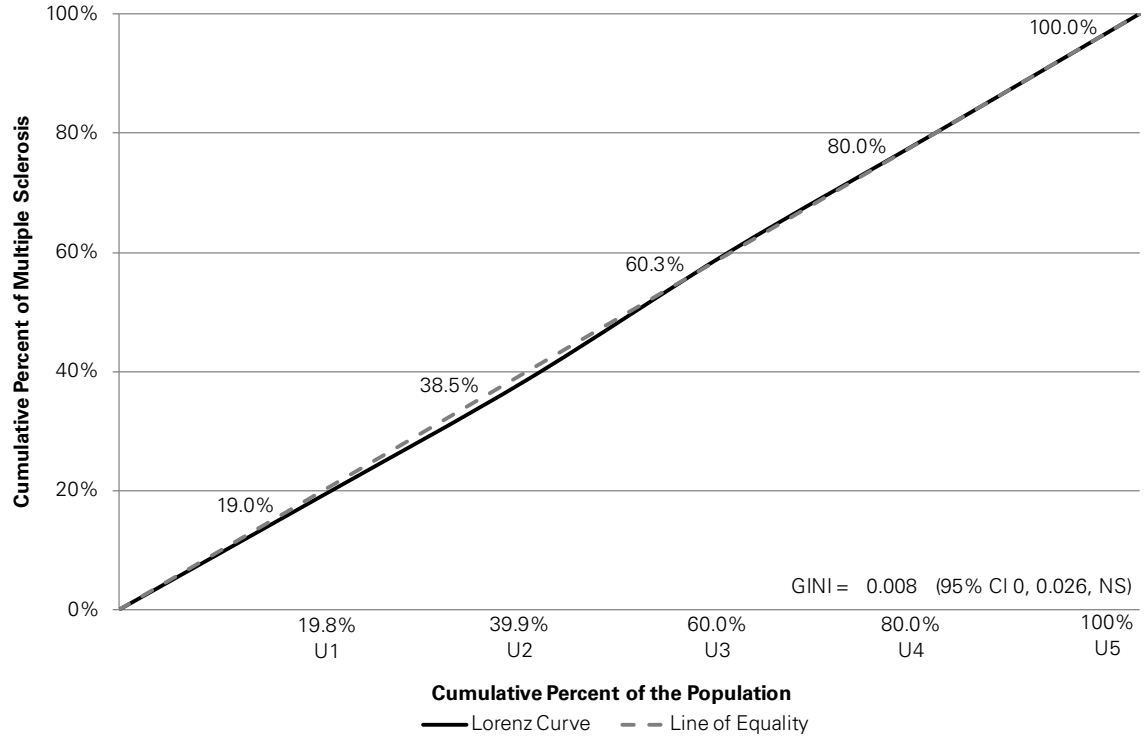
Adjusted by (2004/05-2007/08) age & sex, residents 16+



Source: Manitoba Centre for Health Policy, 2010

Figure 5.30: Adjusted Lorenz Curve for Multiple Sclerosis in Urban Areas 2004/05-2007/08

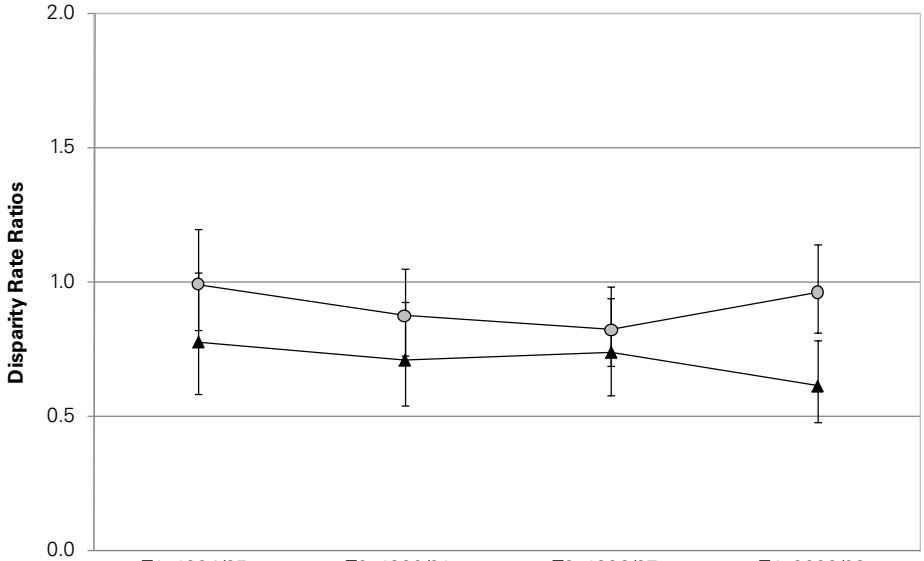
Adjusted by (2004/05-2007/08) age & sex, residents 16+



Source: Manitoba Centre for Health Policy, 2010

Figure 5.31: Multiple Sclerosis Disparity Rate Ratios by Urban and Rural Income Quintile

Adjusted by (2002/03-2007/08) age & sex, per 100,000 residents aged 16+



	T1: 1984/85-1989/90	T2: 1990/91 - 1995/96	T3: 1996/97 - 2001/02	T4: 2002/03 - 2007/08
Urban Disparity Rate Ratios	0.99	0.87	0.82	0.96
Rural Disparity Rate Ratios	0.78	0.71	0.74	0.61

Time Period (fiscal years)

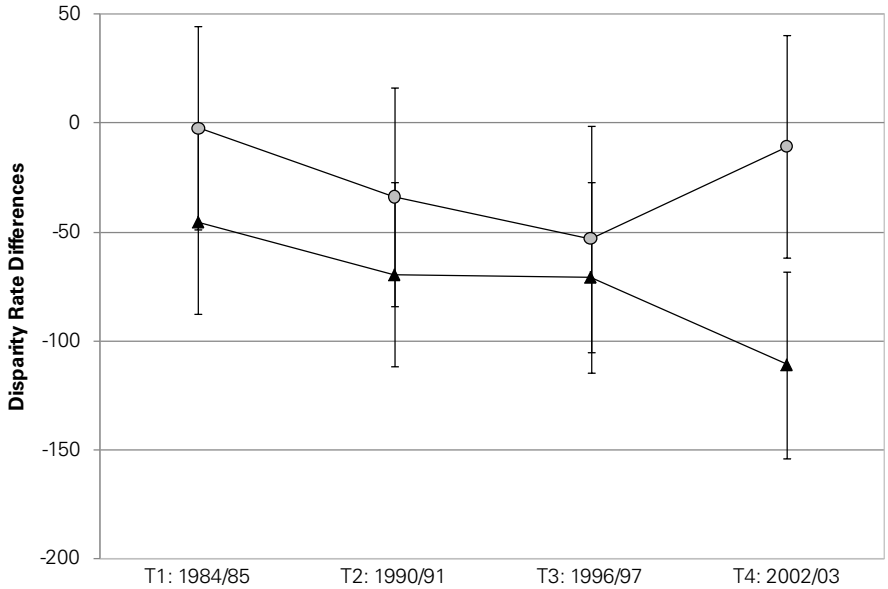
Urban Disparity Rate Ratios T4 to T1: 0.97 (95% CI 0.75, 1.25) NS

Rural Disparity Rate Ratios T4 to T1: 0.79 (95% CI 0.54, 1.15) NS

Source: Manitoba Centre for Health Policy, 2010

Figure 5.32: Multiple Sclerosis Disparity Rate Differences by Urban and Rural Income Quintile

Adjusted by (2004-2007) age & sex, per 100,000 residents aged aged 16+



	T1: 1984/85 -1989/90	T2: 1990/91 -1995/96	T3: 1996/97 -2001/02	T4: 2002/03 -2007/08
Urban Disparity Rate Differences	-2.28	-33.86	-53.08	-10.73
Rural Disparity Rate Differences	-45.34	-69.57	-70.69	-110.89

Time Period (fiscal years)

Urban Disparity Rate Differences T4 to T1: 4.70, NS

Rural Disparity Rate Differences T4 to T1: 2.45, NS

Source: Manitoba Centre for Health Policy, 2010

References:

Marie RA, Yu N, Blanchard J, Leung S, Elliott L. The rising prevalence and changing age distribution of multiple sclerosis in Manitoba. *Neurology,* 2010;74;1–7.

Poppe AY, Wolfson C, Zhu B. Prevalence of Multiple Sclerosis in Canada: A systematic review. *Canadian Journal of Neurological Science.* 2008;35:593–601.

Chapter 6: Primary Care and Prevention

Continuity of Care

Definition

The percentage of individuals of all ages who have the majority of their visits (50% or greater) from the same physician over a two–year period. Individuals with less than three visits to a healthcare provider were excluded from analyses. Tables describing the proportion of the population excluded from these analyses are available in the Glossary.

Time Periods	Average percentage of people over a two–year period
T1: 1984/85–1985/86	75.39
T2: 1986/87–1987/88	71.96
T3: 1988/89–1989/90	69.88
T4: 1990/91–1991/92	69.06
T5: 1992/93–1993/94	68.47
T6: 1994/95–1995/96	68.53
T7: 1996/97–1997/98	67.81
T8: 1998/99–1999/00	67.89
T9: 2000/01–2001/02	67.27
T10: 2002/03–2003/04	68.88
T11: 2004/05–2005/06	69.00
T12: 2006/07–2007/08	69.63

Key Findings: Continuity of Care

Manitoba overall rates:

- From the first time period T1 (1984/85–1985/86) to the last time period T12 (2006/07–2007/08), the prevalence of **continuity of care** decreased from 75.39% to 69.63% of Manitoba residents. The decrease was not steady: there was a steady decrease from T1 to T9 (2000/01–2001/02) with an increase in each of the three remaining time periods.
- Note that continuity of care is calculated based on those visiting the physician at least three times within two fiscal years; those residents without three or more visits are excluded from analyses. The percent of children (aged 14 and younger) with fewer than three visits increased over time, the percent of adults aged 15–59 with fewer than three visits remained relatively stable over time, and the percent of seniors aged 60 and older who had fewer than three physician visits over two years decreased over time.

Rates by neighbourhood income quintile over time:
Rural:

- Comparing T1 to T12, the prevalence of continuity of care decreased for all rural neighbourhood income quintile groups.
- The disparity between R1 and R5 remained stable or increased over time, depending on the measure used. The rate ratio of R1 compared to R5 was 0.88 in the first time period and 0.83 in the last time period, which was not a statistically significant change. The absolute difference gap in prevalence of continuity of care comparing R1 to R5 statistically significantly increased by 26% over time, from 9.31 fewer persons per 100 residents with continuity of care in the first time period (T1) in R1 compared to R5 to 11.70 fewer persons per 100 residents with continuity of care in R1 compared to R5 in the last time period (T12).

Urban:

- Comparing T1 to T12, the prevalence of continuity of care dropped slightly for all urban neighbourhood income quintile groups.
- The disparity between U1 and U5 remained stable over time. The rate ratio of U1 compared to U5 was 0.93 in the first time period and 0.92 in the last time period, which was not a statistically significant change. The absolute difference gap in the prevalence of continuity of care comparing R1 to R5 increased slightly but not statistically significantly (5.76 fewer persons with continuity of care per 100 residents in the first time period in U1 compared to U5 and 5.99 fewer persons with continuity of care per 100 residents in U1 compared to U5 in the last time period).

Lorenz Curves:
Rural over time:

- In T1, 16.4% of persons with continuity of care were accounted for in the18.1% of the population in the lowest neighbourhood income quintile group R1, with the Gini coefficient of 0.026 indicating a statistically significant disparity.
- In T12, 16.3% of persons with continuity of care were accounted for in the18.3% of the population in the lowest neighbourhood income quintile group R1, with the Gini coefficient of 0.037 indicating a statistically significant disparity.
- The Gini coefficient increased from the first to the last time period ($p<.0001$), showing a statistically significant increase in inequality over that time period.

Urban over time:

- In T1, 19.5% of persons with continuity of care were accounted for in the 20.8% of the population in the lowest neighbourhood income quintile group U1, with the Gini coefficient of 0.015 indicating a statistically significant, though small, disparity.
- In T12, 19.5% of persons with continuity of care were accounted for in the 20.8% of the population in the lowest neighbourhood income quintile group U1, with the Gini coefficient of 0.016 indicating a statistically significant, though small, disparity.
- There was no statistically significant change in the Gini coefficient from the first to the last time period, suggesting stability in inequality over that time period.

Rural compared to urban in most recent time period:

- In the most recent time period T12, the Gini coefficient for rural neighbourhood income quintiles was statistically significantly higher than for urban neighbourhood income quintiles, indicating a greater level of inequality in rural compared to urban Manitoba for continuity of care.

Disparity measures over time by rural and urban:

- The disparity rate ratios (i.e., the ratio of the prevalence of continuity of care in the lowest compared to the highest neighbourhood income group) are all below 1.00, indicating less continuity of care in the lowest compared to the highest neighbourhood income quintiles. The disparity rate ratios remained stable over time for both rural and urban Manitoba. For most of the time periods, there was no difference in the ratios between rural and urban, although for T6–T8 and T11 the ratios were greater (further from 1.00) in rural compared to urban areas.

- The disparity rate differences (DRD, i.e., the absolute difference of the prevalence of continuity of care between the lowest and highest neighbourhood income group) show an uneven pattern over time for both rural and urban areas. In rural areas, there was a significant increase in absolute disparity (shown by numbers moving further away from 0.0); but in urban areas, the increase was not statistically significant. For all time periods, the absolute differences were greater in rural compared to urban areas (shown by DRDs further away from 0.0).

What is this telling us?

- By some measures, the socioeconomic gap in the prevalence of continuity of care is widening over time for rural Manitobans, whereas for other measures the prevalence remains stable over time.

- By all measures, the socioeconomic gap in the prevalence of continuity of care is stable over time for urban Manitobans.

- By some, but not all, measures, the socioeconomic gap is greater in rural compared in urban Manitoba.

- The socioeconomic gap for continuity of care is not very wide is rural areas and is even narrower in urban areas.

- The largest socioeconomic gap in prevalence of continuity of care is seen in the last time period for rural Manitoba.

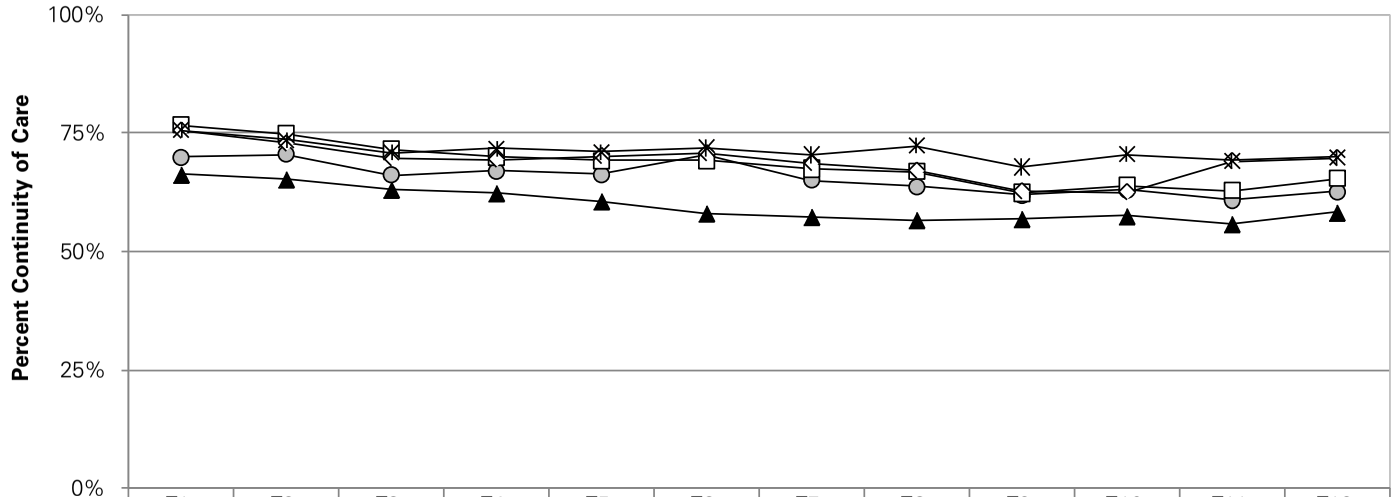
Where to from here?

- Absolute differences in continuity of care, as measured by the disparity rate differences (DRDs), appear to be growing in rural Manitoba, even though the relative rates appear stable. Although access to physicians is universal across the province, there may be barriers to accessing care, such as distance to physician and lack of transportation in the lower income rural areas. Efforts should be made to reduce barriers to access, particularly in these areas.

- The disparity in the prevalence of continuity of care is relatively small in both rural and urban areas. However, the overall decrease in continuity of care in Manitoba is of concern and strategies to increase continuity should be implemented, ensuring that disparities do not increase as a result of these efforts.

Figure 6.1: Continuity of Care Prevalence Over Time by Rural Income Quintile

Adjusted by (2006/07-2007/08) age & sex, percent of residents with at least 50% of visits to the same physician



	T1: 1984/85-1985/86	T2: 1986/87-1987/88	T3: 1988/89-1989/90	T4: 1990/91-1991/92	T5: 1992/93-1993/94	T6: 1994/95-1995/96	T7: 1996/97-1997/98	T8: 1998/99-1999/00	T9: 2000/01-2001/02	T10: 2002/03-2003/04	T11: 2004/05-2005/06	T12: 2006/07-2007/08
NF (Not displayed)	77.18	75.29	72.76	70.89	71.80	68.56	66.75	68.42	70.04	71.55	71.00	73.00
R1 (lowest income)	66.32	65.32	63.15	62.40	60.70	58.13	57.40	56.73	56.95	57.54	55.88	58.30
R2	69.93	70.52	66.21	67.09	66.35	70.34	65.09	63.72	61.94	63.06	60.91	62.60
R3	76.75	74.93	71.48	70.13	69.19	69.21	67.48	66.85	62.37	63.99	62.86	65.42
R4	75.58	72.84	69.74	69.47	70.21	70.79	68.72	67.09	62.74	62.57	69.13	69.76
R5 (highest income)	75.63	73.63	70.92	71.76	71.04	71.93	70.41	72.39	67.86	70.57	69.18	70.00
Disparity Rate Ratios (R1/R5)	0.88	0.89	0.89	0.87	0.85	0.81	0.82	0.78	0.84	0.82	0.81	0.83
Disparity Rate Differences (R1-R5)	-9.31	-8.30	-7.77	-9.36	-10.34	-13.80	-13.01	-15.66	-10.90	-13.03	-13.30	-11.70

Time Period (fiscal years)

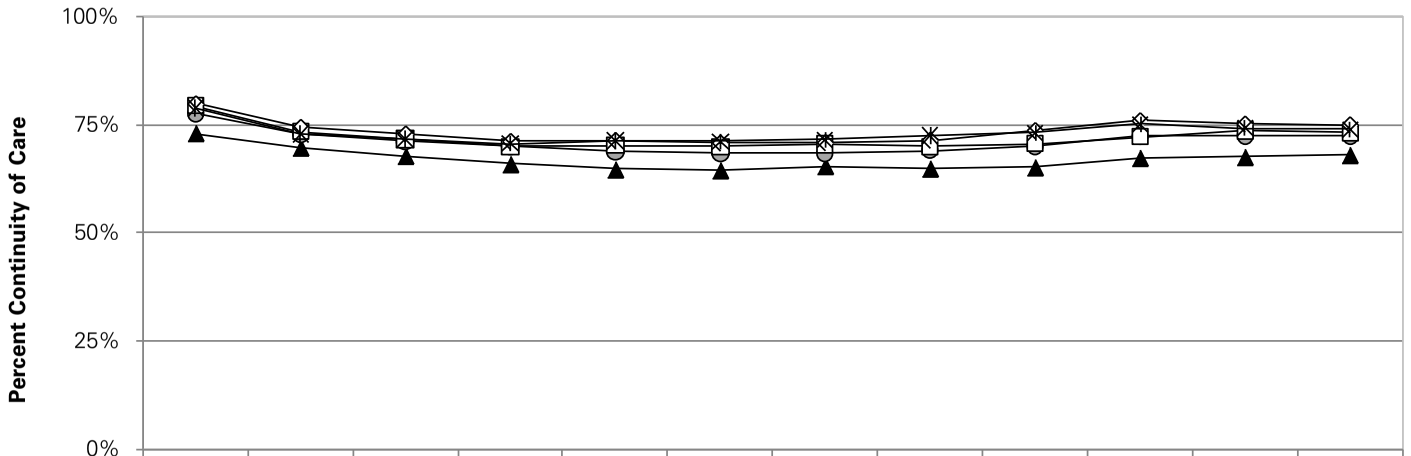
Comparison of Disparity Rate Ratios T12 to T1: 0.95 (95% CI 0.89, 1.02) NS

Comparison of Disparity Rate Differences T12 to T1: 1.26, p<.001

Source: Manitoba Centre for Health Policy, 2010

Figure 6.2: Continuity of Care Prevalence Over Time by Urban Income Quintile

Adjusted by (2006/07-2007/08) age & sex, percent of residents with at least 50% of visits to the same physician



	T1: 1984/85-1985/86	T2: 1986/87-1987/88	T3: 1988/89-1989/90	T4: 1990/91-1991/92	T5: 1992/93-1993/94	T6: 1994/95-1995/96	T7: 1996/97-1997/98	T8: 1998/99-1999/00	T9: 2000/01-2001/02	T10: 2002/03-2003/04	T11: 2004/05-2005/06	T12: 2006/07-2007/08
NF (Not displayed)	77.18	75.29	72.76	70.89	71.80	68.56	66.75	68.42	70.04	71.554102	71.003086	73.00
U1 (lowest income)	73.01	69.68	67.78	65.87	64.66	64.46	65.44	64.86	65.14	67.31	67.52	67.97
U2	77.46	72.78	71.15	69.98	68.72	68.41	68.31	68.95	70.08	72.34	72.45	72.46
U3	79.29	73.36	71.59	69.89	70.12	69.93	70.39	69.87	70.59	72.15	73.62	73.04
U4	79.82	74.38	72.85	71.13	71.34	70.78	70.84	71.42	73.64	75.91	75.15	74.97
U5 (highest income)	78.78	72.82	71.66	70.60	71.20	71.09	71.50	72.47	73.10	75.07	74.20	73.96

Disparity Rate Ratios (U1/U5)	0.93	0.96	0.95	0.93	0.91	0.91	0.92	0.90	0.89	0.90	0.91	0.92
Disparity Rate Differences (U1-U5)	-5.76	-3.14	-3.88	-4.73	-6.54	-6.63	-6.06	-7.61	-7.96	-7.76	-6.68	-5.99

Time Period (fiscal years)

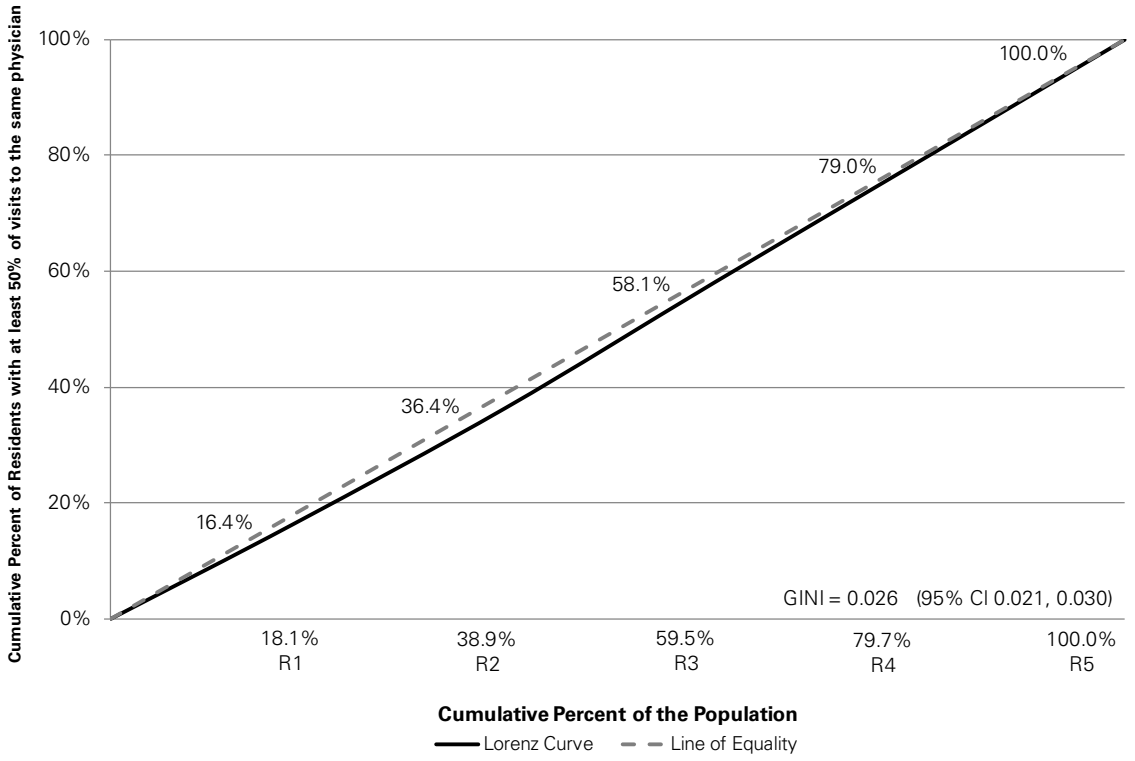
Comparison of Disparity Rate Ratios T12 to T1: 0.99 (95% CI 0.93, 1.06), NS

Comparison of Disparity Rate Differences T12 to T1: 1.04, NS

Source: Manitoba Centre for Health Policy, 2010

Figure 6.3: Adjusted Lorenz Curve for Continuity of Care in Rural Areas 1984/85-1985/86

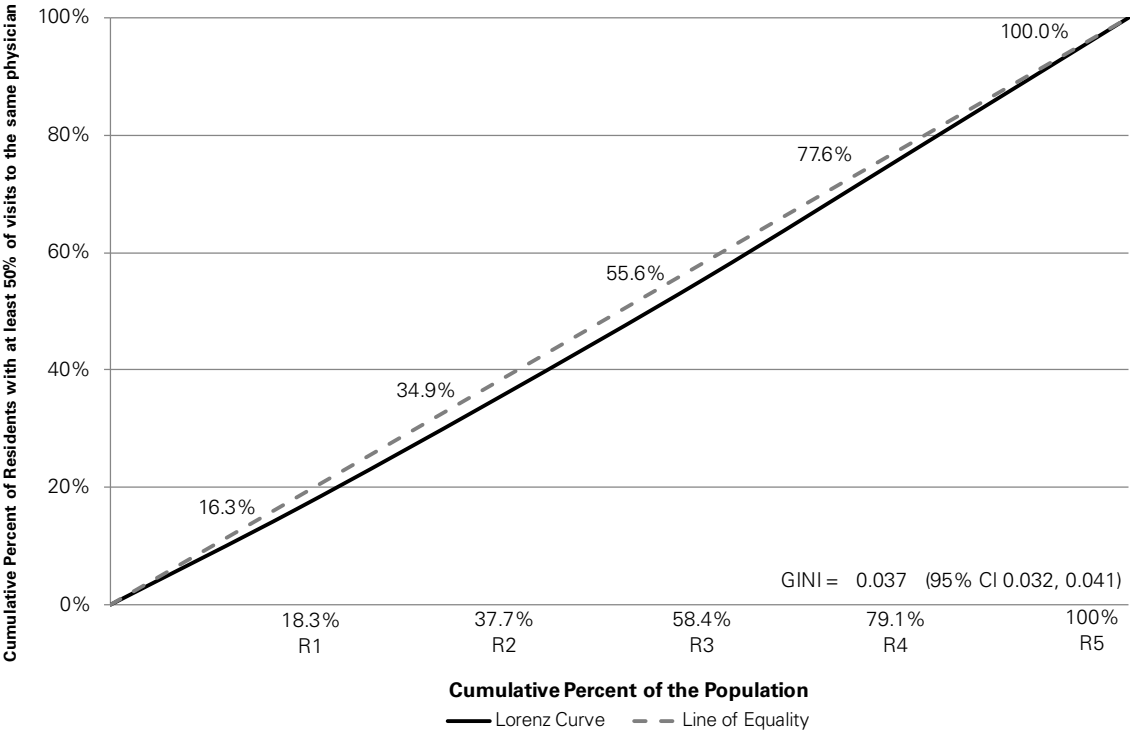
Adjusted by (2006/07-2007/08) age & sex, percent of residents with at least 50% of visits to the same physician



Source: Manitoba Centre for Health Policy, 2010

Figure 6.4: Adjusted Lorenz Curve for Continuity of Care in Rural Areas 2006/07-2007/08

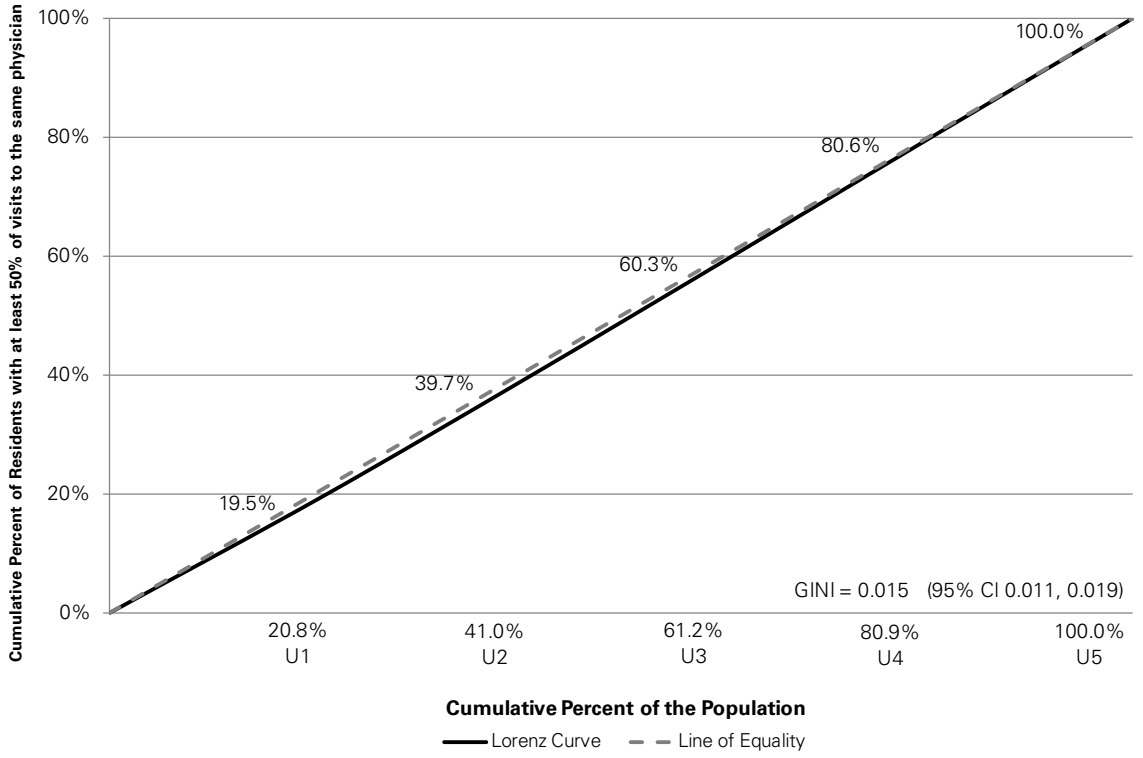
Adjusted by (2006/07-2007/08) age & sex, percent of residents with at least 50% of visits to the same physician



Source: Manitoba Centre for Health Policy, 2010

Figure 6.5: Adjusted Lorenz Curve for Continuity of Care in Urban Areas 1984/85-1985/86

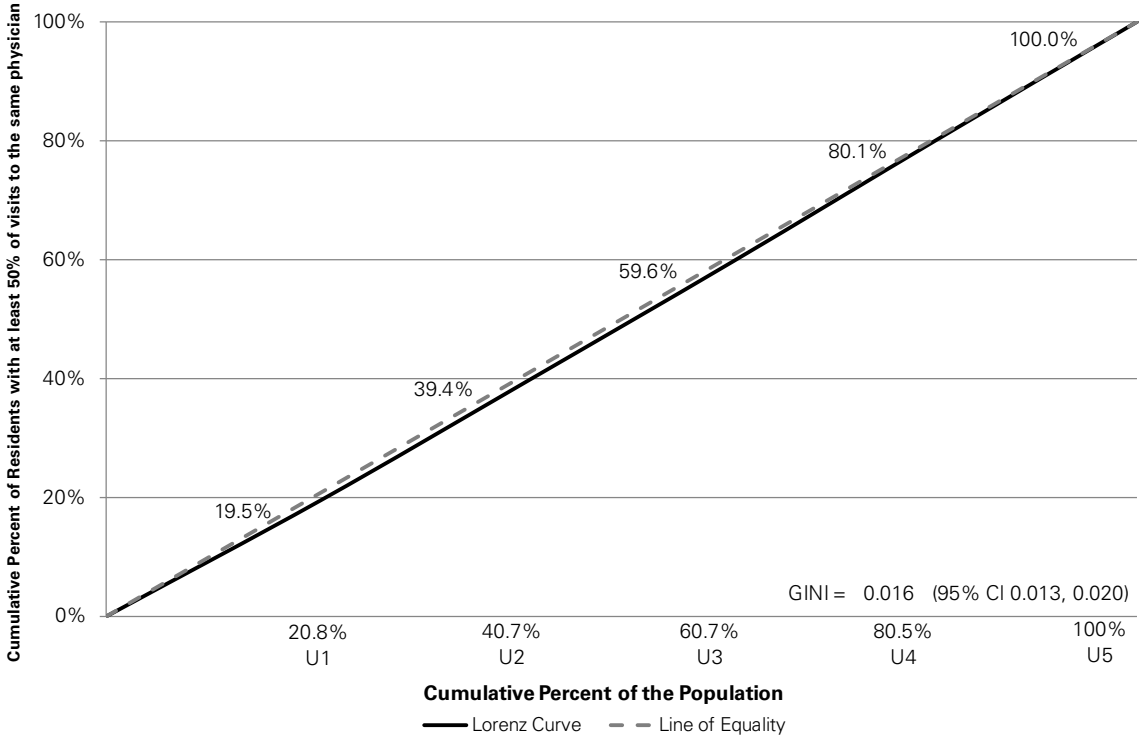
Adjusted by (2006/07-2007/08) age & sex, percent of residents with at least 50% of visits to the same physician



Source: Manitoba Centre for Health Policy, 2010

Figure 6.6: Adjusted Lorenz Curve for Continuity of Care in Urban Areas 2006/07-2007/08

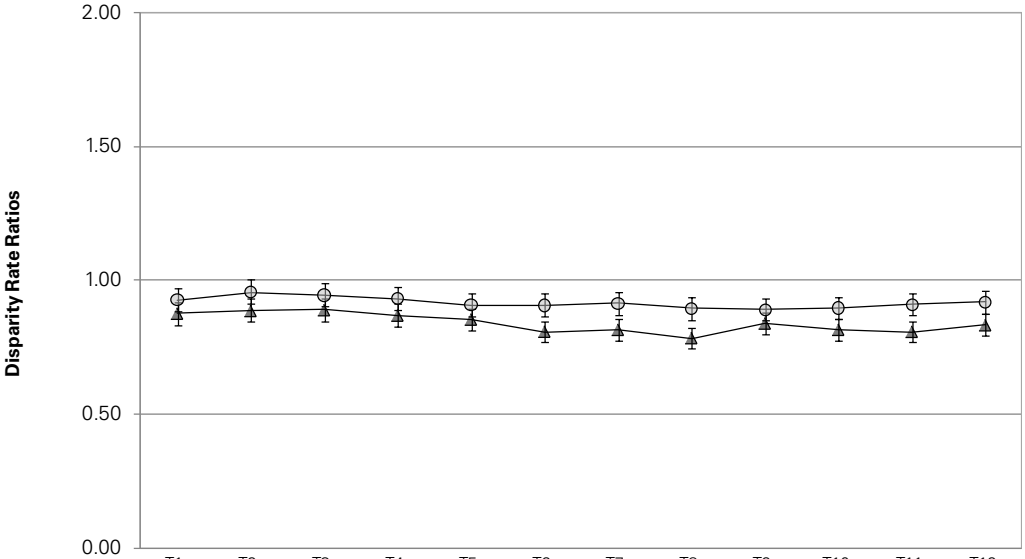
Adjusted by (2006/07-2007/08) age & sex, percent of residents with at least 50% of visits to the same physician



Source: Manitoba Centre for Health Policy, 2010

Figure 6.7: Continuity of Care Disparity Rate Ratios by Urban and Rural Income Quintile

Adjusted by (2006/07-2007/08) age & sex, percent of residents with at least 50% of visits to the same physician



	T1: 1984/85-1985/86	T2: 1986/87-1987/88	T3: 1988/89-1989/90	T4: 1990/91-1991/92	T5: 1992/93-1993/94	T6: 1994/95-1995/96	T7: 1996/97-1997/98	T8: 1998/99-1999/00	T9: 2000/01-2001/02	T10: 2002/03-2003/04	T11: 2004/05-2005/06	T12: 2006/07-2007/08
Rural Disparity Rate Ratios	0.88	0.89	0.89	0.87	0.85	0.81	0.82	0.78	0.84	0.82	0.81	0.83
Urban Disparity Rate Ratios	0.93	0.96	0.95	0.93	0.91	0.91	0.92	0.90	0.89	0.90	0.91	0.92

Time Period (fiscal years)

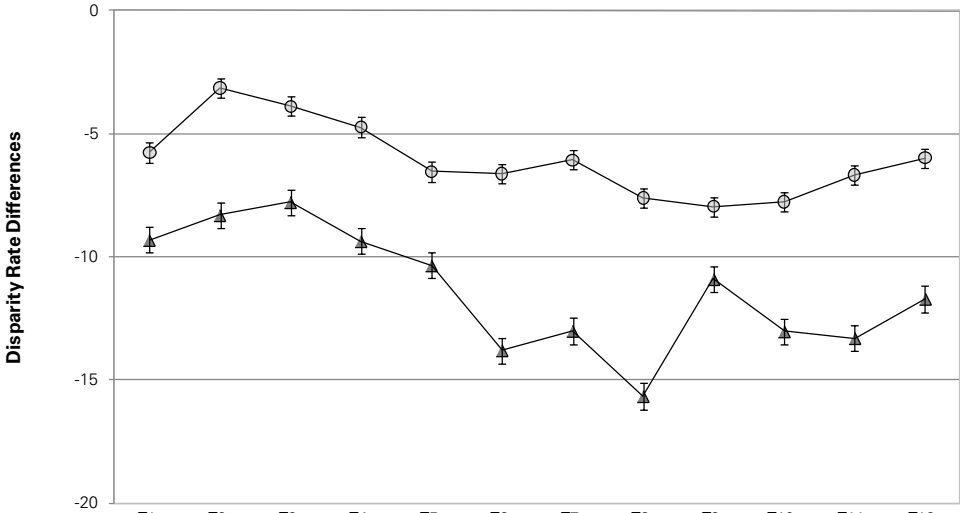
Urban Disparity Rate Ratios T12 to T1: 0.99 (95% CI 0.93, 1.06) NS

Rural Disparity Rate Ratios T12 to T1: 0.95 (95% CI 0.89, 1.02) NS

Source: Manitoba Centre for Health Policy, 2010

Figure 6.8: Continuity of Care Disparity Rate Differences by Urban and Rural Income Quintile

Adjusted by (2006/07-2007/08) age & sex, percent of residents with at least 50% of visits to the same physician



	T1: 1984/85-1985/86	T2: 1986/87-1987/88	T3: 1988/89-1989/90	T4: 1990/91-1991/92	T5: 1992/93-1993/94	T6: 1994/95-1995/96	T7: 1996/97-1997/98	T8: 1998/99-1999/00	T9: 2000/01-2001/02	T10: 2002/03-2003/04	T11: 2004/05-2005/06	T12: 2006/07-2007/08
Rural Disparity Rate Differences	-9.31	-8.30	-7.77	-9.36	-10.34	-13.80	-13.01	-15.66	-10.90	-13.03	-13.30	-11.70
Urban Disparity Rate Differences	-5.76	-3.14	-3.88	-4.73	-6.54	-6.63	-6.06	-7.61	-7.96	-7.76	-6.68	-5.99

Time Period (fiscal years)

Urban Disparity Rate Differences T12 to T1: 1.04, NS

Rural Disparity Rate Differences T12 to T1: 1.26, p<.001

Source: Manitoba Centre for Health Policy, 2010

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Hospitalization due to Tuberculosis

Definition

Tuberculosis (TB) is a disease that is acquired through an infection from a bacterium called *Mycobacterium tuberculosis*. TB is highly contagious: it is spread through the air by individuals with infected lungs or throats when they cough, sneeze, or talk. An individual with a spreading TB disease will become sick; and if left untreated, the individual may die.

In this report, we calculated the average annual hospital episode rates for TB per 100,000 residents for all ages. We used ICD–9 codes 011–018 and ICD–10 codes A15–A19 to identify these hospital visits. We included all diagnosis fields for TB in dX01–dX16. Only those who had a diagnosis of TB were counted for this indicator; therefore, the code for "primary tuberculosis infection" (010.xx, coded for individuals who have a skin test for TB) has been excluded.

Time Periods	Average annual hospitalizations for TB per 100,000
T1: 1984/85–1988/89	16.67
T2: 1989/90–1993/94	11.01
T3: 1994/95–1998/99	11.32
T4: 1999/00–2003/04	10.29
T5: 2004/05–2007/08	12.81

Key Findings: Hospitalization due to Tuberculosis

Manitoba overall rates:

- From the first time period T1 (1984/85–1988/89) to the last time period T5 (2004/05–2007/08), hospitalizations due to tuberculosis rates have decreased from 16.67 per 100,000 to 12.81 per 100,000 residents provincially.

Rates by neighbourhood income quintile over time:

Rural:

- Comparing only T1 to T5, the rate of hospitalizations due to tuberculosis among rural residents increased for R1 and R2 and decreased for R4 and R5.
- The rates of hospitalizations due to tuberculosis are much higher in R1 than in the other rural neighbourhood income quintile groups.
- The disparity in hospitalizations due to tuberculosis rates between R1 and R5 increased over time between the first and last time period. The rate ratio of R1 compared to R5 was 2.72 in the first time period and 5.83 in the last time period, a statistically significant increase of 114%. The absolute difference gap in tuberculosis hospitalization rates comparing R1 to R5 was 26.22 more hospitalizations per 100,000 residents in T1, and 47.91 more in T5, a statistically significant increase over time of 82%.

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Urban:

- From T1 to T5, rates of hospitalizations due to tuberculosis dropped for U1, U2, and U3; it rose slightly for U4 and remained stable for U5.
- Depending upon the measure used, the disparity between U1 and U5 remained similar or narrowed between the first and last time period for tuberculosis hospitalization rates. The rate ratio of U1 compared to U5 was 14.46 in the first time period and 9.43 in the last time period; this decrease is not statistically significantly different. The absolute difference gap in tuberculosis hospitalization rates comparing U1 to U5 decreased over the study period; 35.20 per 100,000 more tuberculosis hospitalizations in U1 compared to U5 in the first time period, and 19.19 more per 100,000 in the last time period, for a statistically significant decrease of 45%.

Lorenz Curves:

Rural over time:

- In T1, 40.9% of tuberculosis hospitalizations were accounted for in the 20.0% of the rural population in the lowest neighbourhood income quintile group (R1), with the Gini coefficient of 0.260 indicating a statistically significant (and large) inequality.
- In T5, 57.2% of the tuberculosis hospitalizations were accounted for in the 19.9% of the population in the lowest neighbourhood income quintile group (R1), with the Gini coefficient of 0.463 indicating a statistically significant (and large) inequality.
- The Gini coefficient from T1 to T5 increased from 0.260 to 0.463, a statistically significant increase ($p<.0001$), showing increasing disparity over time.

Urban over time:

- In T1, 58.4% of tuberculosis hospitalizations were accounted for in the19.9% of the urban population in the lowest neighbourhood income quintile group (U1), with the Gini coefficient of 0.496 indicating a statistically significant (and large) disparity.
- In T5, 52.9% of tuberculosis hospitalizations were accounted for in the 20.0% of the urban population in the lowest neighbourhood income quintile group (U1), with the Gini coefficient of 0.401 indicating a statistically significant (and large) disparity.
- The Gini coefficient decreased from the first to the last time period, but this decrease was not statistically significant, suggesting stability of inequality in urban residents over that time period.

Rural compared to urban in most recent time period:

- In the most recent time period T5, there is no statistically significantly difference between Gini coefficients in rural compared to urban areas, indicating a similar level of inequality in rural and urban Manitoba for hospitalizations due to tuberculosis.

Disparity measures over time by rural and urban:

- The disparity rate ratios (DRRs) (i.e., the ratio of rates of hospitalizations due to tuberculosis in the lowest compared to the highest neighbourhood income group) are similar across time for the urban neighbourhood income quintiles, but show statistically significantly increasing disparity over time in the rural neighbourhood income quintiles. In T1, the urban rate ratio was higher than the rural gap; for subsequent time periods, the relative ratios did not differ across urban and rural areas.

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- The disparity rate differences (DRDs) for the rural neighbourhood income quintiles are statistically increasing over time, while there was statistically significantly decreasing disparity over time in the urban neighbourhood income quintiles. The absolute differences between the lowest and highest neighbourhood income groups were similar across rural and urban quintiles for all time periods except the last time period, where the rate difference in rural areas was wider than in urban areas.

What is this telling us?

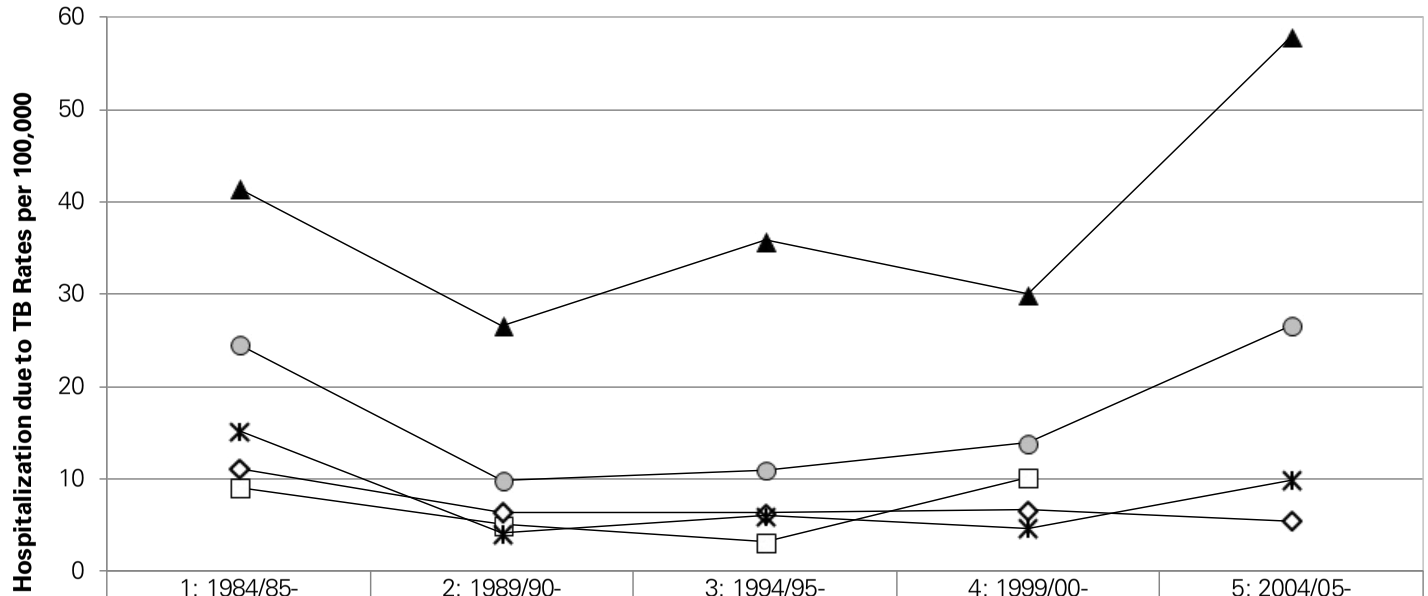
- The socioeconomic gap in rates of hospitalizations due to tuberculosis is very high in both rural and urban neighbourhood income quintiles in all time periods.
- The socioeconomic gap in tuberculosis hospitalization rates is widening over time in rural Manitoba, according to all three measures. However, in urban areas, the socioeconomic gap is narrowing according to some measures, but staying similar according to other measures.
- Although the rate ratio in tuberculosis hospitalization rates by neighbourhood income quintile groups was higher in urban compared to rural in the first time period, for all subsequent time periods the rate ratio was similar between rural and urban areas. On the other hand, the rate difference by neighbourhood income quintile groups was similar between rural and urban areas for all time periods except the last, when the gap was wider in rural compared to urban areas.
- Over time, the rate ratio is similar in urban neighbourhood income groups, but is widening in rural neighbourhood income groups. The rate difference is narrowing over time in urban neighbourhood income quintile groups, but staying the same over time for the rural neighbourhood income quintile groups.

Where to from here?

- An examination of all the factors that lead to hospitalization for tuberculosis should be undertaken to understand where, along the pathway, success has been found in decreasing hospitalization rates in low neighbourhood income groups in urban areas. For example: a person is exposed and the tuberculosis becomes latent or active; they seek or do not seek prompt primary care; they are accurately diagnosed with appropriate medical tests; they are treated with appropriate medications to which their particular tuberculosis is sensitive; and, thorough contact tracing is done to limit the spread to other people. This is not an exhaustive list as things such as exposure also depend on factors such as housing quality, overcrowding, etc.
- Investigation into the differences between rural and urban tuberculosis programs should be completed so the successes of the urban program could be applied to rural areas.

Figure 6.9: Hospitalization Due to Tuberculosis Rates Over Time by Rural Income Quintile

Adjusted by (2004/05-2007/08) age & sex, annual rate per 100,000 residents, all ages



	1: 1984/85-1988/89	2: 1989/90-1993/94	3: 1994/95-1998/99	4: 1999/00-2003/04	5: 2004/05-2007/08
NF (Not displayed)	16.66	17.34	29.72	28.08	28.63
R1 (lowest income)	41.42	26.61	35.87	29.99	57.83
R2	24.52	9.91	11.00	13.93	26.63
R3	9.12	5.10	3.18	10.21	s
R4	11.13	6.42	6.32	6.68	5.49
R5 (highest income)	15.21	4.16	6.02	4.71	9.92
Disparity Rate Ratios (R1/R5)	2.72	6.40	5.96	6.37	5.83
Disparity Rate Differences (R1-R5)	26.22	22.45	29.85	25.28	47.91

Time Period (fiscal years)

Comparison of Disparity Rate Ratios T5 to T1: 2.14 (95% CI 1.21, 3.82) p< .01

Comparison of Disparity Rate Differences T5 to T1: 1.82 p< .001

Source: Manitoba Centre for Health Policy, 2010

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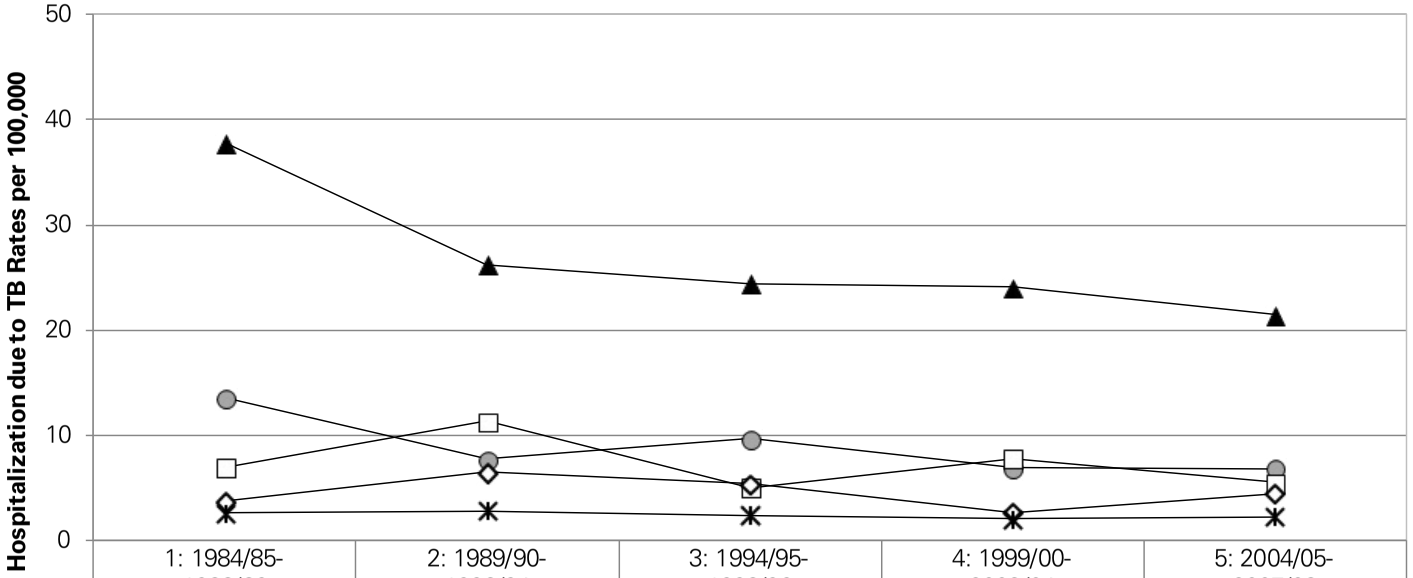
Figure 6.10: Hospitalization Due to Tuberculosis Rates Over Time by Urban Income Quintile

Adjusted by (2004/05-2007/08) age & sex, annual rate per 100,000 residents, all ages



	1: 1984/85-1988/89	2: 1989/90-1993/94	3: 1994/95-1998/99	4: 1999/00-2003/04	5: 2004/05-2007/08
NF (Not displayed)	16.66	17.34	29.72	28.08	28.63
U1 (lowest income)	37.81	26.21	24.40	24.07	21.47
U2	13.56	7.74	9.66	6.93	6.86
U3	6.99	11.36	5.02	7.82	5.53
U4	3.74	6.47	5.35	2.68	4.50
U5 (highest income)	2.61	2.82	2.41	2.08	2.28
Disparity Rate Ratios (U1/U5)	14.46	9.31	10.11	11.58	9.43
Disparity Rate Differences (U1-U5)	35.20	23.40	21.98	21.99	19.19

Time Period (fiscal years)

Comparison of Disparity Rate Ratios T5 to T1: 0.65 (95% CI 0.28, 1.50) NS

Comparison of Disparity Rate Differences T5 to T1: 0.55, p< .001

Source: Manitoba Centre for Health Policy, 2010

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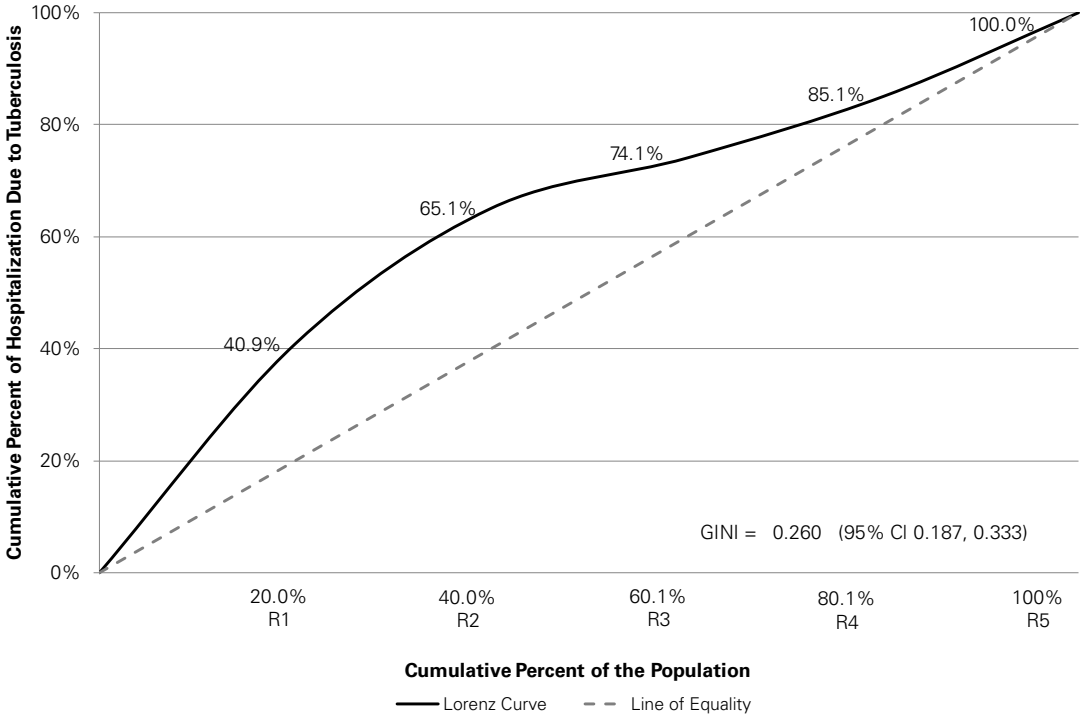
Figure 6.11: Adjusted Lorenz Curve for Hospitalization Due to Tuberculosis in Rural Areas 1984/85-1988/89

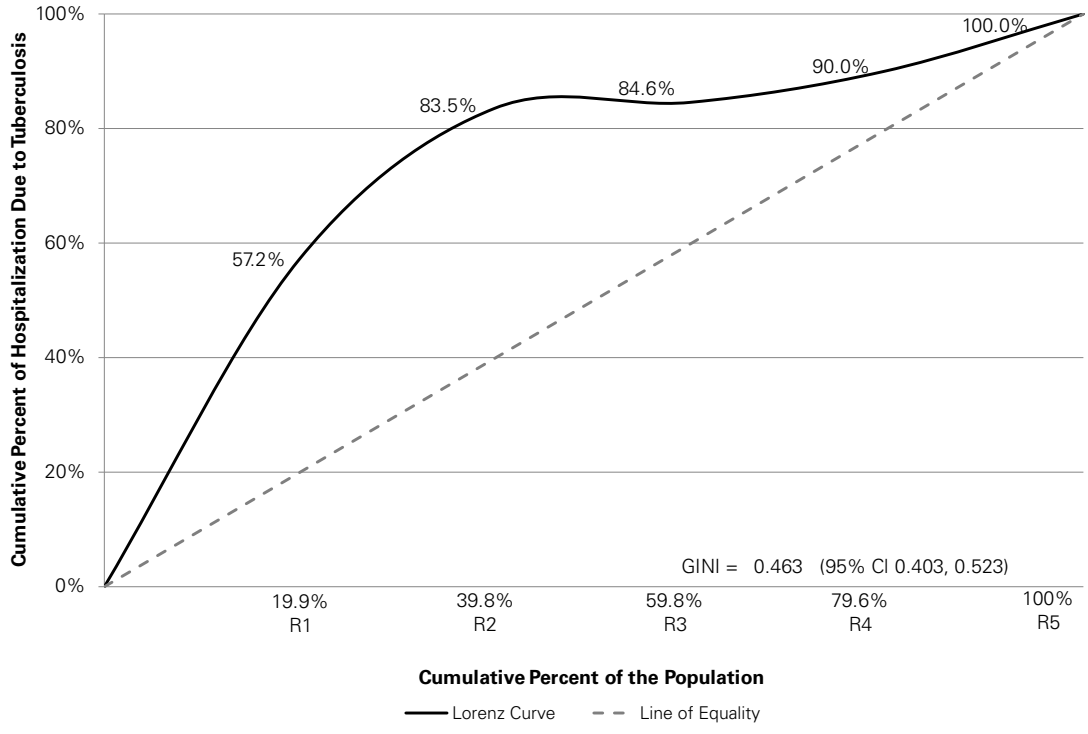
Adjusted by (2004/05-2007/08) age & sex, residents, all ages



Source: Manitoba Centre for Health Policy, 2010

Figure 6.12: Adjusted Lorenz Curve for Hospitalization Due to Tuberculosis in Rural Areas 2004/05-2007/08

Adjusted by (2004/05-2007/08) age & sex, residents, all ages



Source: Manitoba Centre for Health Policy, 2010

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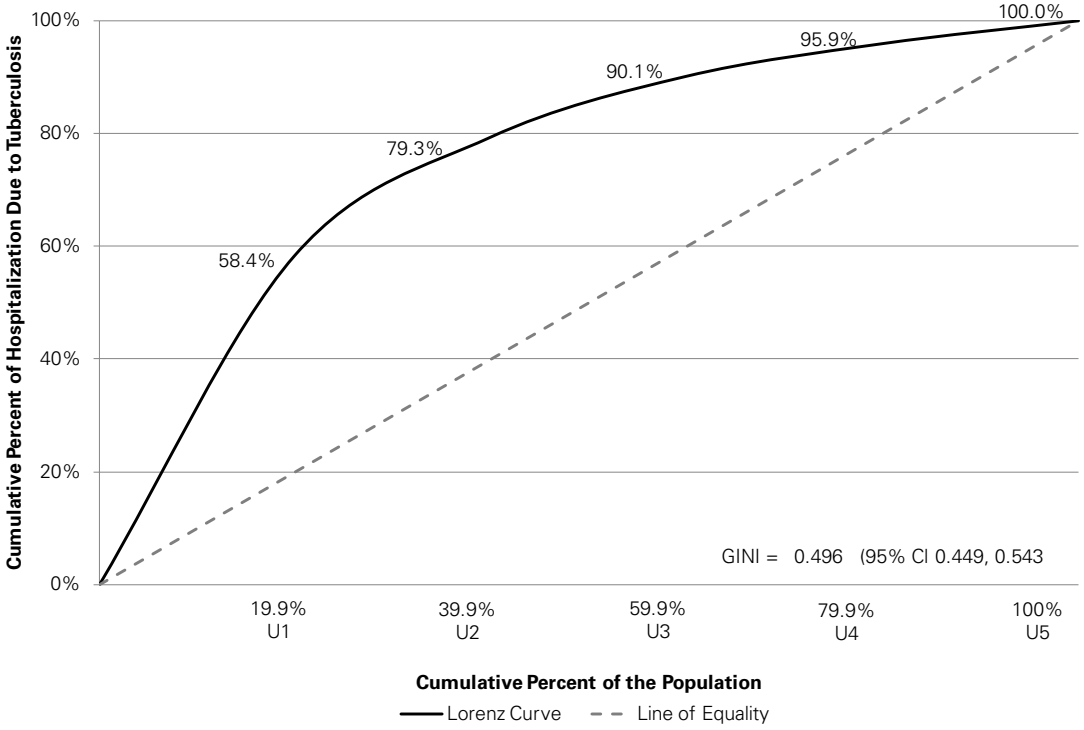
Figure 6.13: Adjusted Lorenz Curve for Hospitalization Due to Tuberculosis in Urban Areas 1984/85-1988/89

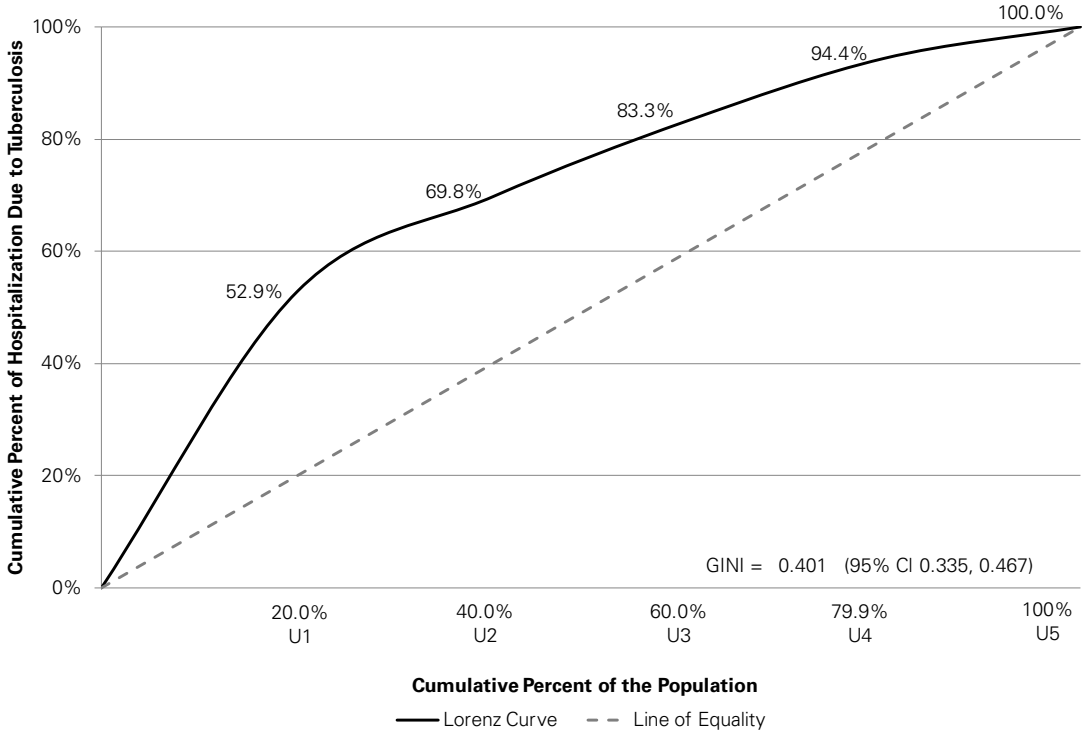
Adjusted by (2004/05-2007/08) age & sex, residents all ages



Source: Manitoba Centre for Health Policy, 2010

Figure 6.14: Adjusted Lorenz Curve for Hospitalization Due to Tuberculosis in Urban Areas 2004/05-2007/08

Adjusted by (2004/05-2007/08) age & sex, residents, all ages



Source: Manitoba Centre for Health Policy, 2010

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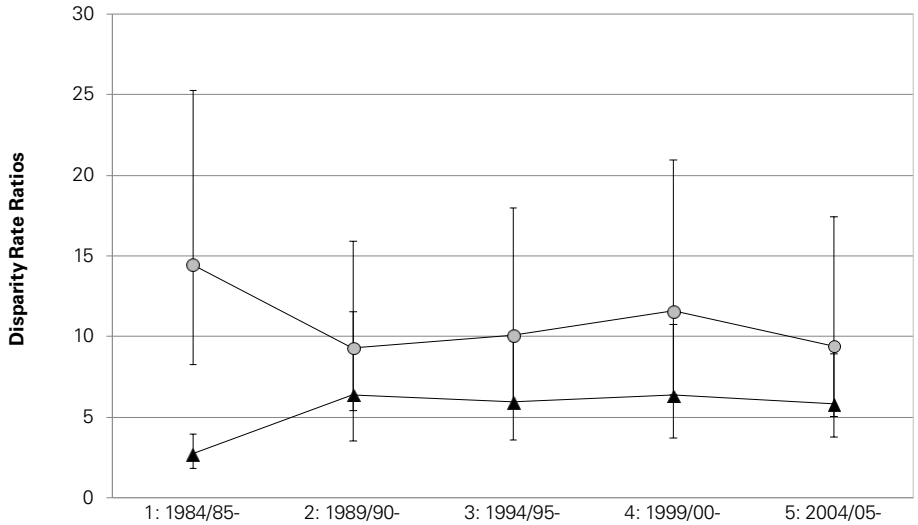
Figure 6.15: Hospitalization Due to Tuberculosis Disparity Rate Ratios by Urban and Rural Income Quintile

Adjusted by (2004/05-2007/08) age & sex, per 100,000 residents, all ages



	1: 1984/85-1988/89	2: 1989/90-1993/94	3: 1994/95-1998/99	4: 1999/00-2003/04	5: 2004/05-2007/08
Urban Disparity Rate Ratios	14.46	9.31	10.11	11.58	9.43
Rural Disparity Rate Ratios	2.72	6.40	5.96	6.37	5.83

Time Period (fiscal years)

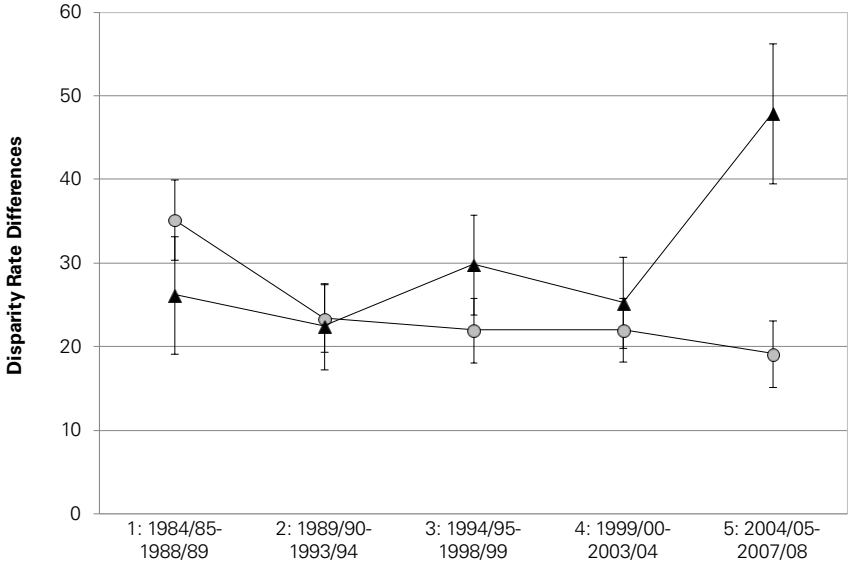
Urban Disparity Rate Ratios T5 to T1: 0.65 (95% CI 0.28, 1.50) NS

Rural Disparity Rate Ratios T5 to T1: 2.14 (95% CI 1.20, 3.82) p< .01

Source: Manitoba Centre for Health Policy, 2010

Figure 6.16: Hospitalization Due to Tuberculosis Disparity Rate Differences by Urban and Rural Income Quintile

Adjusted by (2004/05-2007/08) age & sex, per 100,000 residents, all ages



	1: 1984/85-1988/89	2: 1989/90-1993/94	3: 1994/95-1998/99	4: 1999/00-2003/04	5: 2004/05-2007/08
Urban Disparity Rate Differences	35.20	23.40	21.98	21.99	19.19
Rural Disparity Rate Differences	26.22	22.45	29.85	25.28	47.91

Time Period (fiscal years)

Urban Disparity Rate Differences T5 to T1: 0.55, p< .001

Rural Disparity Rate Differences T5 to T1: 1.83, p< .001

Source: Manitoba Centre for Health Policy, 2010

Cervical Cancer Screening

Definition

Also called a **Papanicolaou (Pap) test, cervical cancer screening** is based on the examination of cells collected from the cervix to reveal pre–malignant (before cancer) and malignant (cancer) changes as well as changes due to non–cancerous conditions such as inflammation from infections.

Cervical cancer screening was measured as the age–adjusted proportion of women aged 18–69 who received at least one Pap test in three fiscal years, from 1984/85–1986/87 through to 2005/06–2007/08. Crude rates are available in the appendix. See Glossary for tariff codes used. The denominator includes all Manitoba female residents aged 18–69 in the three–year period. Women who have had a complete hysterectomy surgery were excluded from both the numerator and denominator. Rates for northern and remote areas served by nursing stations may be underestimated due to missing data.

Time Periods	Percentage of women aged 18–69 over a three–year period
T1: 1984/85–1986/87	64.76
T2: 1987/88–1989/90	67.85
T3: 1990/91–1992/93	66.73
T4: 1993/94–1995/96	65.47
T5: 1996/97–1998/99	65.80
T6: 1999/00–2001/02	67.21
T7: 2002/03–2004/05	65.64
T8: 2005/06–2007/08	65.50

Key Findings: Cervical Cancer Screening

Manitoba overall rates:

- From the first time period T1 (1984/85–1986/87) to the last time period T8 (2005/06–2007/08), Pap test rates have been relatively stable from 64.8% to 65.5% provincially.

Rates by neighbourhood income quintile over time:

Rural:

- Comparing only T1 to T8, the Pap test rate among rural women aged 18–69 remained similar in most rural quintiles, with the exception of R1 where rates may have decreased over time. [6]

6 In the case of certain indicators where fewer events or percentages occur in the lowest compared to the highest quintile (such as in the case of Pap tests), DRRs are below 1 and DRDs are negative—the directions of differences are somewhat non–intuitive. The "lower" the ratio below 1 (for example, 0.7 rather than 0.8), the greater the disparity (i.e., 30% compared to 20% difference). As well, the more negative the difference (for example, –20 compared to –10), the greater the disparity. So what appears as a positive outcome ("lower" disparity) of lower DRRs or lower DRDs on the y–axis is actually a greater disparity.

- The disparity in Pap test rates between R1 and R5 increased over time between the first and last time period. The rate ratio of R1 compared to R5 was 0.82 in the first time period and 0.72 in the last time period, a statistically significant widening of the gap mainly due to the decrease in Pap test rates in R1. The absolute difference gap in Pap test rates comparing R1 to R5 was 12.03 less Pap tests per 100 women in T1 and 18.37 less in T8, showing a statistically significant decrease in Pap testing in R1 compared to R5 over time.

Urban:

- From T1 to T8, Pap test rates remained relatively stable over time with slight increases in U2 to U5, but slight decreases in U1, so the gap widens.
- Depending upon the measure used, the disparity between U1 and U5 remained similar or widened between the first time period T1 and the second time period T8 for Pap test rates. The rate ratio of U1 compared to U5 was 0.84 in the first time period and 0.80 in the last time period; this small increase of 4% in the rate ratio is not statistically significantly different. The absolute difference gap in Pap test rates comparing U1 to U5 widened; 11.55 per 100 less Pap tests in U1 compared to U5 in the first time period and 14.62 less per 100 in the last time period, for a statistically significant increase in the difference.

Lorenz Curves:

Rural over time:

- In T1, 16.5% of Pap tests were accounted for in the 18.7% of the rural population of women aged 18–69 in the lowest neighbourhood income quintile group (R1), with the Gini coefficient of 0.035 indicating a statistically significant (although relatively small) inequality.
- In T8, only 14.6% of Pap tests were accounted for in the 18.3% of the population of women aged 18–69 in the lowest neighbourhood income quintile group (R1), with the Gini coefficient of 0.059 indicating a statistically significant inequality.
- The Gini coefficient from T1 to T8 increased from 0.035 to 0.059 ($p<.0001$), a statistically significant increase showing increasing disparity over time.

Urban over time:

- In T1, 17.4% of Pap tests were accounted for in the 19.3% of the urban population of women aged 18–69 in the lowest neighbourhood income quintile group (U1), with the Gini coefficient of 0.033 indicating a statistically significant disparity.
- In T8, 16.7% of Pap tests were accounted for in the 19.1% of the urban population in the lowest neighbourhood income quintile group (U1), with the Gini coefficient of 0.041 indicating a statistically significant disparity.
- The Gini coefficient increased slightly from the first to the last time period (0.033 to 0.041, $p<.04$), showing a statistically significant increase in inequality in urban residents over that time period.

Rural compared to urban in most recent time period:

- In the most recent time period T8, there is a statistically significantly higher Gini coefficient in rural compared to urban (0.059 vs. 0.041, $p<.0007$), indicating a higher level of inequality in rural Manitoba for Pap tests in women aged 18–69.

Disparity measures over time by rural and urban:

- The disparity rate ratios (DRRs) (i.e., the ratio of Pap test rates in the lowest compared to the highest neighbourhood income group) are similar across time for the urban neighbourhood income quintiles, but the rural neighbourhood income quintiles show statistically significantly increasing disparity over time (i.e., the ratios are below 1 and decreasing). The disparity rate ratios of urban and rural neighbourhood income quintile groups are quite similar, with the tendency that rural DRRs tend to show higher disparity for most time periods (although not statistically significant in most time periods).

- The disparity rate differences (DRDs) are widening for both urban and rural neighbourhood income quintiles over time, with statistically significant differences comparing T8 to T1 in both groups. However, for every time period except T4 (mid–1990s), the absolute differences between lowest and highest neighbourhood income quintile group are statistically significantly larger (i.e., more negative) in rural compared to urban.

What is this telling us?

- The socioeconomic gap in Pap test rates for women aged 18–69 is widening over time in rural Manitoba, according to all measures. However, in urban areas, the socioeconomic gap is possibly widening according to some indicators, but staying similar according to other indicators.

- The rate ratio in Pap test rates by neighbourhood income quintile groups is similar in rural and urban in some time periods and higher in rural for other time periods. Over time, the rate ratio is staying similar in urban neighbourhood income groups, but is widening in rural neighbourhood income groups. The rate difference is increasing over time in both urban and rural neighbourhood income quintile groups; but for most time periods, the rate difference in Pap test rates is statistically significantly larger in the rural groups.

- Most neighbourhood income groups in both rural and urban Manitoba show similar or decreasing Pap test rates among women aged 18–69 over time. R1 and R2 patterns show the greatest decrease over time, from 54.1% in T1 to 48.1% in T8 for R1 and 61.1% to 56.1% in the same time periods for R2. All other neighbourhood income quintile groups show either smaller drops of 1–2% or similar or increasing rates from T1 to T8.

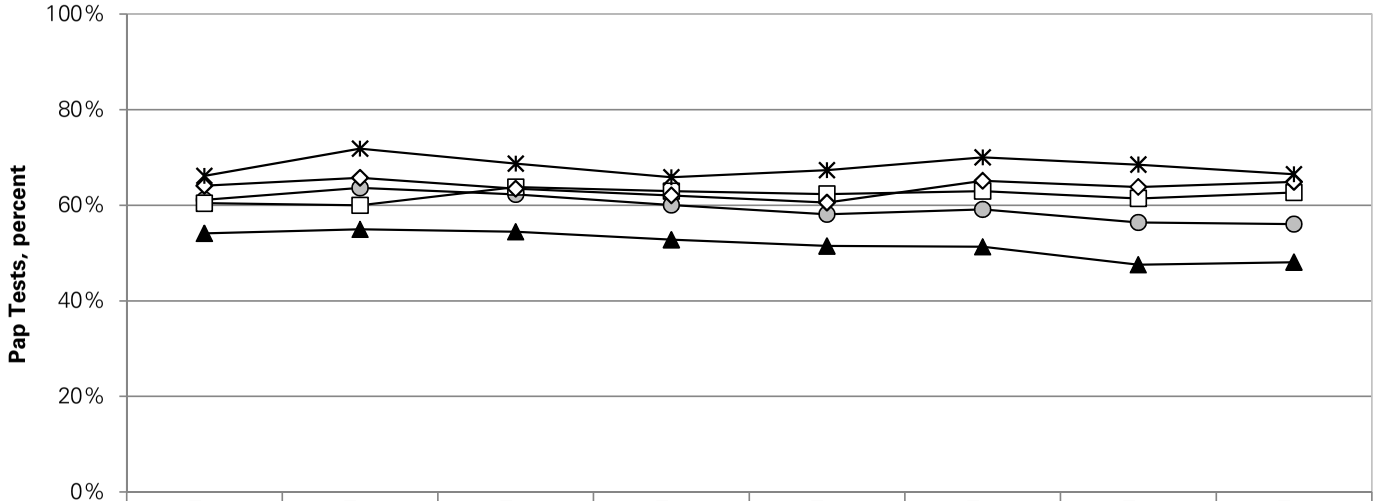
- The largest socioeconomic gap in Pap test rates for women aged 18–69 occur in the most recent time period T8 (2005/06–2007/08) for both urban and rural Manitoba. However, the inequality in Pap tests is relatively small (i.e., the bend in the Lorenz curve is close to equality) compared to several other indicators in this report. For 19.1% of the population of women aged 18–69 in the lowest neighbourhood income quintile R1 in rural, they account for 16.7% of the Pap tests. For 18.3% of the population in U1, they account for 14.6% of the Pap tests.

Where to from here?

- There are inequities in Pap test rates for women aged 18–69 by neighbourhood income groups, especially in rural Manitoba. These are increasing over time according to several disparity measures. However, all Pap test rates in all neighbourhood income quintile groups appear to have changed very little or slightly decreased from the first to the last time period. This would indicate the need for a universal screening program to increase rates across all socioeconomic groups, with possible targeted interventions especially for women in the lowest rural neighbourhood income quintiles.

Figure 6.17: Papanicolaou Test Rates Over Time by Rural Income Quintile

Adjusted by (2005/06-2007/08) age, percent of women aged 18-69 with one or more Pap smears in a three-year period



	T1: 1984/85-1986/87	T2: 1987/88-1989/90	T3: 1990/91-1992/93	T4: 1993/94-1995/96	T5: 1996/97-1998/99	T6: 1999/00-2001/02	T7: 2002/03-2004/05	T8: 2005/06-2007/08
NF (Not displayed)	38.31	39.98	47.72	85.95	38.54	39.84	36.58	43.80
R1 (lowest income)	54.13	54.97	54.47	52.78	51.47	51.32	47.57	48.10
R2	61.11	63.63	62.26	60.05	58.13	59.13	56.40	56.06
R3	60.42	60.00	63.80	62.95	62.35	62.97	61.44	62.69
R4	64.08	65.76	63.47	62.06	60.54	65.14	63.83	64.90
R5 (highest income)	66.16	71.85	68.70	65.86	67.34	70.03	68.51	66.47
Disparity Rate Ratios (R1/R5)	0.82	0.77	0.79	0.80	0.76	0.73	0.69	0.72
Disparity Rate Differences (R1-R5)	-12.03	-16.88	-14.23	-13.08	-15.87	-18.70	-20.94	-18.37

Time Period (fiscal years)

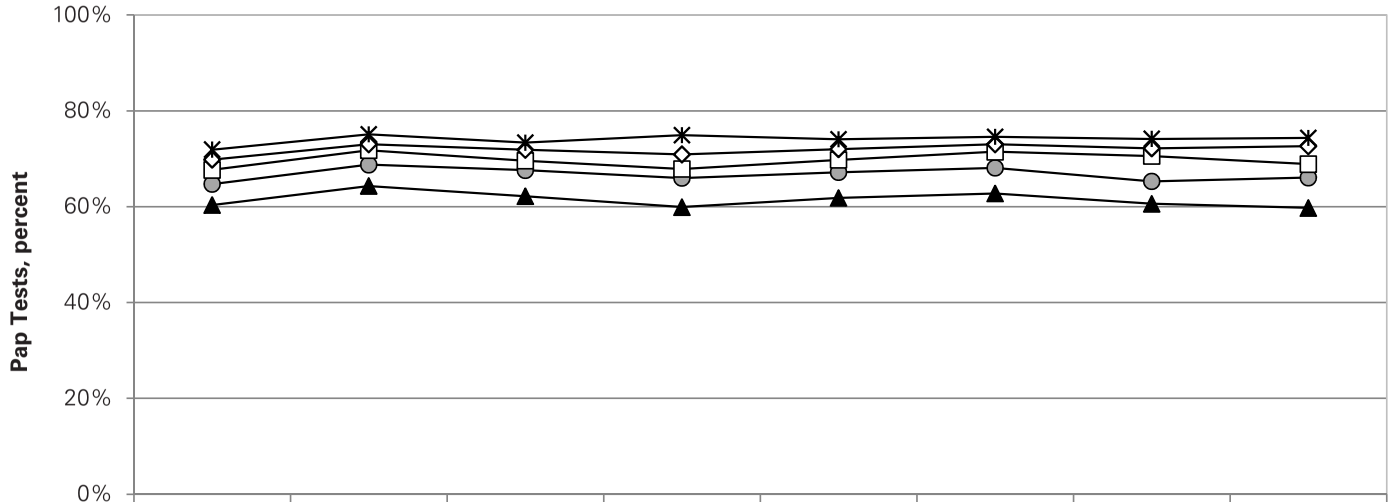
Comparison of Disparity Rate Ratios T8 to T1: 0.88 (95% CI 0.78, 1.00) p<.05

Comparison of Disparity Rate Differences T8 to T1: 1.53, p<.001

Source: Manitoba Centre for Health Policy, 2010

Figure 6.18: Papanicolaou Test Rates Over Time by Urban Income Quintile

Adjusted by (2005/06-2007/08) age, percent of women aged 18-69 with one or more Pap smears in a three-year period



	T1: 1984/85-1986/87	T2: 1987/88-1989/90	T3: 1990/91-1992/93	T4: 1993/94-1995/96	T5: 1996/97-1998/99	T6: 1999/00-2001/02	T7: 2002/03-2004/05	T8: 2005/06-2007/08
NF (Not displayed)	38.31	39.98	47.72	85.95	38.54	39.84	36.58	43.80
U1 (lowest income)	60.35	64.33	62.18	59.91	61.82	62.75	60.60	59.74
U2	64.73	68.75	67.61	65.98	67.16	68.11	65.27	66.06
U3	67.66	71.78	69.57	67.87	69.76	71.46	70.58	68.87
U4	69.84	73.03	71.87	70.92	72.02	73.03	72.19	72.62
U5 (highest income)	71.91	75.10	73.35	74.91	74.08	74.58	74.15	74.36
Disparity Rate Ratios (U1/U5)	0.84	0.86	0.85	0.80	0.83	0.84	0.82	0.80
Disparity Rate Differences (U1-U5)	-11.55	-10.77	-11.17	-15.00	-12.25	-11.84	-13.55	-14.62

Time Period (fiscal years)

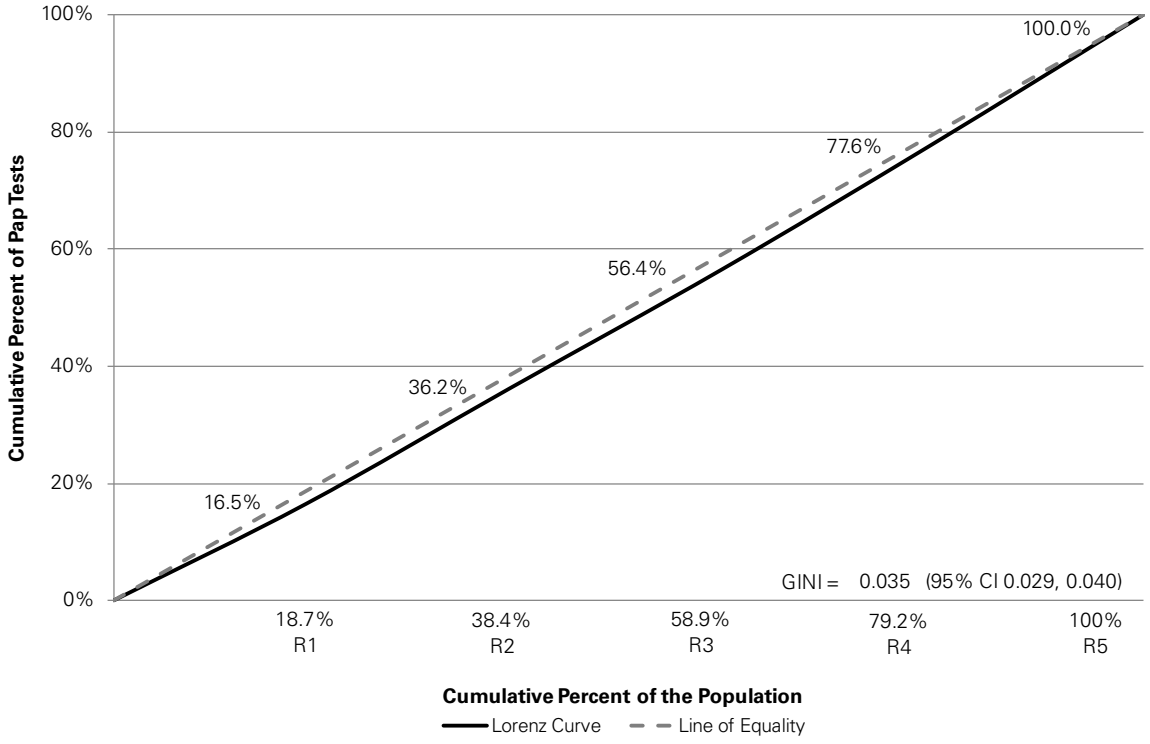
Comparison of Disparity Rate Ratios T8 to T1: 0.96 (95% CI 0.85, 1.08) NS

Comparison of Disparity Rate Differences T8 to T1: 1.27, p<.001

Source: Manitoba Centre for Health Policy, 2010

Figure 6.19: Adjusted Lorenz Curve for Papanicolaou Tests in Rural Areas 1984/85-1986/87

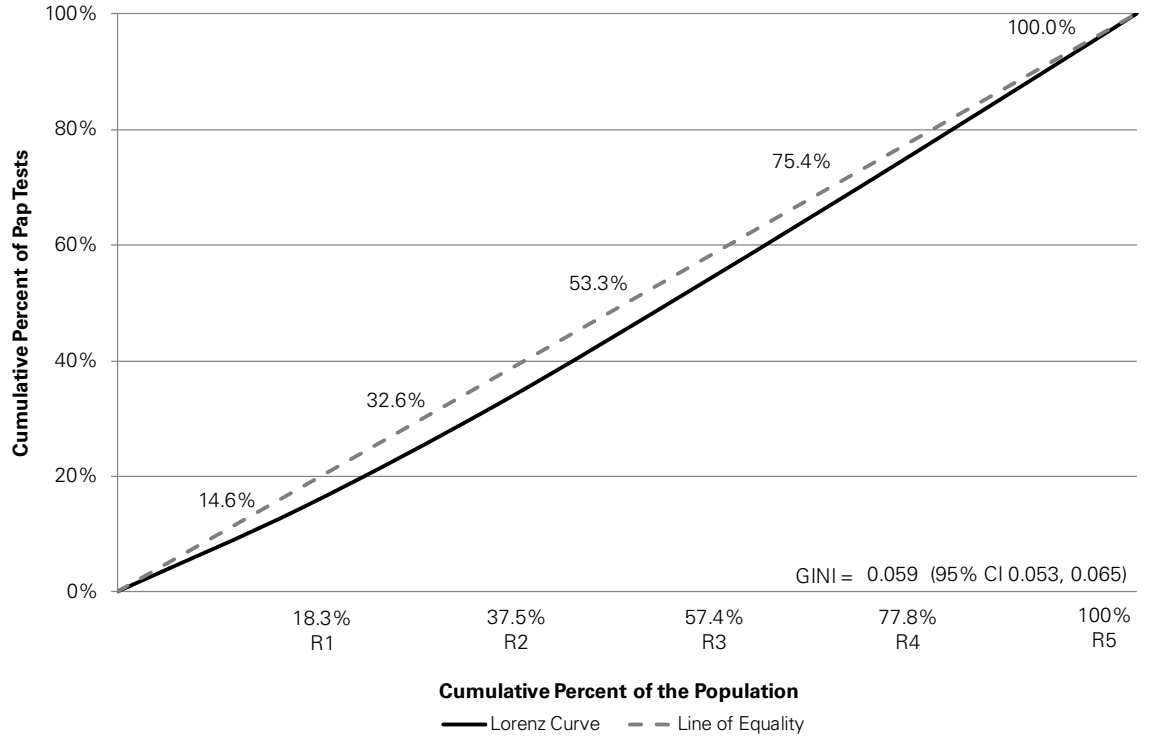
Adjusted by (2005-06/2007-08) age, women aged 18-69 with one or more Pap smears in a three-year period



Source: Manitoba Centre for Health Policy, 2010

Figure 6.20: Adjusted Lorenz Curve for Papanicolaou Tests in Rural Areas 2005-06/2007-08

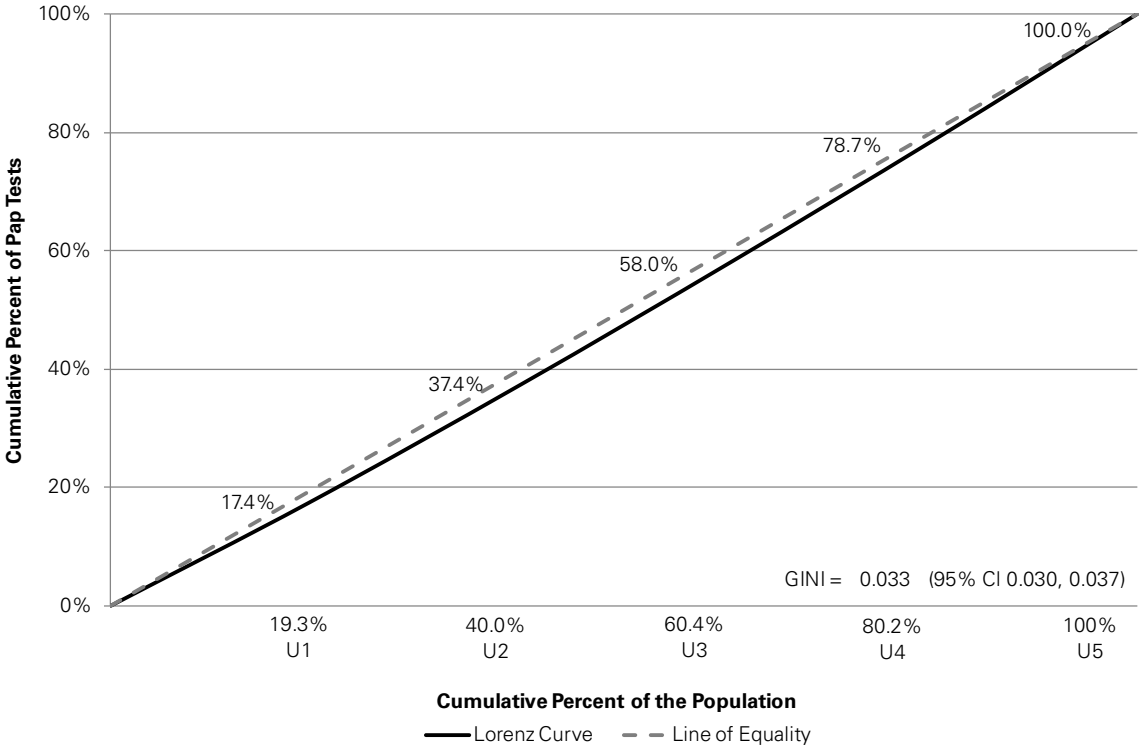
Adjusted by (2005-06/2007-08) age, women aged 18-69 with one or more Pap smears in a three-year period



Source: Manitoba Centre for Health Policy, 2010

Figure 6.21: Adjusted Lorenz Curve for Papanicolaou Tests in Urban Areas 1984/85-1986/87

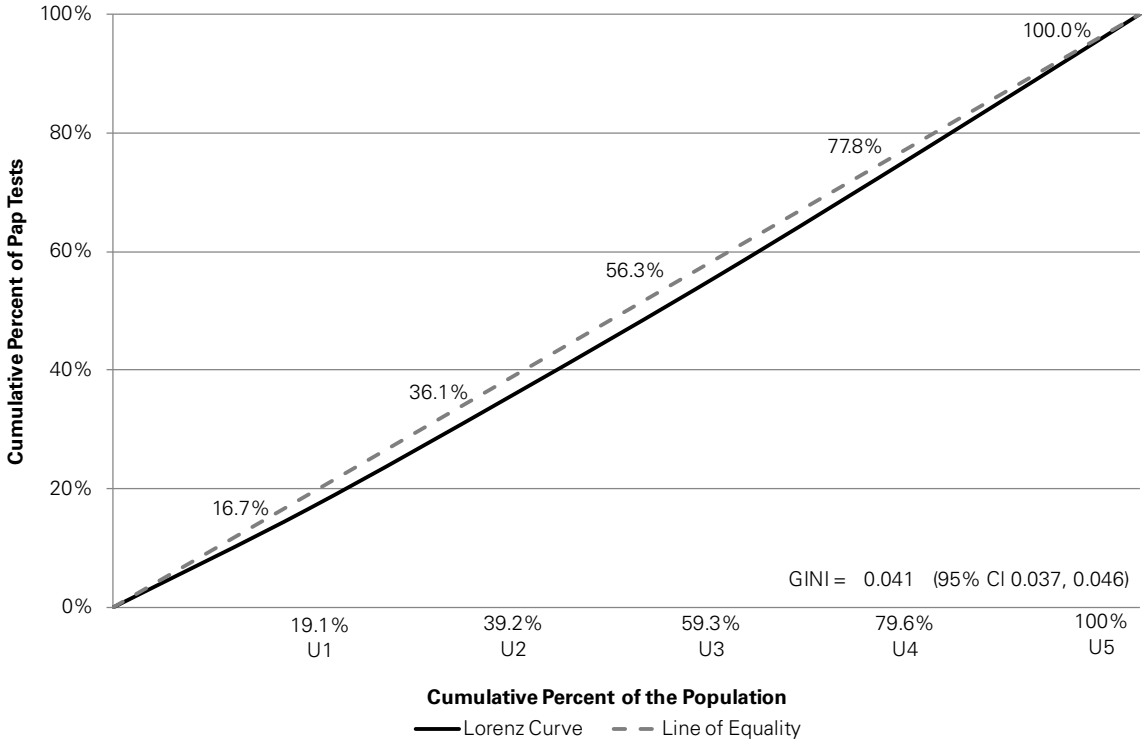
Adjusted by (2005/06-2007/08) age, women aged 18-69 with one or more Pap smears in a three-year period



Source: Manitoba Centre for Health Policy, 2010

Figure 6.22: Adjusted Lorenz Curve for Papanicolaou Tests in Urban Areas 2005-06/2007-08

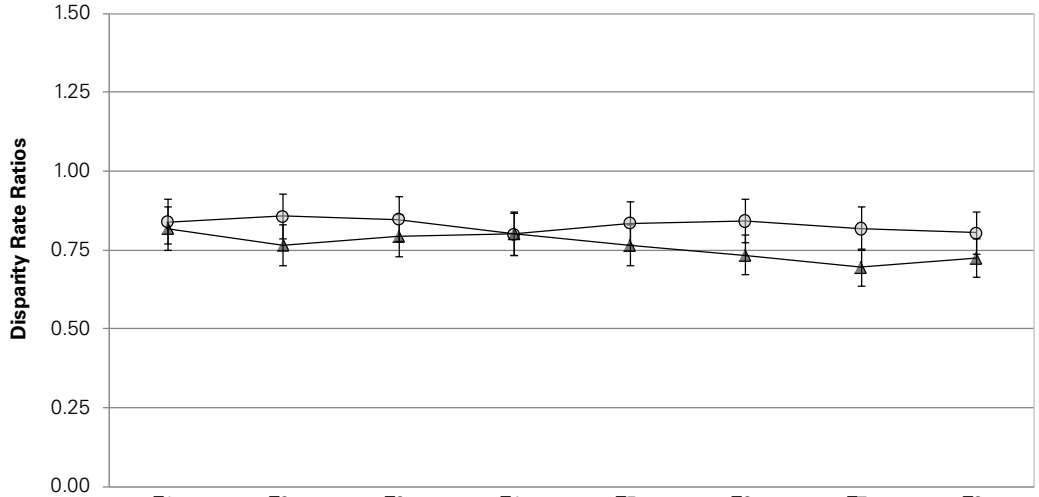
Adjusted by (2005/06-2007/08) age, women aged 18-69 with one or more Pap smears in a three-year period



Source: Manitoba Centre for Health Policy, 2010

Figure 6.23: Papanicolaou Test Disparity Rate Ratios by Urban and Rural Income Quintile

Adjusted by (2005/06-2007/08) age, percent of women aged 18-69 with one or more Pap smears in a three-year period



	T1: 1984/85-1986/87	T2: 1987/88-1989/90	T3: 1990/91-1992/93	T4: 1993/94-1995/96	T5: 1996/97-1998/99	T6: 1999/00-2001/02	T7: 2002/03-2004/05	T8: 2005/06-2007/08
Urban Disparity Rate Ratios	0.84	0.86	0.85	0.80	0.83	0.84	0.82	0.80
Rural Disparity Rate Ratios	0.82	0.77	0.79	0.80	0.76	0.73	0.69	0.72

Time Period (fiscal years)

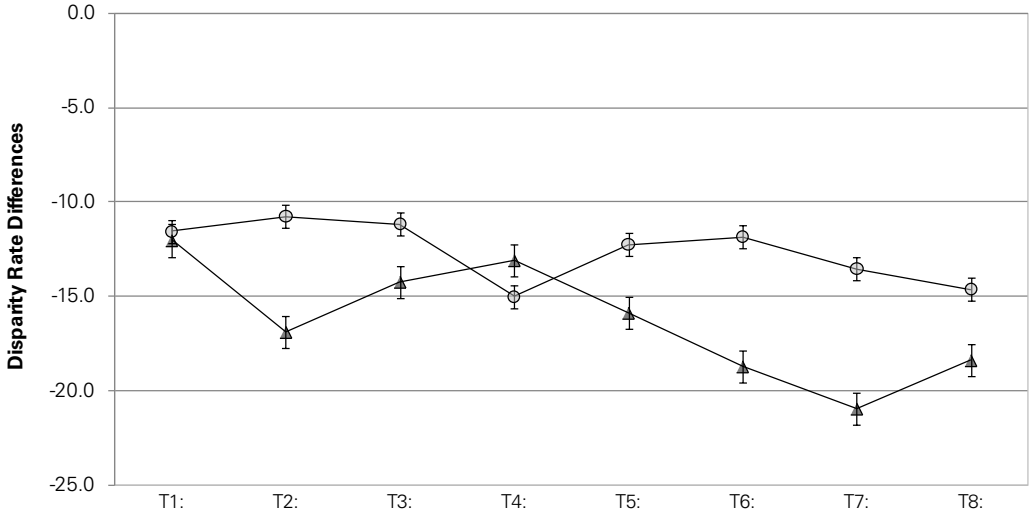
Urban Disparity Rate Ratios T8 to T1: 0.96 (95% CI 0.85, 1.08) NS

Rural Disparity Rate Ratios T8 to T1: 0.88 (95% CI 0.78, 1.00) p< .05

Source: Manitoba Centre for Health Policy, 2010

Figure 6.24: Papanicolaou Test Disparity Rate Differences by Urban and Rural Income Quintile

Adjusted by (2005/06-2007/08) age, percent of women aged 18-69 with one or more Pap smears in a three-year period



	T1: 1984/85-1986/87	T2: 1987/88-1989/90	T3: 1990/91-1992/93	T4: 1993/94-1995/96	T5: 1996/97-1998/99	T6: 1999/00-2001/02	T7: 2002/03-2004/05	T8: 2005/06-2007/08
Urban Disparity Rate Differences	-11.55	-10.77	-11.17	-15.00	-12.25	-11.84	-13.55	-14.62
Rural Disparity Rate Differences	-12.03	-16.88	-14.23	-13.08	-15.87	-18.70	-20.94	-18.37

Time Period (fiscal years)

Urban Disparity Rate Differences T8 to T1: 1.27, p< .001

Rural Disparity Rate Differences T8 to T1: 1.53, p< .001

Source: Manitoba Centre for Health Policy, 2010

Chapter 7: Mental Health

Cumulative Mental Illness

Definition

The grouping **"Cumulative Mental Illness"** was created to provide an overall indicator of the prevalence of mental illness, accounting for the co–occurrence among mental illnesses. Five–year period prevalence of cumulative mental illness was the proportion of the population aged 10 and older that had a diagnosis for any of the following over a five–year period: **depression, anxiety, substance abuse, personality disorders, or schizophrenia**. Refer to the Glossary for more details on the coding of each diagnosis.

Note: Cumulative mental illness rates from previous recent findings are slightly higher than results in this report, due to the exclusion of drugs in the definitions for this report compared to the RHA Indicators Atlas 2009 (Fransoo et al., 2009). This is in an attempt to make the definition consistent across all time periods, as the drug data are only available after 1995.

Time Periods	Five–year period prevalence (%)
T1: 1984/85–1988/89	15.99
T2: 1989/90–1993/94	17.66
T3: 1994/95–1998/99	19.40
T4: 1999/00–2003/04	23.24
T5: 2004/05–2008/09	23.56

Key findings: Cumulative Mental Illness

Manitoba overall rates:

- From the first time period T1 (1984/85–1988/89) to the last time period T5 (2004/05–2008/09), the provincial prevalence of cumulative mental illness increased from 15.99% to 23.56% of the population.

Rates by neighbourhood income quintile over time:
Rural:

- From T1 to T5, the percent of the population aged 10 or older with cumulative mental illness increased steadily for all rural neighbourhood income quintiles. The increase was greatest in R1.
- The disparity between R1 and R5 increased over time. The rate ratio of R1 compared to R5 was almost non–existent in the first time period at 0.98 (i.e., R1 and R5 are very similar, hence the ratio is close to 1). It increased to 1.10 in the last time period, for a statistically significant increase of 12%. The absolute difference gap of cumulative mental illness comparing R1 to R5 also statistically significantly increased over time, from 0.21 *fewer* people per 100 having cumulative mental illness in R1 compared to R5 in the first time period, to 1.83 *more* people with cumulative mental illness per 100 in R1 compared to R5 in the last time period. Although this difference is statistically significant, it represents a minimal change in disparity over time.

Urban:

- From T1 to T5, the percent of the population aged 10 or older with cumulative mental illness increased for all urban neighbourhood income quintile groups, with a plateauing between T4 (1999/2000–2003/04) and T5 (2004/05–2008/09).
- In the urban areas, there is a greater spread by neighbourhood income quintile between all quintiles, compared to minimal spread in the rural quintiles.
- The relative disparity between U1 and U5 was similar from T1 to T5 (i.e., not statistically significantly different, NS), whereas the absolute disparity showed a statistically significant increase. The rate ratio of U1 compared to U5 was 1.50 in the first time period and 1.43 in the last time period, a non–significant change. The absolute difference of cumulative mental illness comparing U1 to U5 statistically significantly increased by 27% over time, from 6.92 more people per 100 with cumulative mental illness in U1 compared to U5 in the first time period to 8.82 more people per 100 with cumulative mental illness in the last time period.

Lorenz Curves:

Rural over time:

- The Lorenz curves show almost no disparity in rural areas in either time period. In T1, 18.6% of the cumulative mental illness occurred in the 19.4% of the population in the lowest neighbourhood income quintile group R1, with the Gini coefficient of 0.001 (NS) indicating no statistically significant disparity.
- In T5, 20.1% of the cumulative mental illness occurred in the 18.9% of the population in the lowest neighbourhood income quintile group R1, with the Gini coefficient of 0.012 indicating a statistically significant, though very small, disparity.
- The Gini coefficients increased from the first to the last time period, and this increase was statistically significant ($p<.005$).

Urban over time:

- In T1, 25.1% of the cumulative mental illness occurred in the 19.9% of the population in the lowest neighbourhood income quintile group U1, with the Gini coefficient of 0.076 indicating a statistically significant disparity.
- In T5, 25.0% of the cumulative mental illness occurred in the 19.8% of the population in the lowest neighbourhood income quintile group U1, with the Gini coefficient of 0.071 indicating a statistically significant disparity.
- The Gini coefficient did not change significantly from the first to the last time period ($p=0.49$, NS) indicating that urban inequality remained similar over that time period.

Rural compared to urban in most recent time period:

- In the most recent time period T5, there is a statistically significantly higher Gini coefficient in urban compared to rural (0.071 vs. 0.012, $p<.0001$), which indicates a higher level of inequality in urban Manitoba for prevalence of cumulative mental illness.

Disparity measures over time by rural and urban:

- The disparity rate ratios (i.e., the ratio of cumulative mental illness in the lowest compared to the highest neighbourhood income group) remained statistically similar over time for urban Manitoba, whereas they increased statistically significantly by 12% in rural Manitoba. However, the ratios are consistently higher in urban Manitoba, indicating a larger rate ratio between lowest and highest neighbourhood income groups in urban Manitoba.

- The disparity rate differences (i.e., the absolute difference of cumulative mental illness between the lowest and highest neighbourhood income group) increased over time in both rural and urban Manitoba. Furthermore, the absolute differences are consistently and substantially higher in urban Manitoba, indicating a larger rate difference between lowest and highest neighbourhood income groups in urban Manitoba.

What is this telling us?

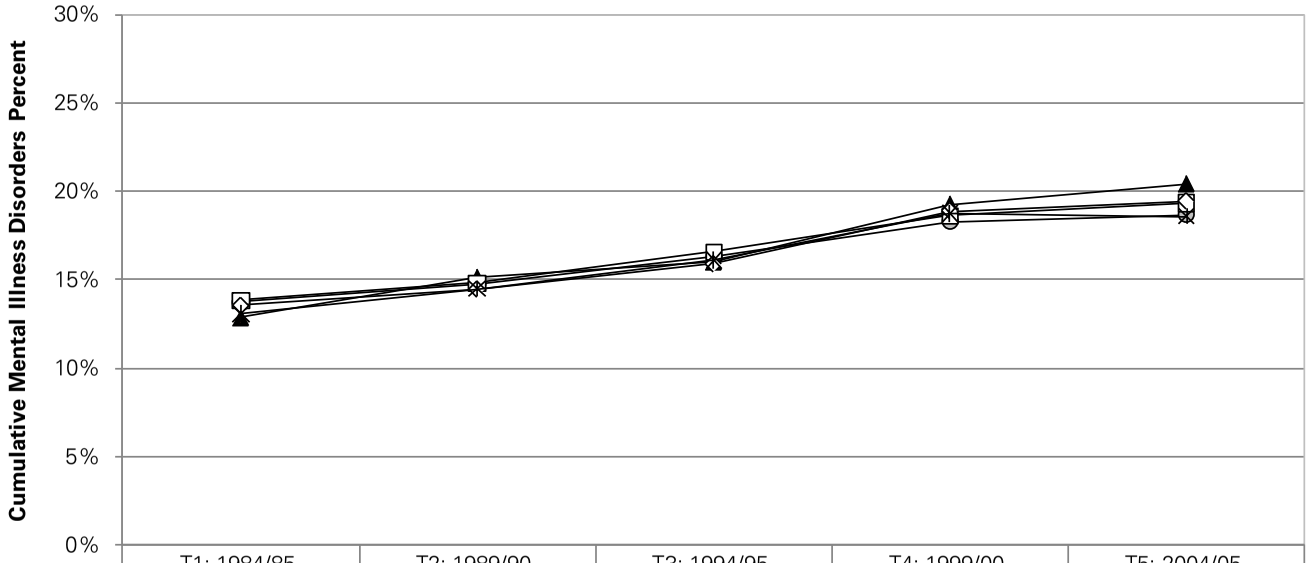
- The socioeconomic gap in cumulative mental illness is widening over time for rural Manitobans and is widening by absolute, but not relative, measures for urban Manitobans.
- By all measures, the socioeconomic gap is much larger in urban than in rural Manitoba.
- In both rural and urban Manitoba, there is a plateauing of cumulative mental illness in the last two time periods.
- The minimal socioeconomic disparity in rural Manitoba contrasts to the disparity observed in urban Manitoba. Disparity observed in urban areas may be due to migration of those with mental illness to low neighbourhood income (core) urban areas. Alternately, the lack of disparity observed in rural areas may reflect poorer access to mental health services by those with mental illness in low neighbourhood income areas, thus a potential underdiagnosis or underreporting in rural Manitoba. However, the heterogeneous nature of the rural neighbourhood income quintile areas compared to the relative homogeneity of the urban neighbourhood income quintile groups may result in an underestimate of the disparity in rural compared to urban.

Where to from here?

- Further exploration of the difference in disparity between urban and rural areas could involve examining timing of mental illness diagnoses and residential mobility before and after diagnosis in urban areas.

Figure 7.1: Prevalence of Cumulative Mental Illness Over Time by Rural Income Quintile

Adjusted by (2004/05-2008/09) age & sex, percent of residents aged 10+ over a five-year period



	T1: 1984/85-1988/89	T2: 1989/90-1993/94	T3: 1994/95-1998/99	T4: 1999/00-2003/04	T5: 2004/05-2008/09
NF (Not displayed)	52.23	50.22	46.74	52.57	74.28
R1 (lowest income)	12.89	15.16	16.03	19.28	20.43
R2	13.75	14.79	16.32	18.29	18.69
R3	13.85	14.82	16.55	18.61	19.32
R4	13.55	14.47	15.89	18.89	19.43
R5 (highest income)	13.10	14.48	16.13	18.75	18.59
Disparity Rate Ratios (R1/R5)	0.98	1.05	0.99	1.03	1.10
Disparity Rate Differences (R1-R5)	-0.21	0.68	-0.10	0.53	1.83

Time Period (fiscal years)

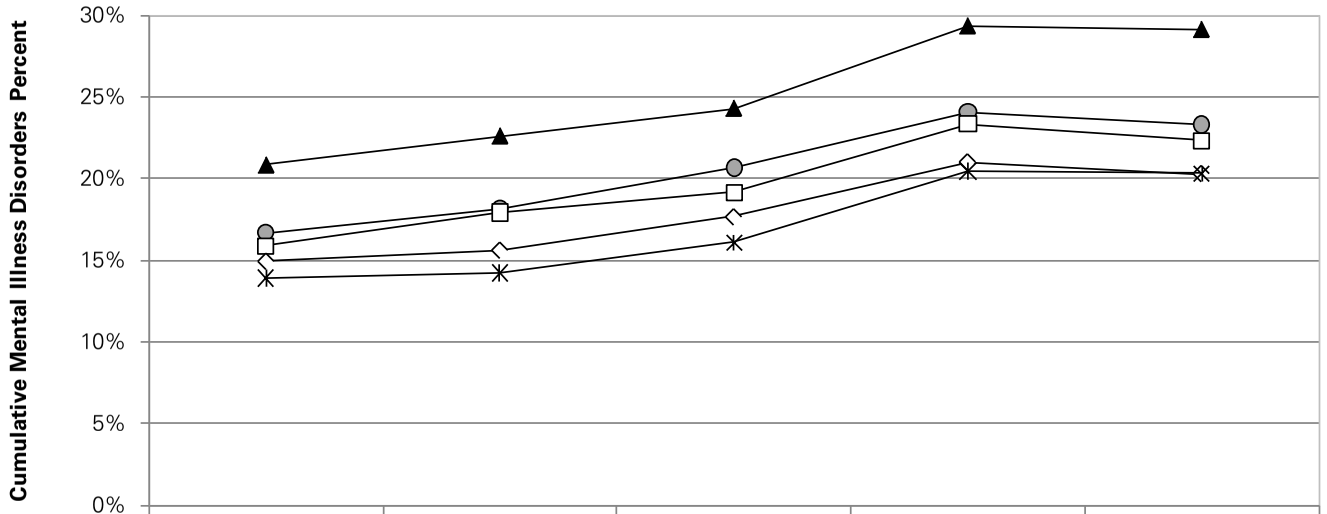
Source: Manitoba Centre for Health Policy, 2010

Comparison of Disparity Rate Ratios T5 to T1: 1.12(95% CI 1.01, 1.23) p<.05

Comparison of Disparity Rate Differences T5 to T1: p <.001 (note: the crossover between negative and positive makes a ratio calculation not plausible)

Figure 7.2: Prevalence of Cumulative Mental Illness Over Time by Urban Income Quintile

Adjusted by (2004/05-2008/09) age & sex, percent of residents aged 10+ over a five-year period



	T1: 1984/85-1988/89	T2: 1989/90-1993/94	T3: 1994/95-1998/99	T4: 1999/00-2003/04	T5: 2004/05-2008/09
NF (Not displayed)	52.23	50.22	46.74	52.57	74.28
U1 (lowest income)	20.82	22.60	24.30	29.35	29.13
U2	16.69	18.14	20.67	24.08	23.30
U3	15.88	17.91	19.15	23.33	22.31
U4	14.96	15.63	17.66	20.99	20.28
U5 (highest income)	13.90	14.20	16.07	20.45	20.31
Disparity Rate Ratios (U1/U5)	1.50	1.59	1.51	1.43	1.43
Disparity Rate Differences (U1-U5)	6.92	8.41	8.23	8.90	8.82

Time Period (fiscal years)

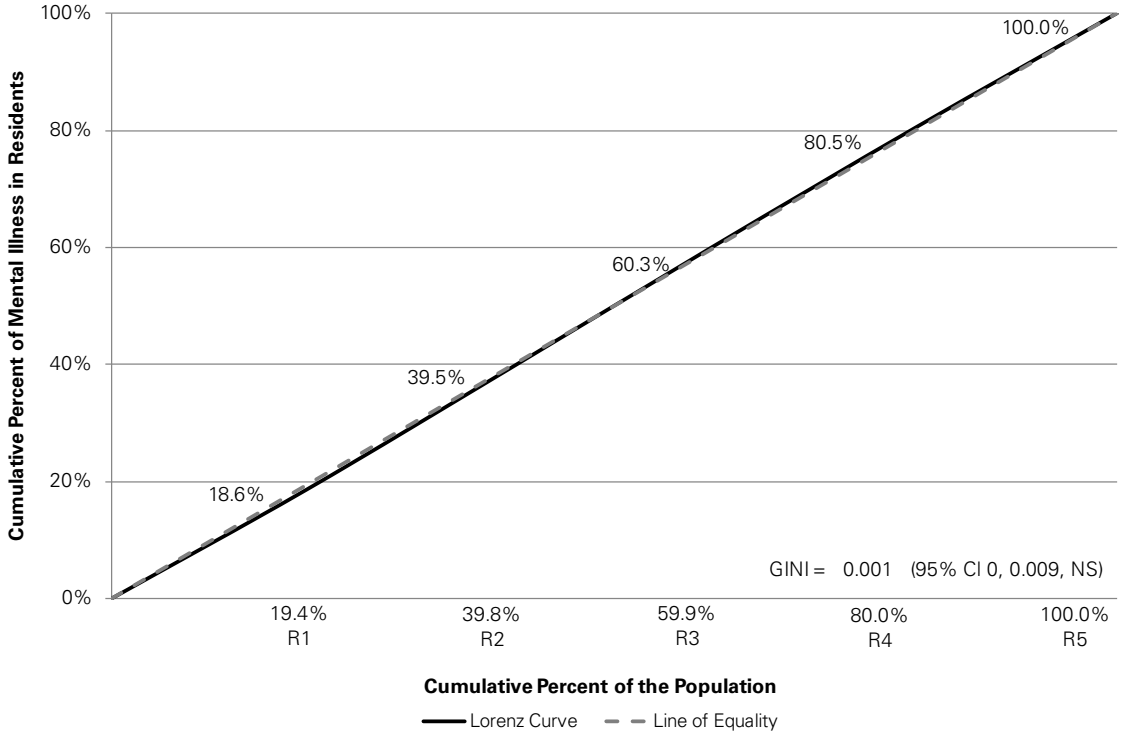
Comparison of Disparity Rate Ratios T5 to T1: 0.96 (95% CI 0.87,1.05) NS

Comparison of Disparity Rate Differences T5 to T1: 1.27 , p <.001

Source: Manitoba Centre for Health Policy, 2010

Figure 7.3: Adjusted Lorenz Curve for Cumulative Mental Illness in Rural Areas 1984/85-1988/89

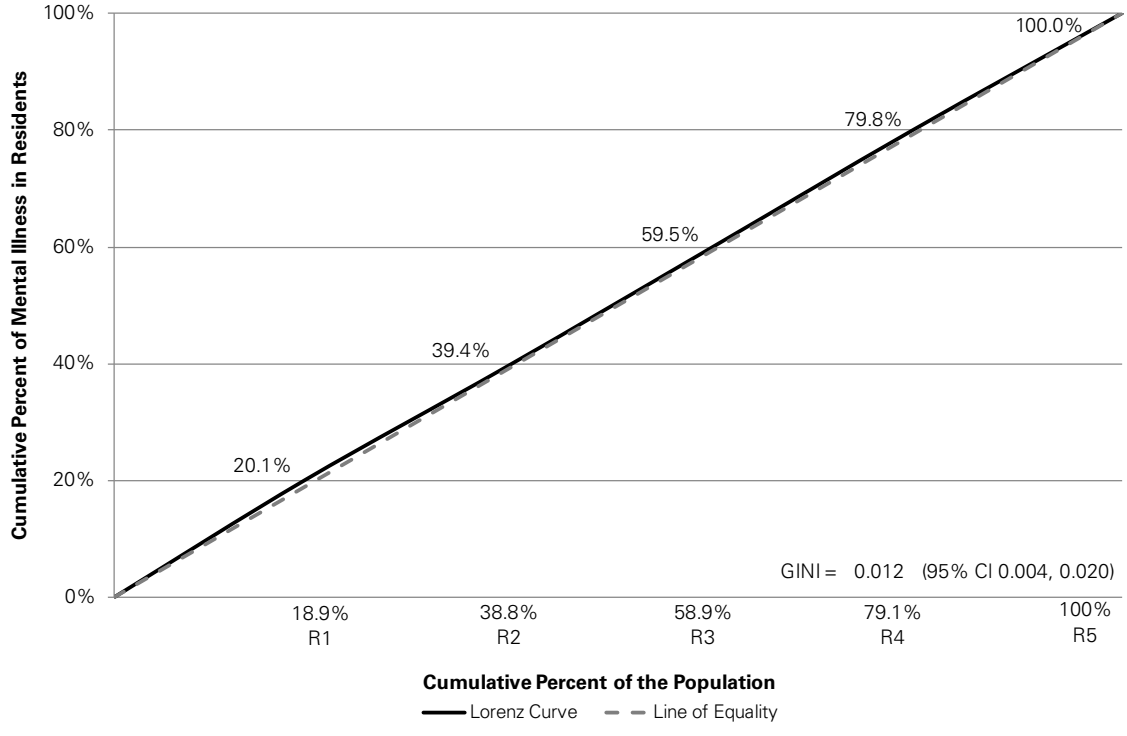
Adjusted by (2004/05-2008/09) age & sex, residents aged 10+



Source: Manitoba Centre for Health Policy, 2010

Figure 7.4: Adjusted Lorenz Curve for Cumulative Mental Illness in Rural Areas 2004/05-2008/09

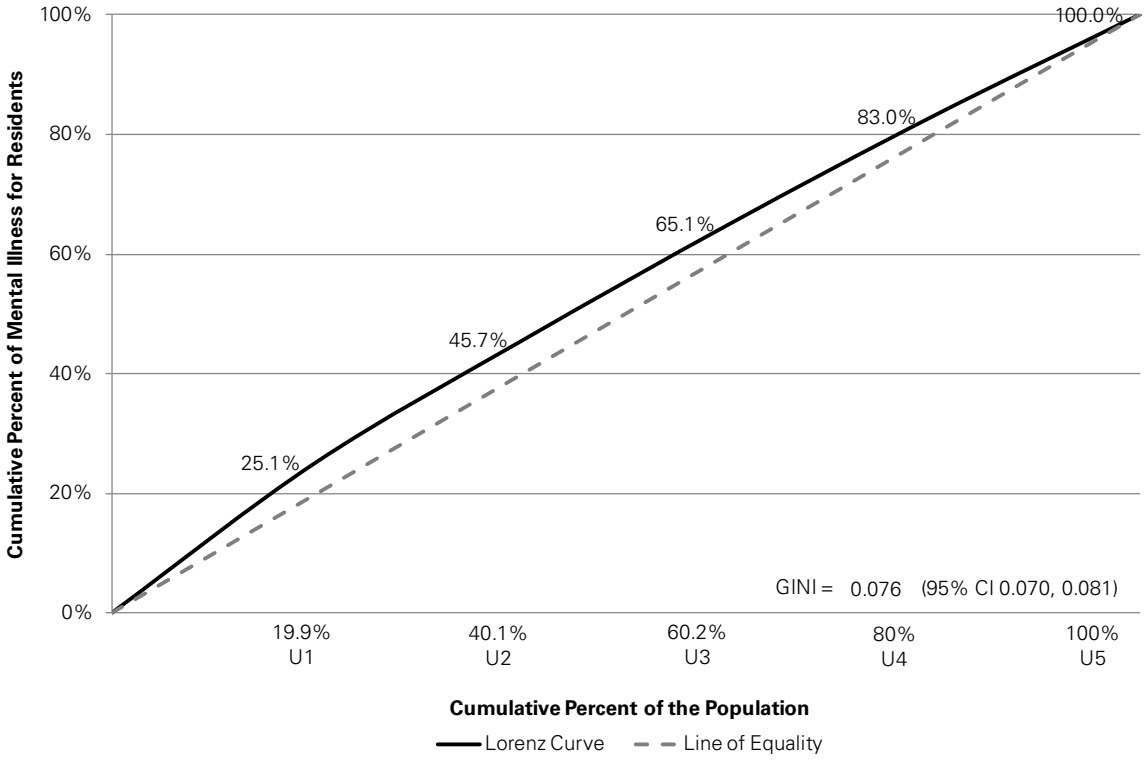
Adjusted by (2004/05-2008/09) age & sex, residents aged 10 years+



Source: Manitoba Centre for Health Policy, 2010

Figure 7.5: Adjusted Lorenz Curve for Cumulative Mental Illness in Urban Areas 1984/05-1988/89

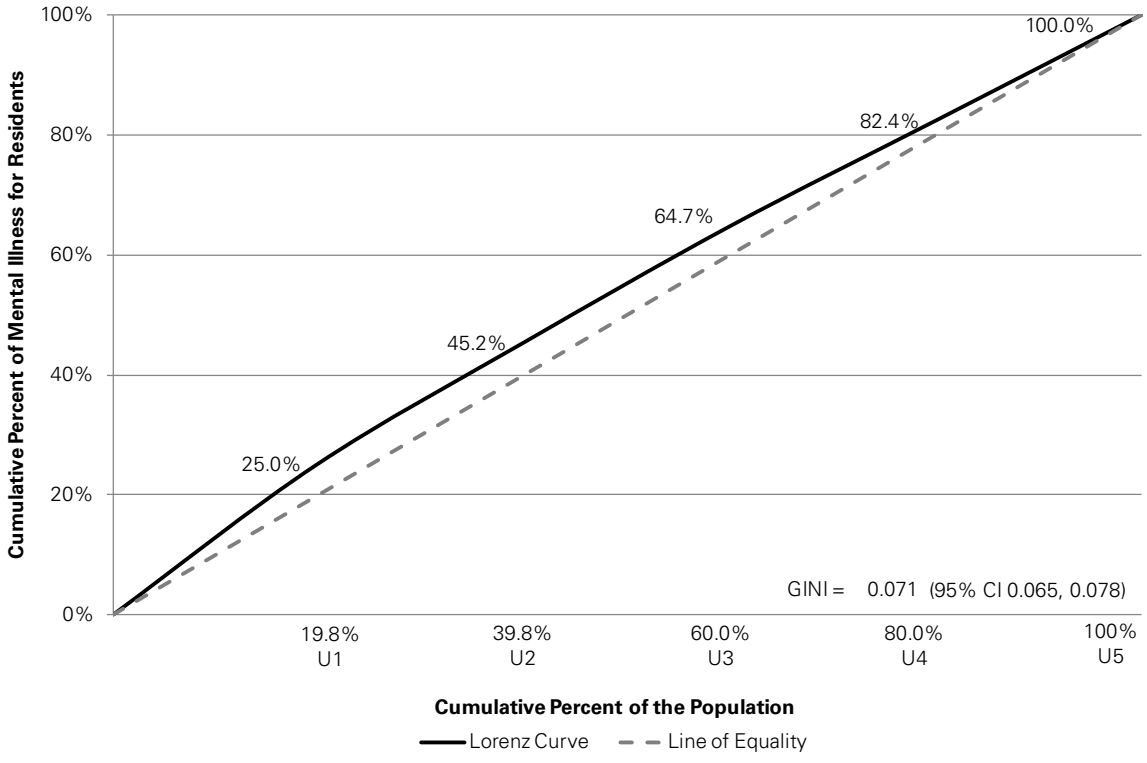
Adjusted by (2004/05-2008/09) age & sex, residents aged 10+



Source: Manitoba Centre for Health Policy, 2010

Figure 7.6: Adjusted Lorenz Curve for Cumulative Mental Illness in Urban Areas 2004/05-2008/09

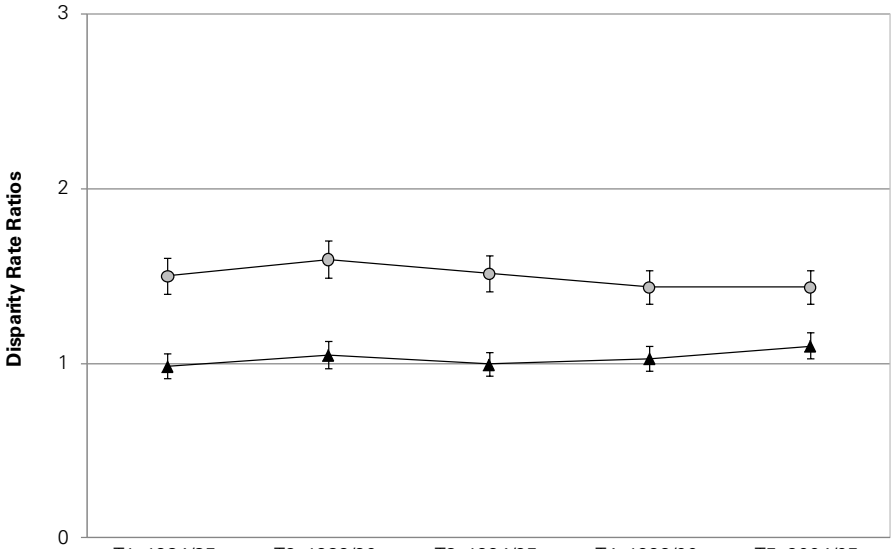
Adjusted by (2004/05-2008/09) age & sex, residents aged 10+



Source: Manitoba Centre for Health Policy, 2010

Figure 7.7: Cumulative Mental Illness Disparity Rate Ratios by Urban and Rural Income Quintile

Adjusted by (2004/05-2008/09) age & sex, percent of residents aged 10+ over a five-year period



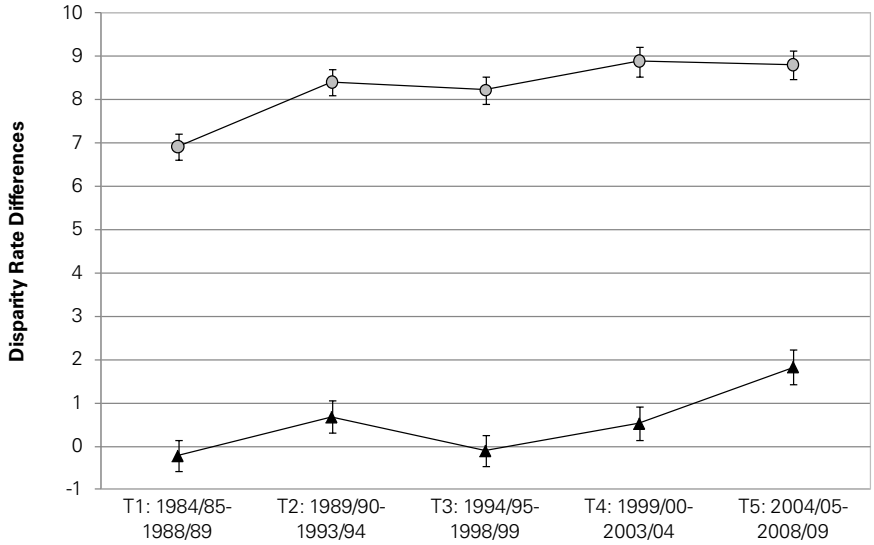
	T1: 1984/85-1988/89	T2: 1989/90-1993/94	T3: 1994/95-1998/99	T4: 1999/00-2003/04	T5: 2004/05-2008/09
Urban Disparity Rate Ratios	1.50	1.59	1.51	1.43	1.43
Rural Disparity Rate Ratios	0.98	1.05	0.99	1.03	1.10

Urban Disparity Rate Ratios T5 to T1: 0.96 (95% CI 0.87, 1.05) NS
Rural Disparity Rate Ratios T5 to T1: 1.12 (95% CI 1.01, 1.23) p<.05

Source: Manitoba Centre for Health Policy, 2010

Figure 7.8: Cumulative Mental Illness Disparity Rate Differences by Urban and Rural Income Quintile

Adjusted by (2004/05-2008/09) age & sex, percent of residents aged 10+ over a five-year period



	T1: 1984/85-1988/89	T2: 1989/90-1993/94	T3: 1994/95-1998/99	T4: 1999/00-2003/04	T5: 2004/05-2008/09
Urban Disparity Rate Differences	6.92	8.41	8.23	8.90	8.82
Rural Disparity Rate Differences	-0.21	0.68	-0.10	0.53	1.83

Urban Disparity Rate Differences T5 to T1: 1.27, p <.001
Rural Disparity Rate Differences T5 to T1: p <.001 (note: the crossover between negativeand positive makes a ratio calculation not plausible)

Source: Manitoba Centre for Health Policy, 2010

Dementia

Definition

Dementia is a loss of brain function. It is not a single disease. Instead, dementia refers to a group of illnesses that involve memory, behaviour, learning, and communication problems. The problems are progressive, which means they get worse over time.

In this report, residents are considered to have dementia if they meet one of the following conditions:

- one or more hospitalizations in five years with a diagnosis for dementia, including organic psychotic conditions, cerebral degenerations, and senility, ICD–9–CM diagnosis codes 290, 291.1, 292.2, 292.82, 294, 331, 797; or ICD–10–CA diagnosis codes F00, F01, F02, F03, F04, F05.1, F06.5, F06.6, F06.8, F06.9, F09, F10.7, F11.7, F12.7, F13.7, F14.7, F1.57, F16.7, F18.7, F19.7, G30, G31.0, G31.1, G31.9, G32.8, G91, G93.7, G94, R54
- one or more physician visits in five years with a diagnosis for dementia, ICD–9–CM diagnosis codes 290, 294, 331, 797

The denominator includes all Manitoba residents age 55 and older. However, many people with dementia may be living in a nursing home (personal care home), and thus be assigned to the "NF" (Not Found, i.e., the income for this dissemination area grouping was not available) group due to average household income not being recorded in the census for institutionalized residents' postal codes.

Time Periods	Five–year period prevalence (%)
T1: 1984/85–1988/89	6.37
T2: 1989/90–1993/94	6.59
T3: 1994/95–1998/99	8.69
T4: 1999/00–2003/04	10.30
T5: 2004/05–2008/09	10.33

Key Findings: Dementia

Manitoba overall rates:

- From the first time period T1 (1984/85–1988/89) to the last time period T5 (2004/05–2008/09), the overall Manitoba prevalence of dementia for people aged 55 and older increased from 6.37% to 10.33%. The increase was steady from T1 to T4 (1999/2000–2003/04) and then plateaued to T5.

Rates by neighbourhood income quintile over time:

Rural:

- Comparing T1 to T5, dementia prevalence for all rural neighbourhood income quintile groups increased. The pattern was the same for all rural neighbourhood income quintiles except for R2: rates in R1, R3, R4, and R5 decreased in T2 (1989/90–1993/94) with steady increases in each subsequent time period. In R2, the pattern was a steady increase between T1 and T4 (1999/2000–2003/04) with a decrease in T5.

- The disparity between R1 and R5 did not change over time. The rate ratio of R1 compared to R5 was 1.08 in the first time period and 1.03 in the last time period, for a non–statistically significant decrease. The absolute difference gap in dementia rates comparing R1 to R5 was also not statistically significant, going from 0.48 in T1 to 0.23 in T5.

Urban:

- Comparing T1 to T5, dementia prevalence of all urban neighbourhood income quintile groups increased over time. Only in U3 was the increase steady across all time periods; for all other urban neighbourhood income quintiles, there was one (U1 and U5) or two (U2 and U4) periods of decrease, with an overall increase over time.

- The disparity between U1 and U5 was stable by one measure and increased by another measure. The rate ratio of U1 compared to U5 was 1.25 in the first time period and 1.28 in the last time period, but this increase was not statistically significant. The absolute difference gap in dementia prevalence comparing U1 to U5 statistically significantly increased by 96% over time, from 1.39 more persons with dementia per 100 residents aged 55 and older in U1 compared to U5 in the first time period (1984/85–1988/89) to 2.73 more persons with dementia per 100 residents in the last time period (2004/05–2008/09).

Lorenz Curves:

Rural over time:

- In T1, 20.0% of persons with dementia were accounted for in 19.7% of the population in the lowest neighbourhood income quintile group R1, with the Gini coefficient of 0.010 indicating no disparity.

- In T5, 17.0% of persons with dementia were accounted for in 16.9% of the population in the lowest neighbourhood income quintile group R1, with the Gini coefficient of 0.003 indicating no disparity across rural neighbourhood income quintile groups.

- The Gini coefficient decreased from the first to the last time period, but the decrease was not statistically significant, which indicates no change in inequality over that time period.

Urban over time:

- In T1, 26.7% of persons with dementia were accounted for in 23.1% of the population in the lowest neighbourhood income quintile group U1, with the Gini coefficient of 0.050 indicating a statistically significant disparity.

- In T5, 26.1% of persons with dementia were accounted for in 20.4% of the population in the lowest neighbourhood income quintile group U1, with the Gini coefficient of 0.056 indicating a statistically significant disparity.

- The Gini coefficient increased slightly from the first to the last time period, but the change was not statistically significant, which indicates no change in inequality over that time period.

Rural compared to urban in most recent time period:

- In the most recent time period T5, there is a statistically significantly higher Gini coefficient in urban compared to rural (0.003 vs. 0.056, $p<.0001$), indicating a higher level of inequality in urban Manitoba for dementia.

Disparity measures over time by rural and urban:

- The disparity rate ratios (i.e., the ratio of the dementia rates in the lowest compared to the highest neighbourhood income group) are stable over time for both rural and urban Manitoba.

- The disparity rate differences (i.e., the absolute difference of dementia rates between the lowest and highest neighbourhood income group) are increasing in urban neighbourhood income areas over time but staying stable in rural areas. In T1 and T2, the absolute differences are similar in rural and urban; but in the last three time periods, the absolute differences are higher in urban compared to rural areas.

What is this telling us?

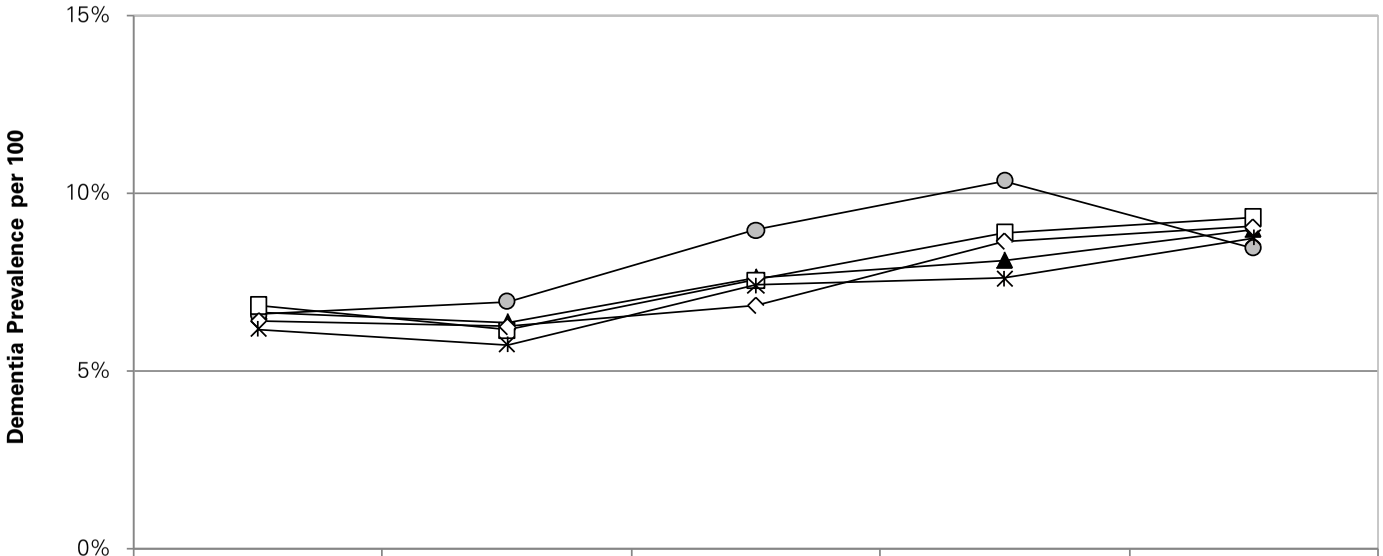
- There is no socioeconomic gap in the prevalence of dementia for residents aged 55 and older in rural areas. On the other hand, there is a socioeconomic gap in dementia rates in urban areas.
- By all measures, the lack of a socioeconomic gap in dementia in rural areas remained stable throughout the study period.
- The socioeconomic gap in dementia in urban areas increased by one measure (disparity rate differences) but remained stable by other measures (disparity rate ratios and Gini coefficients).
- By most measures (disparity rate differences and Gini coefficients), the socioeconomic gap is larger in urban than in rural Manitoba.
- All neighbourhood income groups in both rural and urban Manitoba show increasing dementia prevalence over time.
- The NF group in the last time period T5 has a dementia prevalence of 68%, indicative of the institutionalized population. For further information about the NF group, see Chapter 9.

Where to from here?

- The difference in disparity patterns in rural and urban areas suggests that the pattern in urban areas may be due to downward mobility of urban Manitobans with dementia. Programs supporting urban residents with dementia and their family members should include supports for helping those with dementia remain in their homes.
- Dementia rates have increased in rural and urban Manitoba in 20 years. Programs focussed on assisting those with dementia and their family members should be supported.
- The socioeconomic gap in dementia prevalence is fairly small, so programs providing support to those with dementia and their families' members should be universal rather than targeted.

Figure 7.9: Dementia Prevalence Over Time by Rural Income Quintile

Adjusted by (2004/05-2008/09) age & sex, percent of residents aged 55+ in a five-year period



	T1: 1984/85-1988/89	T2: 1989/90-1993/94	T3: 1994/95-1998/99	T4: 1999/00-2003/04	T5: 2004/05-2008/09
NF (Not displayed)	33.34	41.44	51.35	63.17	68.24
R1 (lowest income)	6.63	6.35	7.61	8.09	8.96
R2	6.56	6.94	8.94	10.33	8.44
R3	6.83	6.12	7.53	8.87	9.30
R4	6.40	6.24	6.84	8.64	9.04
R5 (highest income)	6.15	5.73	7.40	7.59	8.73
Disparity Rate Ratios (R1/R5)	1.08	1.11	1.03	1.07	1.03
Disparity Rate Differences (R1-R5)	0.48	0.62	0.21	0.50	0.23

Time Period (fiscal years)

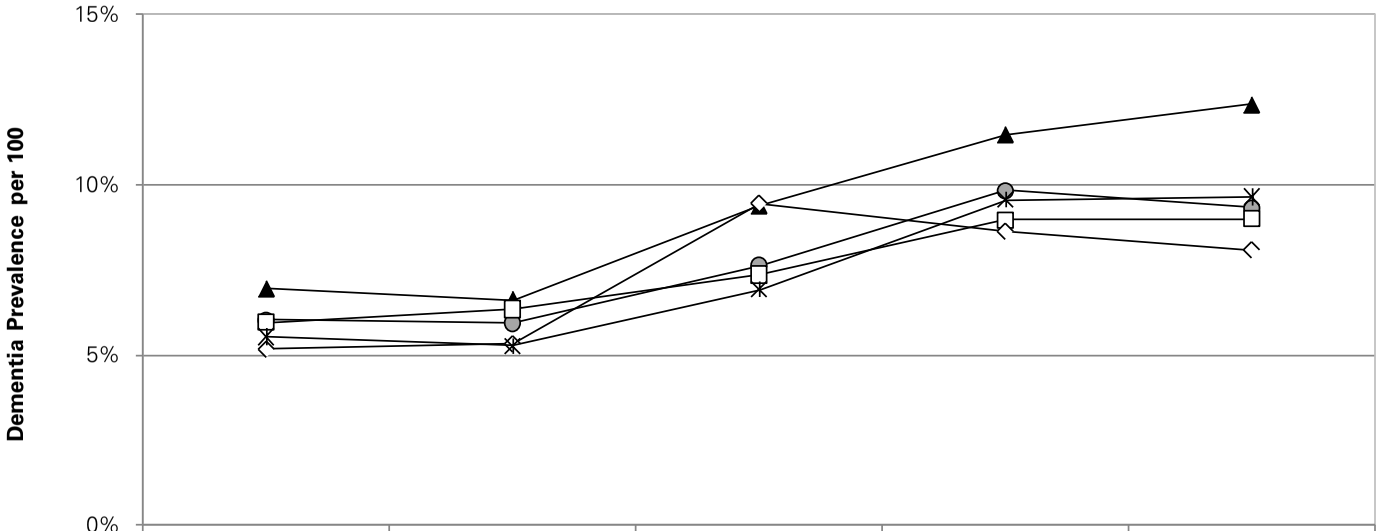
Comparison of Disparity Rate Ratios T5 to T1: 0.95 (95% CI 0.74,1.23) NS

Comparison of Disparity Rate Differences T5 to T1: 0.48 , NS

Source: Manitoba Centre for Health Policy, 2010

Figure 7.10: Dementia Prevalence Over Time by Urban Income Quintile

Adjusted by (2004/05-2008/09) age & sex, percent of residents aged 55+ in a five-year period



	T1: 1984/85-1988/89	T2: 1989/90-1993/94	T3: 1994/95-1998/99	T4: 1999/00-2003/04	T5: 2004/05-2008/09
NF (Not displayed)	33.34	41.44	51.35	63.17	68.24
U1 (lowest income)	6.93	6.62	9.38	11.49	12.36
U2	6.02	5.93	7.64	9.83	9.31
U3	5.95	6.35	7.35	8.96	9.00
U4	5.17	5.33	9.45	8.63	8.09
U5 (highest income)	5.54	5.26	6.92	9.56	9.63
Disparity Rate Ratios (U1/U5)	1.25	1.26	1.36	1.20	1.28
Disparity Rate Differences (U1-U5)	1.39	1.36	2.47	1.93	2.73

Time Period (fiscal years)

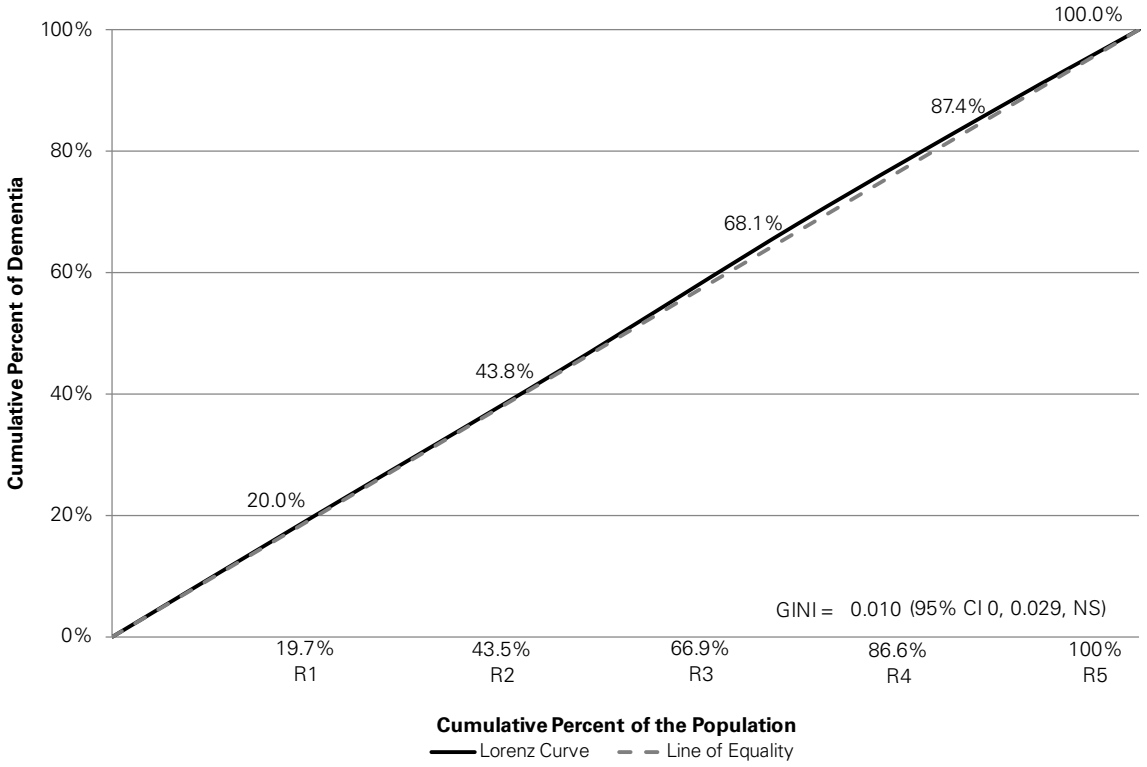
Comparison of Disparity Rate Ratios T5 to T1: 1.03 (95% CI 0.81, 1.30) NS

Comparison of Disparity Rate Differences T5 to T1: 1.96, p< .001

Source: Manitoba Centre for Health Policy, 2010

Figure 7.11: Adjusted Lorenz Curve for Dementia in Rural Areas 1984/85-1988/89

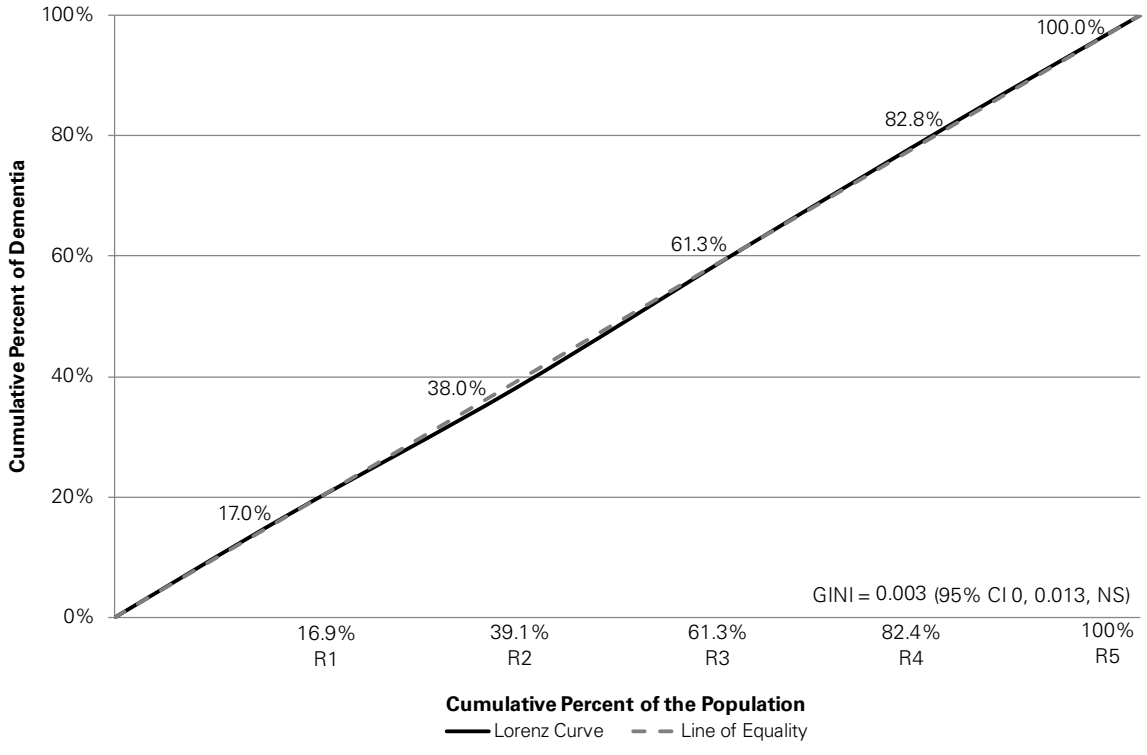
Adjusted by (2004/05-2008/09) age, residents aged 55+



Source: Manitoba Centre for Health Policy, 2010

Figure 7.12: Adjusted Lorenz Curve for Dementia in Rural Areas 2004/05-2008/09

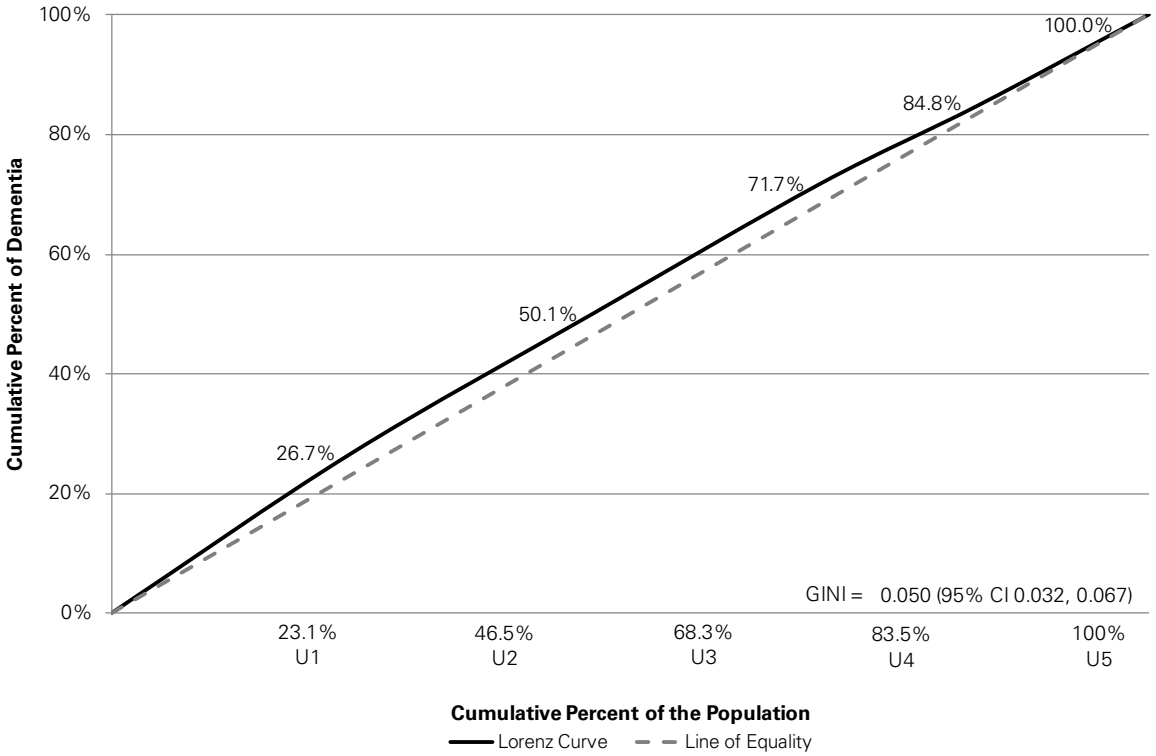
Adjusted by (2004/05-2008/09) age, residents aged 55+



Source: Manitoba Centre for Health Policy, 2010

Figure 7.13: Adjusted Lorenz Curve for Dementia in Urban Areas 1984/85-1988/89

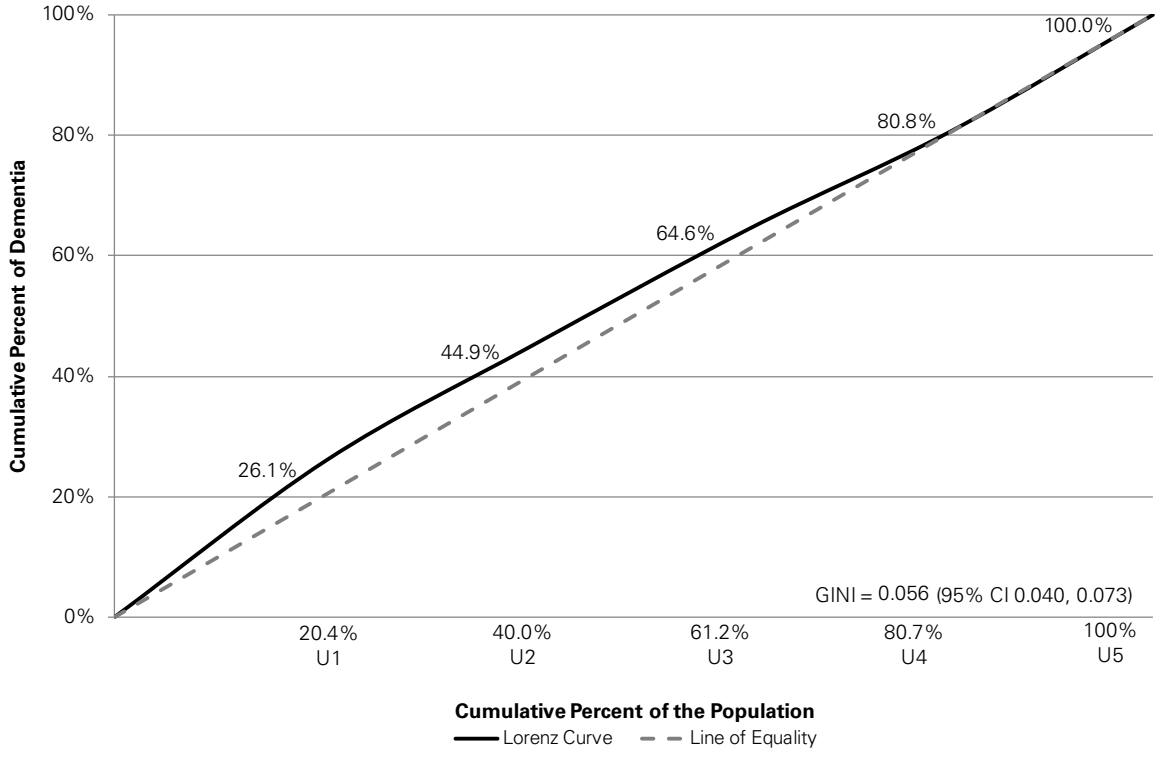
Adjusted by (2004/05-2008/09) age, residents aged 55+



Source: Manitoba Centre for Health Policy, 2010

Figure 7.14: Adjusted Lorenz Curve for Dementia in Urban Areas 2004/05-2008/09

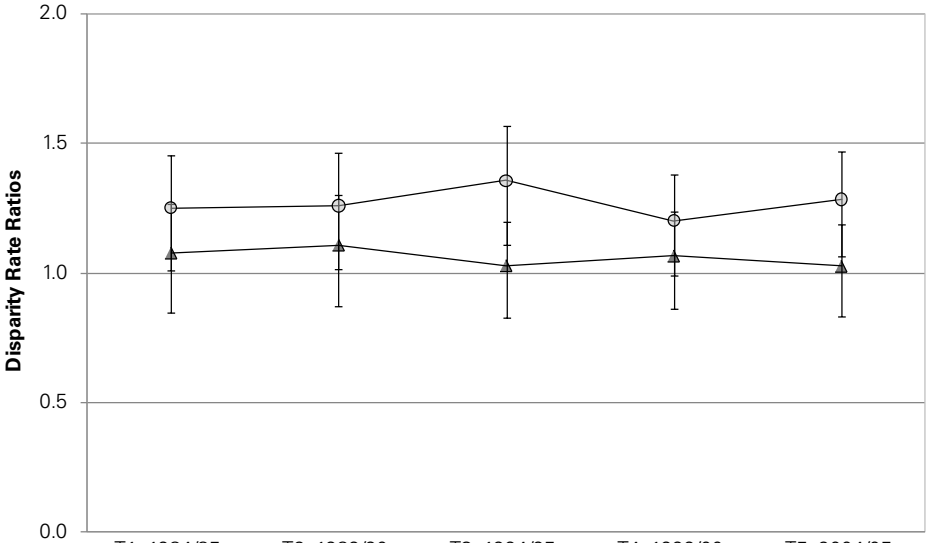
Adjusted by (2004/05-2008/09) age, residents aged 55+



Source: Manitoba Centre for Health Policy, 2010

Figure 7.15: Dementia Disparity Rate Ratios by Urban and Rural Income Quintile

Adjusted by (2004/05-2008/09) age & sex, percent of residents aged 55+ in a five-year period



	T1: 1984/85-1988/89	T2: 1989/90-1993/94	T3: 1994/95-1998/99	T4: 1999/00-2003/04	T5: 2004/05-2008/09
Urban Disparity Rate Ratios	1.25	1.26	1.36	1.20	1.28
Rural Disparity Rate Ratios	1.08	1.11	1.03	1.07	1.03

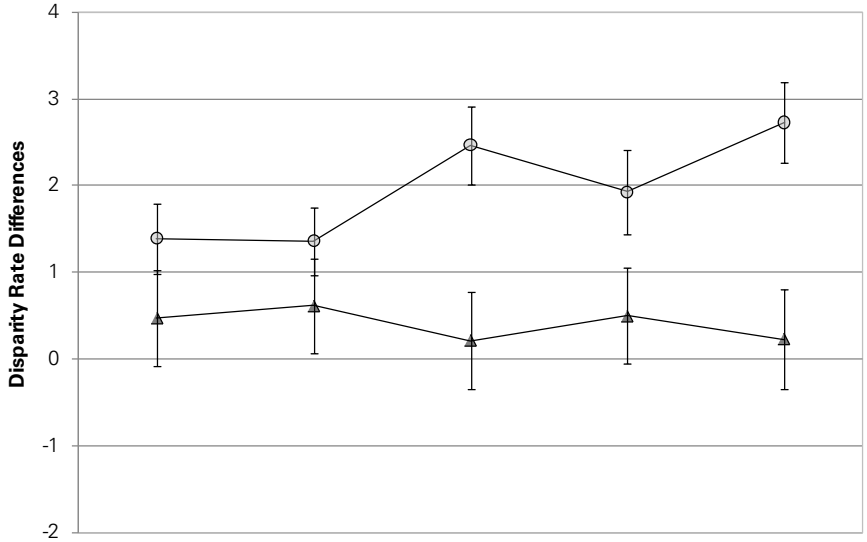
Time Period (fiscal years)

Urban Disparity Rate Ratios T5 to T1: 1.03 (95% CI 0.81, 1.30) NS
Rural Disparity Rate Ratios T5 to T1: 0.95 (95% CI 0.74, 1.23) NS

Source: Manitoba Centre for Health Policy, 2010

Figure 7.16: Dementia Disparity Rate Differences by Urban and Rural Income Quintile

Adjusted by (2004/05-2008/09) age & sex, percent of residents aged 55+ in a five-year period



	T1: 1984/85-1988/89	T2: 1989/90-1993/94	T3: 1994/95-1998/99	T4: 1999/00-2003/04	T5: 2004/05-2008/09
Urban Disparity Rate Differences	1.39	1.36	2.47	1.93	2.73
Rural Disparity Rate Differences	0.48	0.62	0.21	0.50	0.23

Time Period (fiscal years)

Urban Disparity Rate Differences T5 to T1: 1.96, p< .001
Rural Disparity Rate Differences T5 to T1: 0.48, NS

Source: Manitoba Centre for Health Policy, 2010

Suicide Deaths and Suicide Attempts

Definition

Suicide is the act of intentionally killing oneself. Suicide attempt, also known as "self–inflicted injury" or para–suicide, does not result in death. The three–year prevalence of suicide or suicide attempts is the rate per 1,000 of the population age 10 or older who attempted or completed suicide at least once in a three–year period. The most recent event (suicide or suicide attempt) in each calendar year is counted, adjusted by age at the time of the event. The total number of events over each three–year period is used as the numerator. The denominator is the December 31 population age 10 or older summed over each three–year period.

The definition of **suicide deaths** and suicide attempts can be found in the Glossary.

Time Period	Three–year period prevalence per 1,000
T1: 1984–1986	0.57
T2: 1987–1989	0.63
T3: 1990–1992	0.64
T4: 1993–1995	0.64
T5: 1996–1998	0.64
T6: 1999–2001	0.56
T7: 2002–2004	0.57
T8: 2005–2007	0.71

Key Findings: Suicide Deaths and Suicide Attempts

Manitoba overall rates:

- From the first time period T1 (1984–1986) to the last time period T8 (2005–2007), the prevalence of suicide deaths and suicide attempts rose from 0.57 to 0.71 per 1,000 Manitoba residents aged 10 and older. The increase was greatest in T8 compared to the previous time periods.

Rates by neighbourhood income quintile over time:

Rural:

- Comparing T1 to T8, the prevalence of suicide deaths and suicide attempts increased for R1, R3, and R4 and decreased for R2 and R5; the increase in R1 was the most dramatic, showing a steady increase across the study period.

- The disparity between R1 and R5 increased substantially. The rate ratio of R1 compared to R5 was 2.01 in the first time period and 5.01 in the last time period, a statistically significant increase of 149%. The absolute difference gap in prevalence of suicide deaths and suicide attempts comparing R1 to R5 also statistically significantly increased by 181% over time, from 0.55 more persons per 1,000 residents completing or attempting suicide in the first time period (T1) to 1.53 more persons per 1,000 residents completing or attempting suicide in the last time period (T8).

Urban:

- From T1 to T8, the prevalence of suicide deaths and suicide attempts remained relatively stable for all urban neighbourhood income quintile groups with the exception of U1, which showed slight increases and decreases over time, ending in a sharp increase after the early 2000s.

- The disparity between U1 and U5 remained stable by one measure and increased by another. The rate ratio of U1 compared to U5 was 4.40 in the first time period and 4.85 in the last time period, not a statistically significant increase. The absolute difference gap in the prevalence of suicide deaths and suicide attempts comparing U1 to U5 statistically significantly increased by 46% over time, from 0.68 more persons completing or attempting suicide per 1,000 residents in the first time period to 0.99 more persons completing or attempting suicide per 1,000 residents in the last time period (2005–2007).

Lorenz Curves:

Rural over time:

- In T1, 30.9% of persons completing or attempting suicide were accounted for in 19.5% of the population in the lowest neighbourhood income quintile group R1, with the Gini coefficient of 0.181 indicating a statistically significant disparity.

- In T8, 41.5% of persons completing or attempting suicide were accounted for in 19.0% of the population in the lowest neighbourhood income quintile group R1, with the Gini coefficient of 0.295 indicating a statistically significant disparity.

- The Gini coefficient increased from the first to the last time period ($p<.0001$), showing a statistically significant increase in inequality over that time period.

Urban over time:

- In T1, 37.1% of persons aged 10 and older completing or attempting suicide were accounted for in 19.9% of the population in the lowest neighbourhood income quintile group U1, with the Gini coefficient of 0.273 indicating a statistically significant disparity.

- In T8, 42.4% of persons completing or attempting suicide were accounted for in 19.7% of the population in the lowest neighbourhood income quintile group U1, with the Gini coefficient of 0.305 indicating a statistically significant disparity.

- The increase in Gini coefficient from the first to the last time period was not statistically significant, which suggests stability in inequality over that time period.

Rural compared to urban in most recent time period:

- In the most recent time period T8, there was no statistically significant difference in the Gini coefficients in rural compared to urban, indicating a similar (high) level of inequality in rural and urban Manitoba for suicide deaths and suicide attempts.

Disparity measures over time by rural and urban:

- The disparity rate ratios (i.e., the ratio of the prevalence of suicide deaths and suicide attempts in the lowest compared to the highest neighbourhood income group) are increasing over time for rural Manitoba, but remain stable for urban Manitoba. In the first time period, the ratios were higher in urban compared to rural areas, but in all subsequent time periods the ratios are not statistically significantly different between urban and rural. The rural rate ratios (DRRs) appear to have increased steadily over the study period, whereas the urban rate ratios have remained fairly stable.

- The disparity rate differences (i.e., the absolute difference of the prevalence of suicide deaths and suicide attempts between the lowest and highest neighbourhood income group) are increasing over time. For the first four time periods, the absolute differences do not differ between rural and urban areas; however in the last four time periods, the absolute differences are consistently statistically significantly higher in rural. This indicates a larger rate difference between lowest and highest neighbourhood income groups in rural Manitoba. The differences in the rate difference increased steadily in rural areas and, since the early 2000's, appear to be increasing for urban neighbourhood income groups.

What is this telling us?

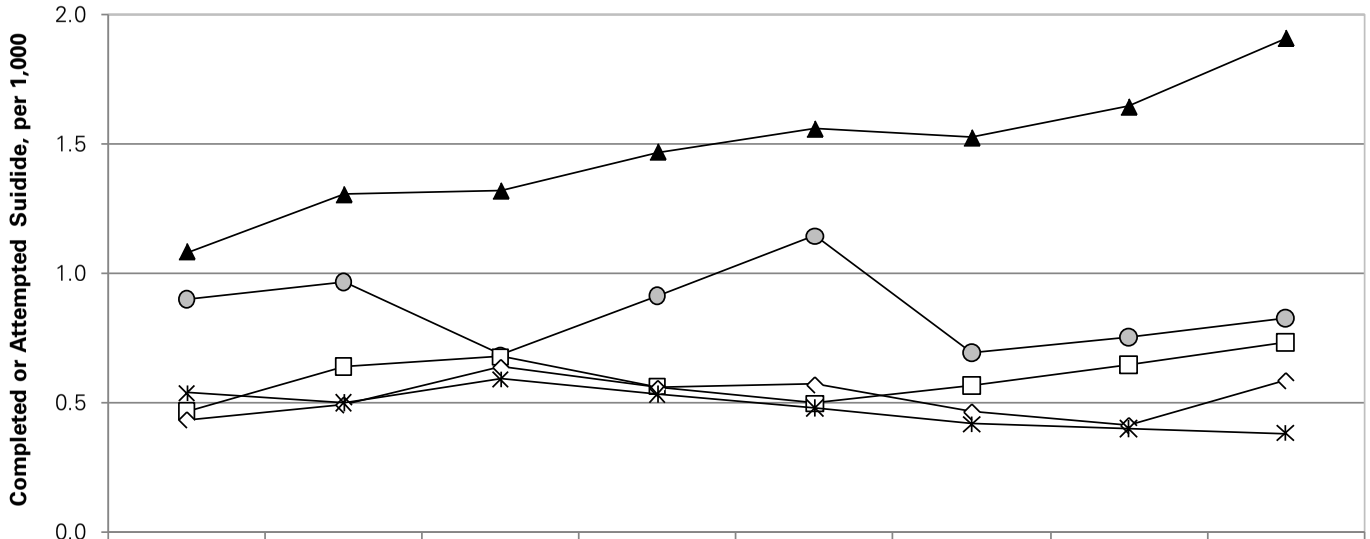
- By all measures, the socioeconomic gap in the prevalence of suicide deaths and suicide attempts is widening over time for rural Manitobans.
- By some measures, the socioeconomic gap in the prevalence of suicide deaths and suicide attempts is stable over time for urban Manitobans.
- By some measures, the socioeconomic gap is similar in rural and in urban Manitoba.
- The socioeconomic gap in prevalence of suicide deaths and suicide attempts is relatively large in both rural and urban Manitoba.
- The largest socioeconomic gap in prevalence of suicide deaths and suicide attempts is seen in the last time period for rural Manitoba.

Where to from here?

- Disparity in prevalence of suicide deaths and suicide attempts is quite large in both rural and urban Manitoba. Although universal approaches to reducing suicide are necessary due to suicide happening in all neighbourhood income quintiles, targeted interventions should occur for the lowest neighbourhood income quintile groups in order to reduce disparity.
- The relatively large increase in the overall Manitoba prevalence of suicide deaths and suicide attempts in the most recent time period is of concern. Additionally, increases in disparity in both rural and urban neighbourhood income quintiles, particularly since the early 2000s, is of concern and should be monitored.

Figure 7.17: Prevalence of Completed or Attempted Suicide Over Time by Rural Income Quintile

Adjusted by (2005-2007) age, per 1,000 residents aged 10+



	T1:1984-1986	T2:1987-1989	T2:1987-1989	T4:1993-1995	T5:1996-1998	T6:1999-2001	T7:2002-2004	T8:2005-2007
NF (Not displayed)	1.92	1.37	2.14	0.94	1.29	1.72	1.17	2.20
R1 (lowest income)	1.08	1.30	1.32	1.47	1.56	1.52	1.64	1.91
R2	0.90	0.97	0.68	0.91	1.15	0.69	0.75	0.83
R3	0.47	0.64	0.68	0.56	0.50	0.57	0.65	0.73
R4	0.44	0.49	0.64	0.56	0.57	0.47	0.41	0.59
R5 (highest income)	0.54	0.50	0.59	0.53	0.48	0.42	0.40	0.38
Disparity Rate Ratios (R1/R5)	2.01	2.61	2.23	2.75	3.25	3.65	4.11	5.01
Disparity Rate Differences (R1-R5)	0.55	0.80	0.73	0.94	1.08	1.11	1.24	1.53

Time Period (years)

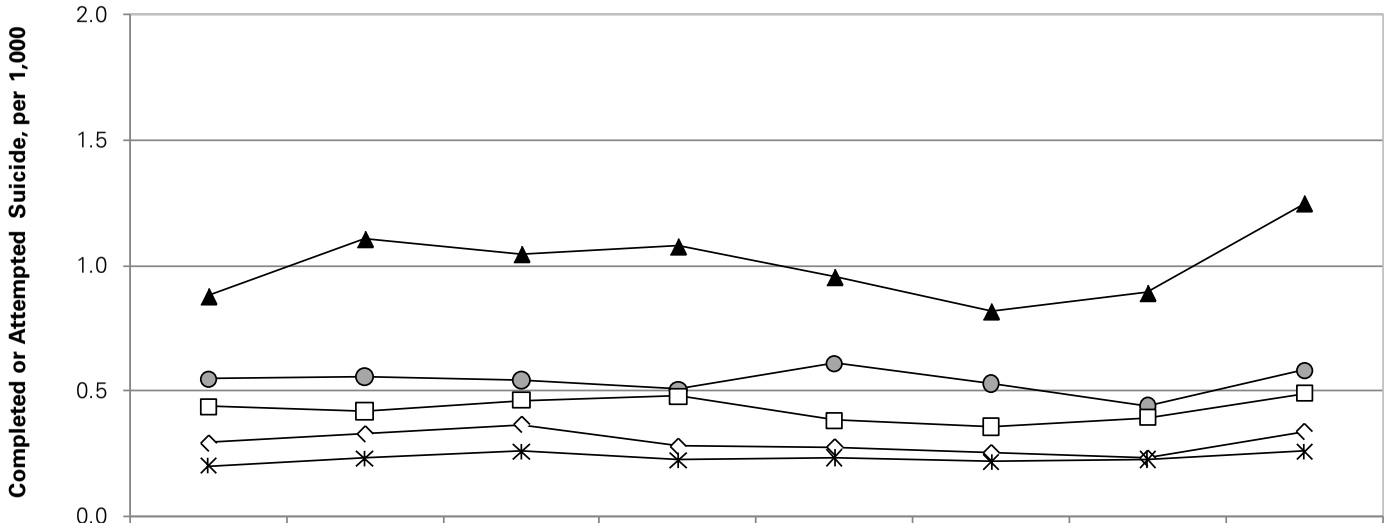
Comparison of Disparity Rate Ratios T8 to T1: 2.49 (95% CI 1.61, 3.85) p< .001

Comparison of Disparity Rate Differences T8 to T1: 2.81 p<.001

Source: Manitoba Centre for Health Policy, 2010

Figure 7.18: Prevalence of Completed or Attempted Suicide Over Time by Urban Income Quintile

Adjusted by (2005-2007) age, per 1,000 residents aged 10+



	T1:1984-1986	T2:1987-1989	T2:1987-1989	T4:1993-1995	T5:1996-1998	T6:1999-2001	T7:2002-2004	T8:2005-2007
NF (Not displayed)	1.92	1.37	2.14	0.94	1.29	1.72	1.17	2.20
U1 (lowest income)	0.88	1.11	1.05	1.08	0.96	0.82	0.89	1.25
U2	0.55	0.56	0.54	0.51	0.61	0.53	0.44	0.58
U3	0.44	0.42	0.46	0.48	0.38	0.36	0.39	0.49
U4	0.29	0.33	0.37	0.28	0.28	0.25	0.23	0.34
U5 (highest income)	0.20	0.23	0.26	0.22	0.23	0.22	0.23	0.26
Disparity Rate Ratios (U1/U5)	4.40	4.78	4.04	4.83	4.09	3.79	3.96	4.85
Disparity Rate Differences (U1-U5)	0.68	0.87	0.79	0.85	0.72	0.60	0.67	0.99

Time Period (years)

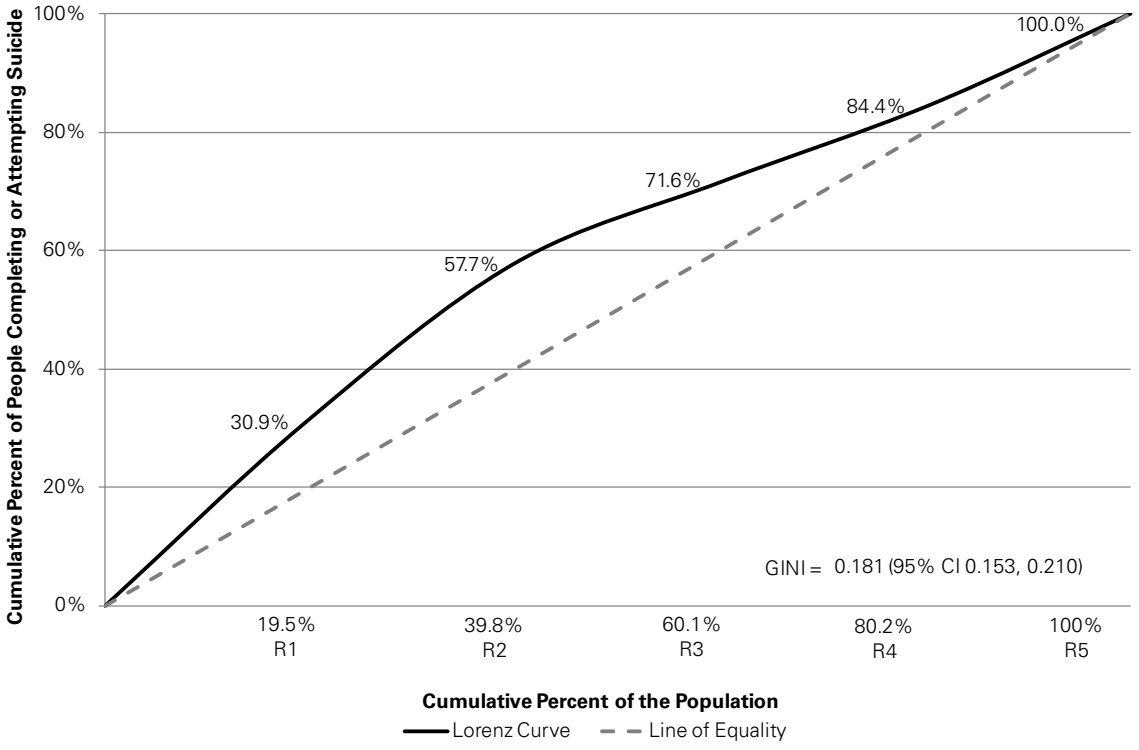
Comparison of Disparity Rate Ratios T8 to T1: 1.10 (95% CI 0.70, 1.73) NS

Comparison of Disparity Rate Differences T8 to T1: 1.46, p<.01

Source: Manitoba Centre for Health Policy, 2010

Figure 7.19: Adjusted Lorenz Curve for Completed or Attempted Suicide in Rural Areas, 1984-1986

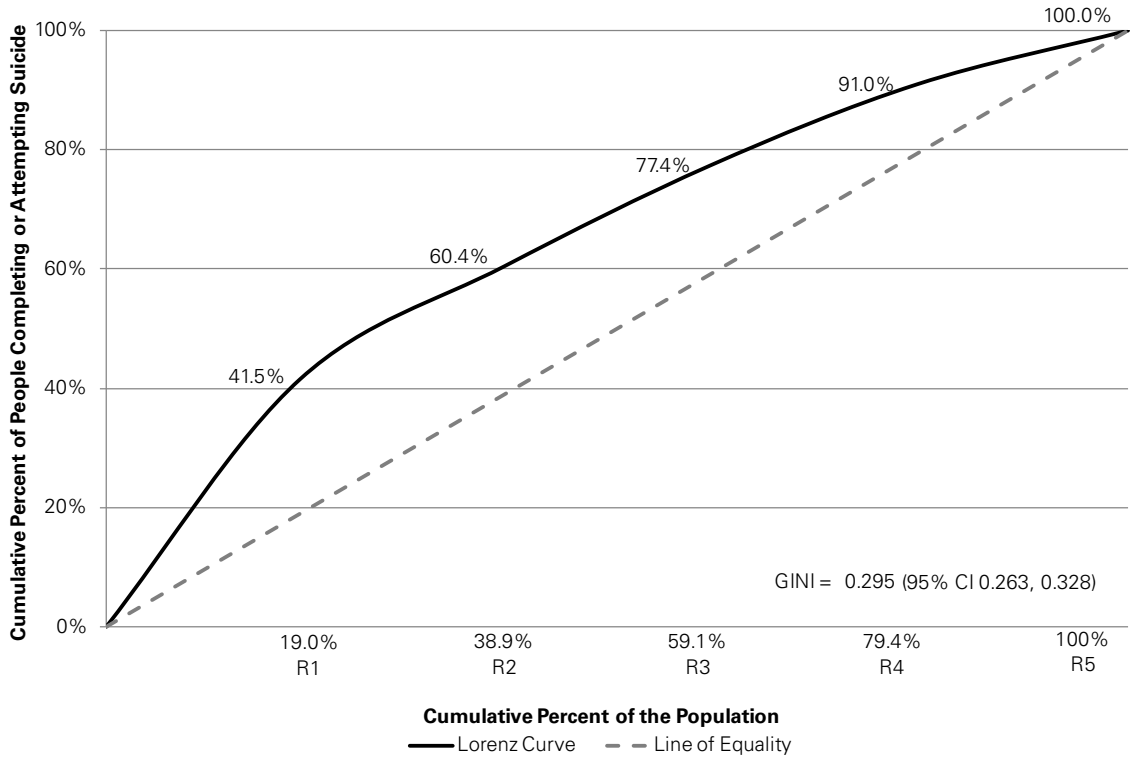
Adjusted by (2005-2007) age, residents aged 10+



Source: Manitoba Centre for Health Policy, 2010

Figure 7.20: Adjusted Lorenz Curve for Completed or Attempted Suicide in Rural Areas, 2005-2007

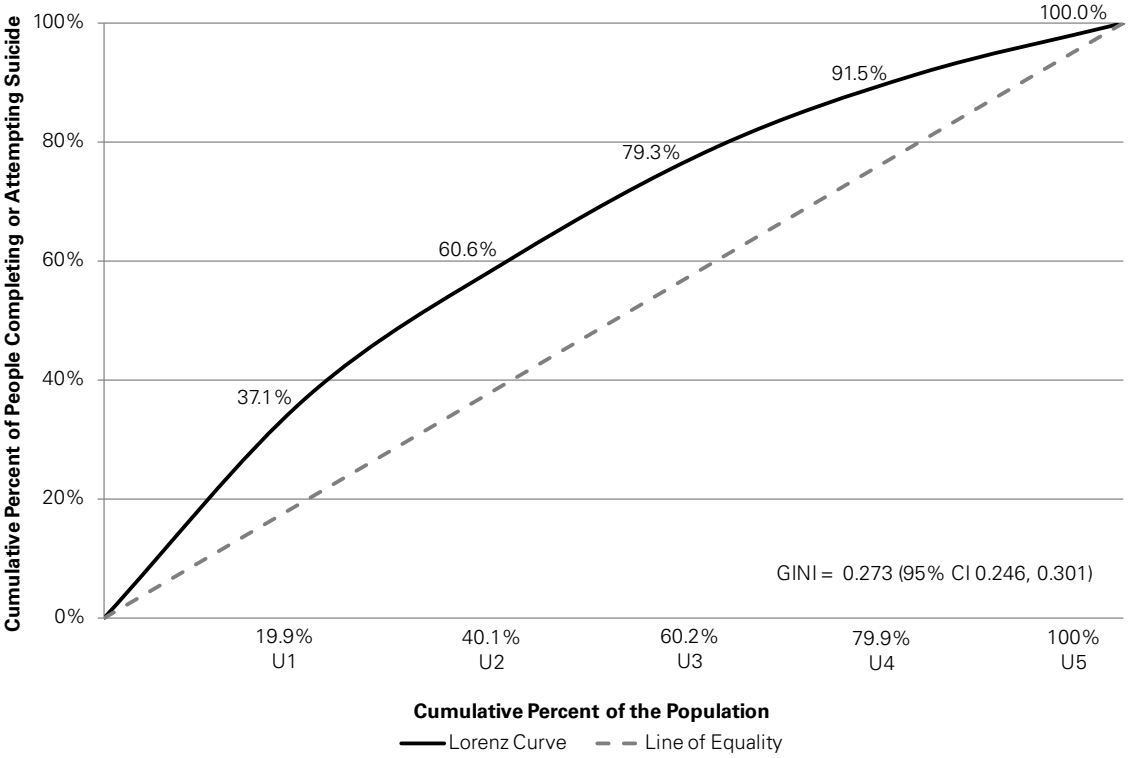
Adjusted by (2005-2007) age, residents aged 10+



Source: Manitoba Centre for Health Policy, 2010

Figure 7.21: Adjusted Lorenz Curve for Completed or Attempted Suicide in Urban Areas, 1984-1986

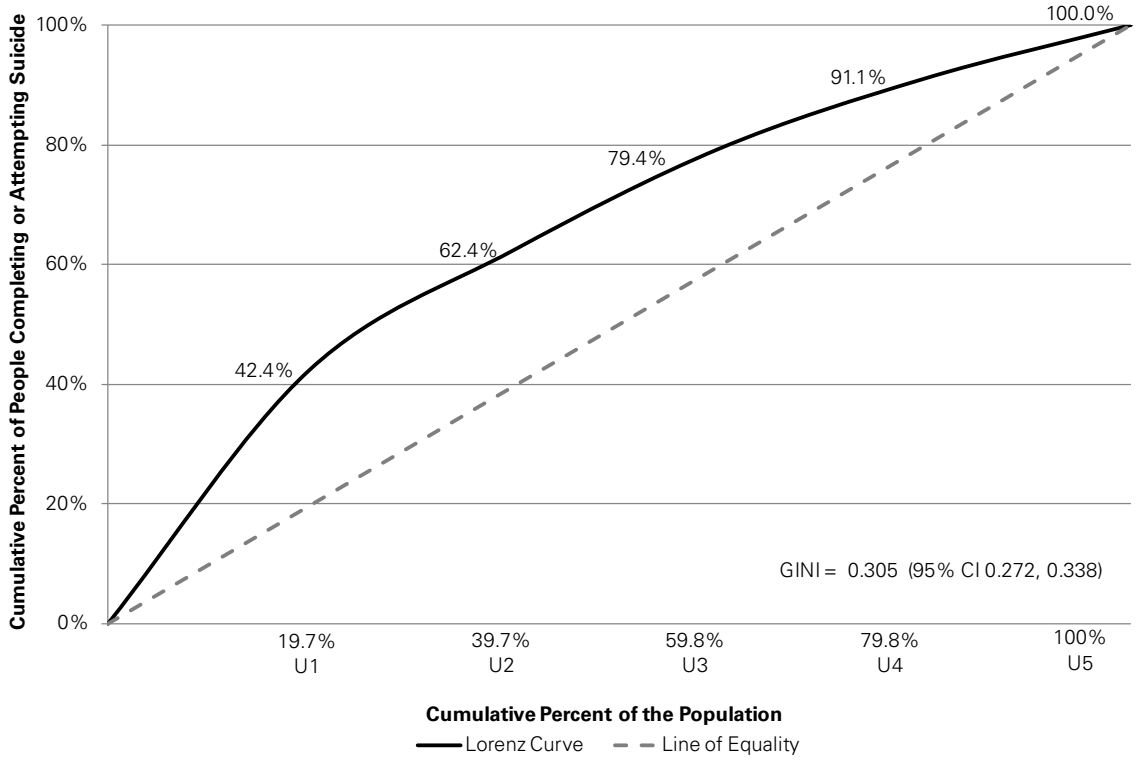
Adjusted by (2005-2007) age, residents aged 10+



Source: Manitoba Centre for Health Policy, 2010

Figure 7.22: Adjusted Lorenz Curve for Completed or Attempted Suicide in Urban Areas, 2005-2007

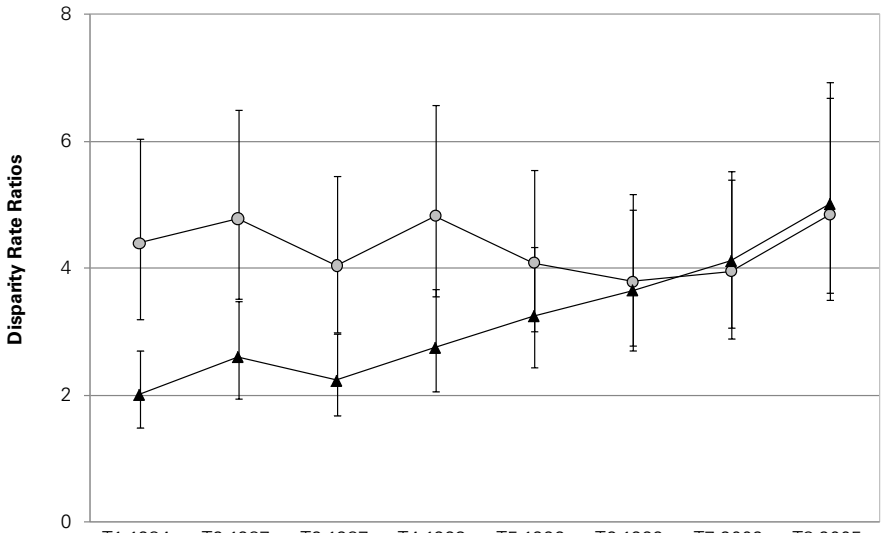
Adjusted by (2005-2007) age, residents aged 10+



Source: Manitoba Centre for Health Policy, 2010

Figure 7.23: Prevalence of Completed or Attempted Suicide Disparity Rate Ratios by Urban and Rural Income Quintile

Adjusted by (2005-2007) age, per 1,000 residents aged 10+



	T1:1984-1986	T2:1987-1989	T2:1987-1989	T4:1993-1995	T5:1996-1998	T6:1999-2001	T7:2002-2004	T8:2005-2007
Urban Disparity Rate Ratios	4.40	4.78	4.04	4.83	4.09	3.79	3.96	4.85
Rural Disparity Rate Ratios	2.01	2.61	2.23	2.75	3.25	3.65	4.11	5.01

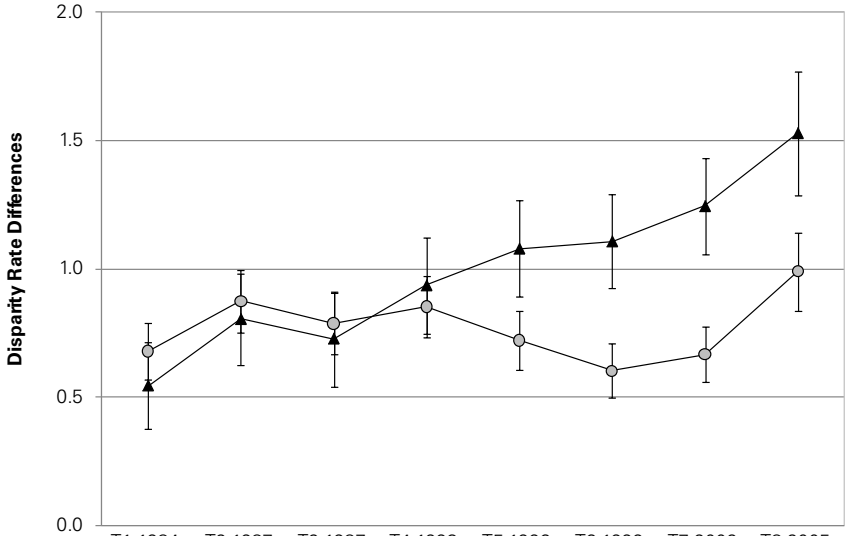
Time Period (years)

Urban Disparity Rate Ratios T5 to T1: 1.10 (95% CI 0.70, 1.73) NS
Rural Disparity Rate Ratios T5 to T1: 2.49 (95% CI 1.61, 3.85) p< .001

Source: Manitoba Centre for Health Policy, 2010

Figure 7.24: Prevalence of Completed or Attempted Suicide Disparity Rate Differences by Urban and Rural Income Quintile

Adjusted by (2005-2007) age, per 1,000 residents aged 10+



	T1:1984-1986	T2:1987-1989	T2:1987-1989	T4:1993-1995	T5:1996-1998	T6:1999-2001	T7:2002-2004	T8:2005-2007
Urban Disparity Rate Differences	0.68	0.87	0.79	0.85	0.72	0.60	0.67	0.99
Rural Disparity Rate Differences	0.55	0.80	0.73	0.94	1.08	1.11	1.24	1.53

Time Period (years)

Urban Disparity Rate Differences T5 to T1: 1.46, p< .01
Rural Disparity Rate Differences T5 to T1: 2.81, p< .001

Source: Manitoba Centre for Health Policy, 2010

Reference

Fransoo R, Martens P, Burland E, *The Need to Know* Team, Prior H, Burchill C. Manitoba RHA Indicators Atlas 2009. Manitoba Centre for Health Policy. 2009. http://mchp-appserv.cpe.umanitoba.ca/reference/RHA_Atlas_Report.pdf. Accessed July 20, 2010.

Chapter 8: Pharmaceutical Use

Post-Acute Myocardial Infarction (AMI) Care: Beta-Blocker Prescribing

Definition

Beta–blockers, properly known as beta–adrenergic blocking drugs, have been shown to lower the risk of subsequent heart attacks after patients have suffered an AMI.

Definition: the proportion of patients aged 20 and older hospitalized for Acute Myocardial Infarction (ICD–9 CM code 410; ICD–10 code I21) who filled at least one prescription for a beta–blocker (ATC C07AA, C07AB) within four months of their AMI.

Patients with a diagnosis of asthma, COPD, or peripheral vascular disease were excluded because beta–blockers are contra–indicated for those patients. Patients with a hospitalization for AMI in the preceding three years were also excluded to remove those experiencing multiple heart attacks in a relatively short period.

Exclusions for contra–indications:

- asthma, ICD–9–CM code 493; ICD–10–CA code J45
- chronic obstructive pulmonary disease, ICD–9–CM codes 491 and 492; ICD–10–CA codes J41–J44
- peripheral vascular disease, ICD–9–CM codes 443 and 459; ICD–10–CA codes I73, I79.2, I87

NOTE: Up until the year 2005, northern First Nations community pharmaceutical data may be missing due to lack of prescription data being entered into the DPIN system. However, as of 2005 to the present, prescriptions for First Nations communities are dispensed through a private pharmaceutical company that reports all prescriptions through DPIN.

Time Periods	Percentage of patients post-AMI with beta-blocker prescription
T1: 1996/97-1998/99	65.28
T2: 1999/00-2001/02	75.92
T3: 2002/03-2004/05	80.58
T4: 2005/06-2007/08	81.28

Key Findings: Post-Acute Myocardial Infarction (AMI) Care: Beta-Blocker Prescribing

Manitoba overall rates:

- From the first time period T1 (1996/97-1998/99) to the last time period T4 (2005/06-2007/08), the percentage of patients with an AMI who filled at least one prescription for a beta-blocker within four months of their AMI increased from 65.3% to 81.3% provincially.

Rates by neighbourhood income quintile over time:
Rural:

- From T1 to T4, the proportion of AMI patients who filled at least one beta-blocker prescription increased steadily across all rural neighbourhood income quintiles.
- The disparity[7] between R1 and R5 did not substantially nor significantly increase over the time period. The rate ratio of R1 compared to R5 was 0.83 in the first time period and 0.91 in the most recent time period, and these were not statistically significantly different. The absolute difference gap of beta-blocker use amongst post-AMI patients was also not statistically significantly different over time, 11.60 less patients prescribed the beta-blockers per 100 in R1 compared to R5 in T1 and 7.37 less per 100 in T4.

Urban:

- From T1 to T4, the proportion of AMI patients who filled at least one beta-blocker prescription increased steadily across all urban neighbourhood income quintiles, although not as dramatically in the last two time periods.
- The disparity between U1 and U5 did not substantially nor significantly increase over the time period. The rate ratio of U1 compared to U5 was 0.86 in the first time period and 0.98 in the most recent time period, representing a non-significant decrease of 14%. The absolute difference gap of beta-blocker use amongst post-AMI patients significantly decreased over time by 80%, from 10.04 fewer beta-blocker users per 100 in U1 compared to U5 in the first time period compared to 1.99 fewer users per 100 in the last time period.

Lorenz Curves:
Rural over time:

- In the first time period T1, 20.7% of the post-AMI patients who were dispensed a beta-blocker were accounted for in the 23.1% of the population in the lowest neighbourhood income quintile group R1, with the Gini coefficient of 0.041. Although this coefficient is statistically significant, this is a relatively minor deviation from the expected curve and should be considered as approaching 'equality'.
- In the last time period T4, 22.5% of the post-AMI patients dispensed a beta-blocker were accounted for in the 23.6% of the population in R1. There was no evidence of disparity as demonstrated by the non-statistically significant Gini coefficient (i.e., the Gini coefficient's 95% CI include 0) and the Lorenz curve that is very similar to the line of equality.
- Comparing T1 to T4, the Gini coefficients in the rural neighbourhood income quintile groups were not statistically significantly different (p=0.24, NS). In other words, the inequality was similar over time and very small—close to the line of equality.

Urban over time:

- In T1, 21.9% of the post-AMI patients who were dispensed a beta-blocker were accounted for in the 24.1% of the population in the lowest neighbourhood income quintile group U1, with a Gini coefficient of 0.028 (not statistically significant). Thus, there appears to be no measured disparity across urban quintiles in the first time period.

7 In the case of certain indicators where fewer events or percentages occur in the lowest compared to the highest quintile (such as in the case of Pap tests), DRRs are below 1 and DRDs are negative—the directions of differences are somewhat non-intuitive. The "lower" the ratio below 1 (for example, 0.7 rather than 0.8), the greater the disparity (i.e., 30% compared to 20% difference). As well, the more negative the difference (for example, -20 compared to -10), the greater the disparity. So what appears as a positive outcome ("lower" disparity) of lower DRRs or lower DRDs on the y-axis is actually a greater disparity.

- In T4, 24.3% of the post-AMI patients dispensed a beta-blocker were accounted for in the 25.0% of the population in U1, for a non-statistically significant Gini coefficient of 0.005. There was also no evidence of disparity in urban areas as demonstrated by the Gini coefficient and the Lorenz curve.

- From T1 to T4, there was no statistically significant difference in inequality over time (p=0.034, NS), and both time periods displayed non-statistically significant Gini coefficients (indicating no inequality was evident in the quality of care received).

Rural compared to urban in most recent time period:

- In the most recent time period T4, there is no statistically significant difference in Gini coefficients in rural compared to urban (0.018 vs. 0.005, p=0.55, NS). Both Gini coefficients were also not statistically significantly different than 0. This indicates that there are similar levels of equity for post-AMI patients receiving beta-blockers in rural and urban Manitoba and that these levels approximate the line of equality.

Disparity measures over time by rural and urban:

- The disparity rate ratios (i.e., the ratio of those post-AMI patients who were dispensed a beta-blocker in the lowest compared to the highest neighbourhood income) have remained stable throughout the observation period T1 to T4 in both the urban and rural regions.

- The disparity rate differences (i.e., the absolute difference in the proportion of post-AMI patients who were dispensed a beta-blocker in the lowest compared to the highest neighbourhood income) have similarly remained stable over time with little evidence of disparity. However, in the rural region, the absolute differences are consistently greater than in urban indicating a larger, albeit statistically non-significant, rate difference between the lowest and highest neighbourhood income groups.

What is this telling us?

- Over the time period from 1996/97-1998/99 to 2005/06-2007/08, there is a continued upward trend of the percentage of post-AMI patients receiving a beta-blocker prescription within four months of their AMI. This indicates increasing quality of care across all neighbourhood income quintiles, both in rural and urban Manitoba.

- Most indicators of disparity are showing that there is little inequality in this indicator. The exceptions also show improvement: urban DRDs (disparity rate differences) show a decreasing inequality between U1 and U5 over time and the rural Gini coefficient at T1 (very small but statistically significant) showed no inequality in the latest time period T4.

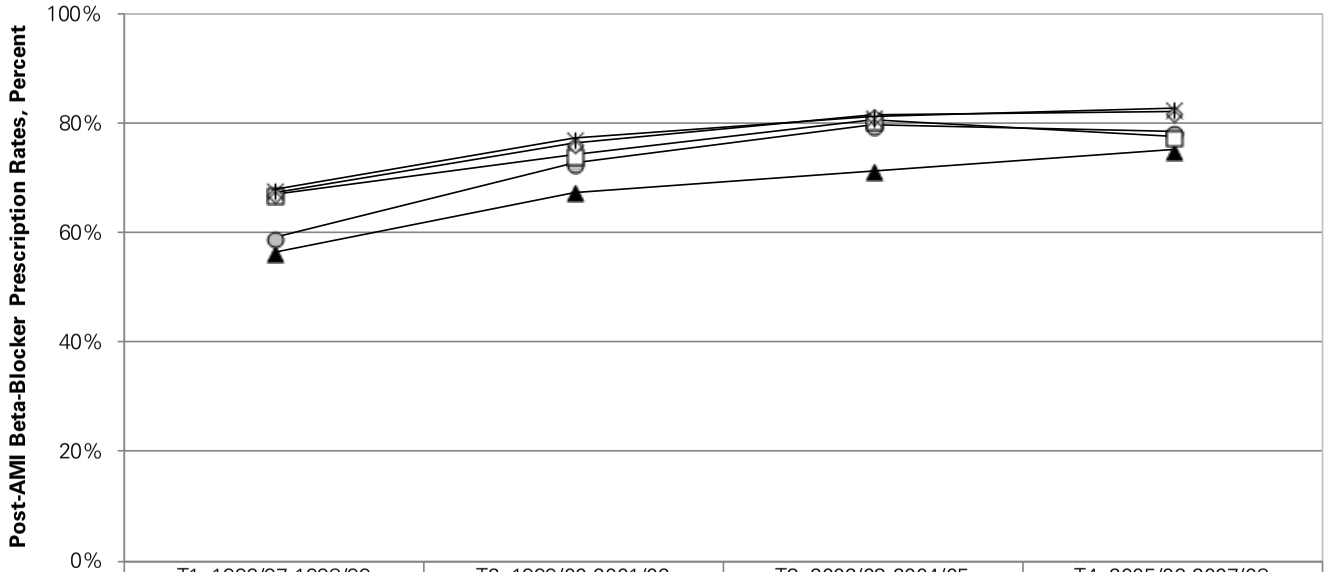
- This indicator shows remarkable equity in pharmaceutical prescribing patterns for post-AMI patients, with no statistically significant differences between neighbourhood income groupings in either rural or urban quintiles in the latest time period T4.

Where to from here?

- Post-AMI patients in Manitoba are experiencing similar beta-blocker prescribing patterns no matter what their socioeconomic group, and no matter where they live (rural or urban). As well, there is no evidence of disparity, meaning that the percentage of the population having an AMI in each quintile has a similar percentage of post-AMI patients receiving beta-blockers. Therefore, it would indicate that no intervention is required to ensure equity, i.e., fair treatment post-AMI. That being said, the lower income quintile groups have a higher incidence rate of AMIs (see Fransoo et al. 2009).

Figure 8.1: Post-AMI Care: Beta-Blocker Prescription Rates Over Time by Rural Income Quintile

Adjusted by (2005/06-2007/08) age & sex, percent of AMI patients aged 20+ with a prescription for a beta-blocker within four months



	T1: 1996/97-1998/99	T2: 1999/00-2001/02	T3: 2002/03-2004/05	T4: 2005/06-2007/08
NF (Not displayed)	37.33	45.36	61.94	65.45
R1 (lowest income)	56.43	67.50	71.41	75.30
R2	59.03	72.80	79.68	78.53
R3	67.03	74.29	80.73	77.70
R4	67.23	76.34	81.60	82.06
R5 (highest income)	68.04	77.25	81.31	82.67
Disparity Rate Ratios (R1/R5)	0.83	0.87	0.88	0.91
Disparity Rate Differences (R1-R5)	-11.60	-9.75	-9.90	-7.37

Time Period (fiscal years)

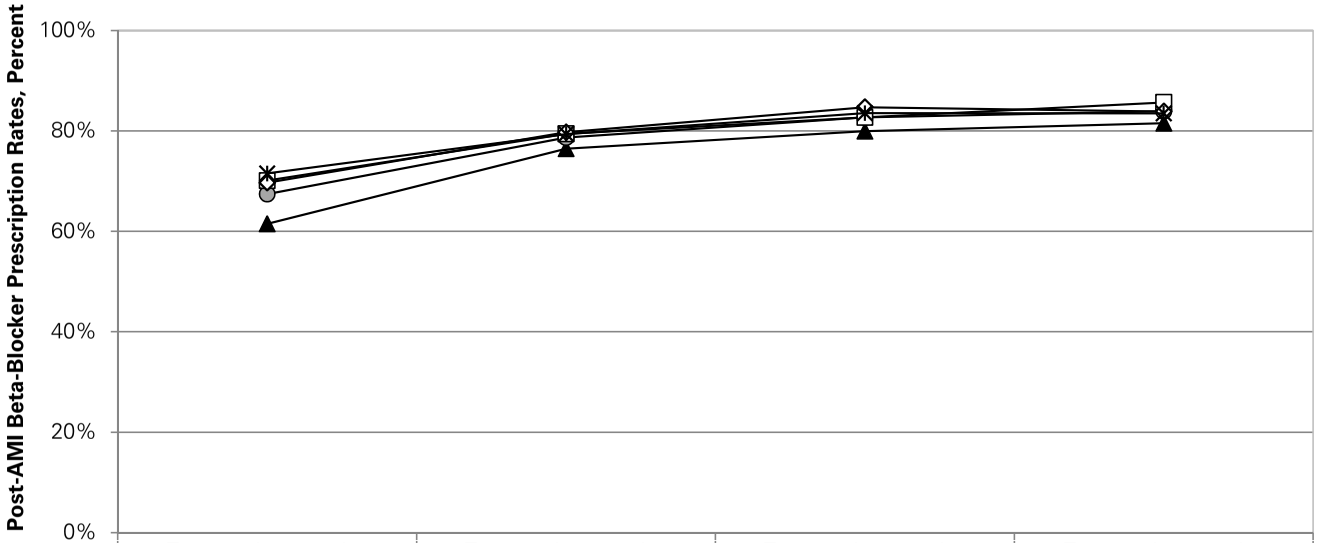
Comparison of Disparity Rate Ratios T5 to T1: 1.10 (95% CI 0.93 , 1.30) NS

Comparison of Disparity Rate Differences T5 to T1: 0.64 , NS

Source: Manitoba Centre for Health Policy, 2010

Figure 8.2: Post-AMI Care: Beta-Blocker Prescription Rates Over Time by Urban Income Quintile

Adjusted by (2005/06-2007/08) age & sex, percent of AMI patients aged 20+ with a prescription for a beta-blocker within four months



	T1: 1996/97-1998/99	T2: 1999/00-2001/02	T3: 2002/03-2004/05	T4: 2005/06-2007/08
NF (Not displayed)	37.33	45.36	61.94	65.45
U1 (lowest income)	61.47	76.42	79.93	81.50
U2	67.43	78.68	82.68	83.92
U3	70.12	79.43	82.68	85.67
U4	69.67	79.72	84.72	83.86
U5 (highest income)	71.51	79.38	83.54	83.49
Disparity Rate Ratios (U1/U5)	0.86	0.96	0.96	0.98
Disparity Rate Differences (U1-U5)	-10.04	-2.95	-3.60	-1.99

Time Period (fiscal years)

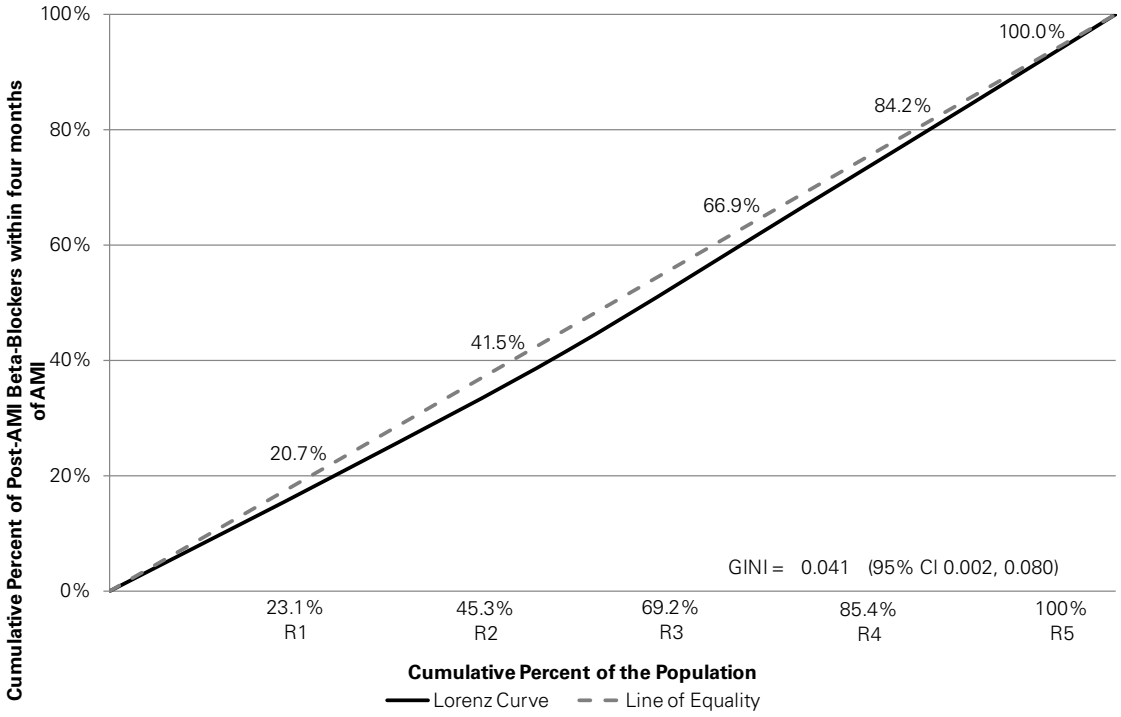
Comparison of Disparity Rate Ratios T5 to T1: 1.14 (95% CI 1.00, 1.29), NS

Comparison of Disparity Rate Differences T5 to T1: 0.2, p<.05

Source: Manitoba Centre for Health Policy, 2010

Figure 8.3: Adjusted Lorenz Curve for Post-AMI Beta-Blockers within four months of having an AMI in Rural Areas 1996/97-1998/99

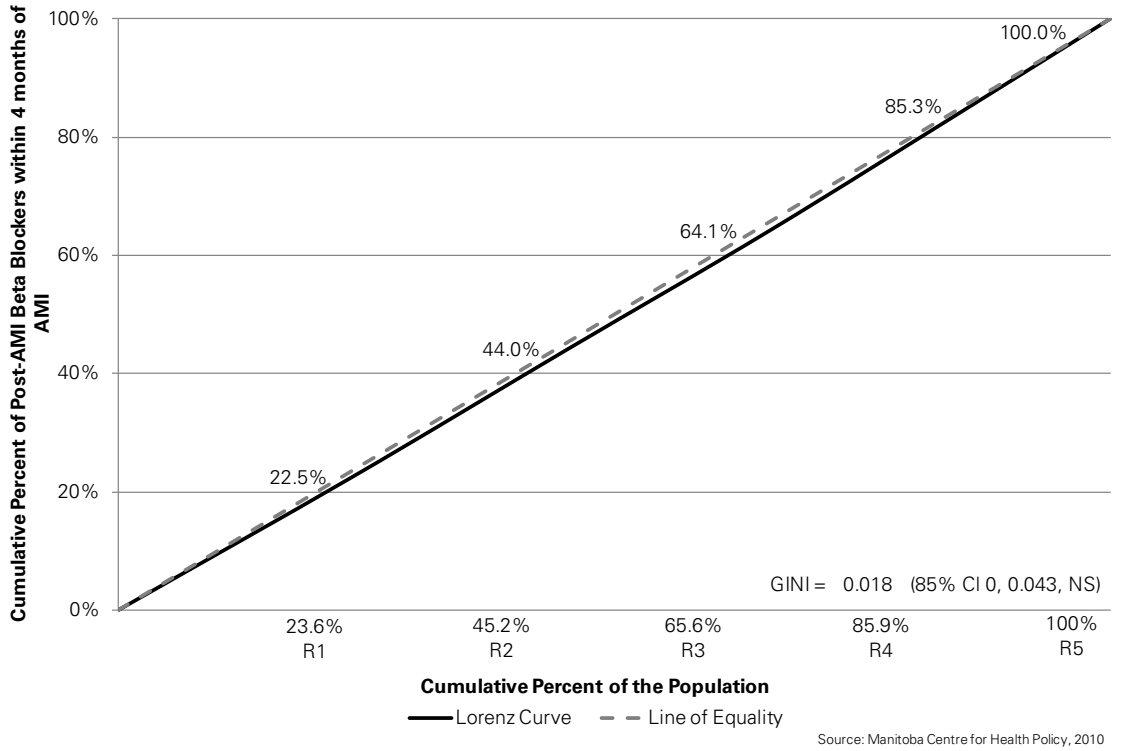
Adjusted by (2005/06-2007/08) age & sex, residents aged 20+



Source: Manitoba Centre for Health Policy, 2010

Figure 8.4: Adjusted Lorenz Curve for Post-AMI Beta-Blockers within four months of AMI in Rural Areas 2005/06-2007/08

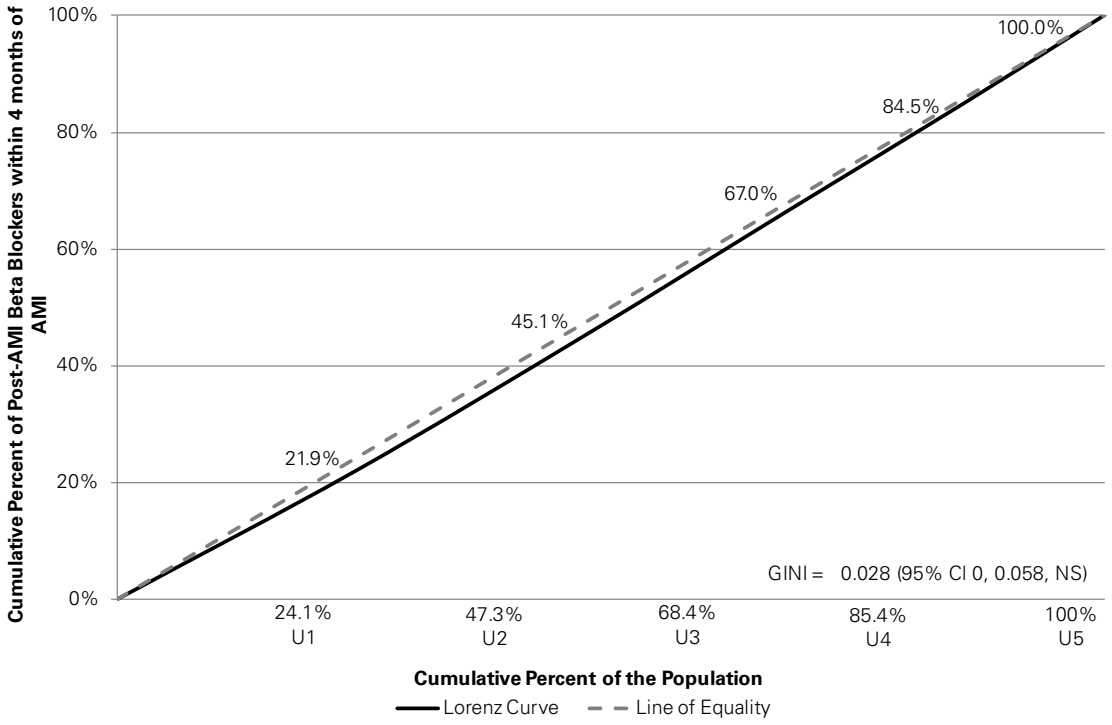
Adjusted by (2005/06-2007/08) age & sex, residents aged 20+



Source: Manitoba Centre for Health Policy, 2010

Figure 8.5: Adjusted Lorenz Curve for Post-AMI Beta-Blockers within four months of an AMI in Urban Areas 1996/97-1998/99

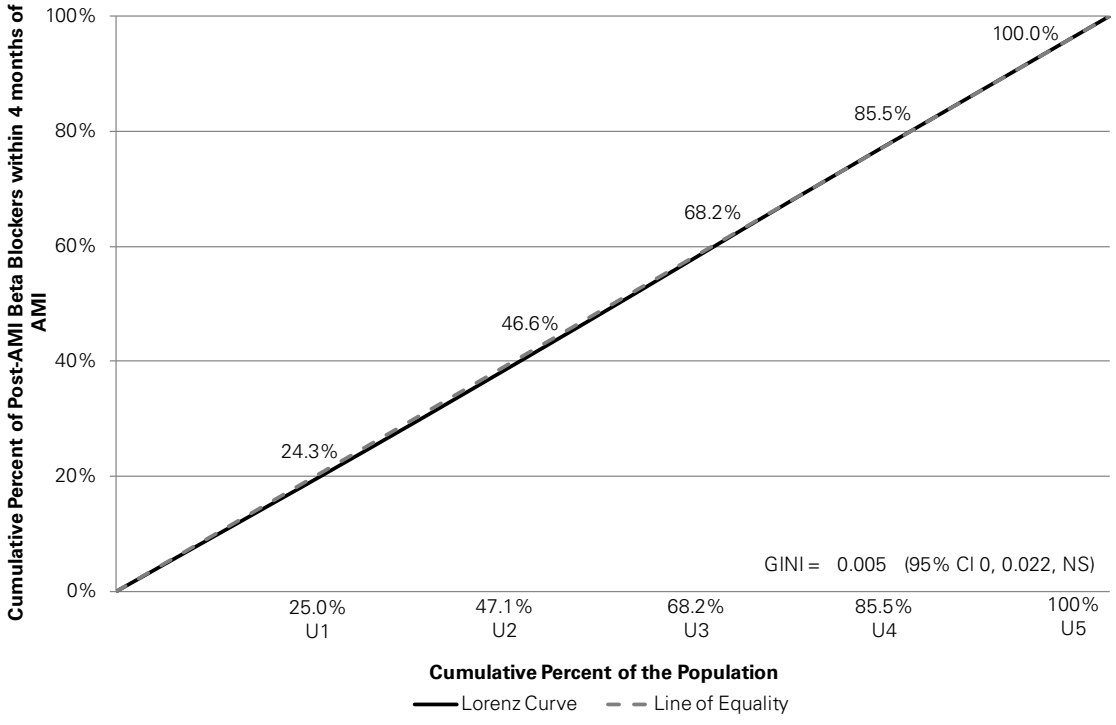
Adjusted by (2005/06-2007/08) age & sex, residents aged 20+



Source: Manitoba Centre for Health Policy, 2010

Figure 8.6: Adjusted Lorenz Curve for Post-AMI Beta-Blockers within four months of an AMI in Urban Areas 2005/06-2007/08

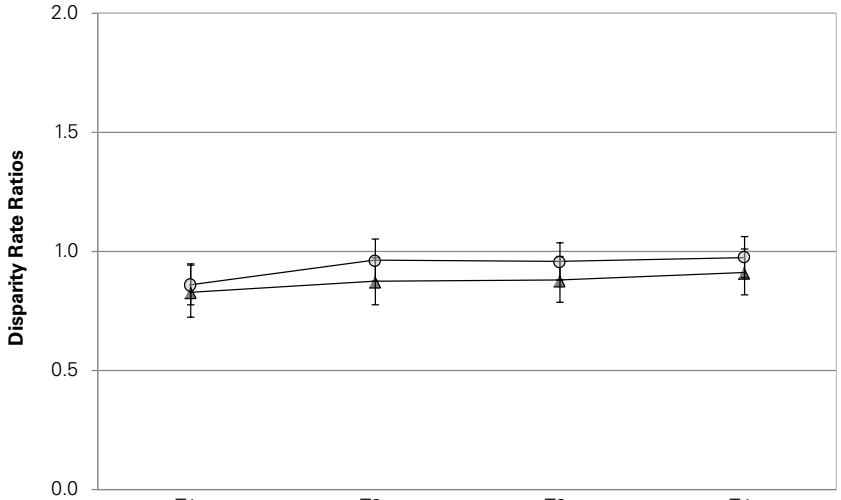
Adjusted by (2005/06-2007/08) age & sex, residents aged 20+



Source: Manitoba Centre for Health Policy, 2010

Figure 8.7: Post-AMI Care: Beta-Blocker Disparity Rate Ratios by Urban and Rural Income Quintile

Adjusted by (2005/06-2007/08) age & sex, percent of AMI patients aged 20+ with a prescription for a beta-blocker within four months



	T1: 1996/97-1998/99	T2: 1999/00-2001/02	T3: 2002/03-2004/05	T4: 2005/06-2007/08
Urban Disparity Rate Ratios	0.86	0.96	0.96	0.98
Rural Disparity Rate Ratios	0.83	0.87	0.88	0.91

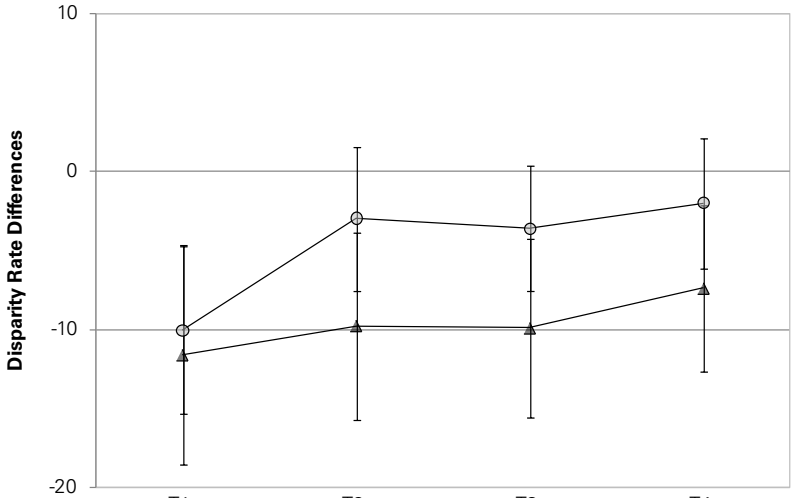
Time Period (fiscal years)

Urban Disparity Rate Ratios T5 to T1: 1.14 (95% CI 1.00, 1.29) NS
Rural Disparity Rate Ratios T5 to T1: 1.10 (95% CI 0.93, 1.30) NS

Source: Manitoba Centre for Health Policy, 2010

Figure 8.8: Post-AMI Care: Beta-Blocker Disparity Rate Differences by Urban and Rural Income Quintile

Adjusted by (2005/06-2007/08) age & sex, percent of AMI patients aged 20+ with a prescription for a beta-blocker within four months



	T1: 1996/97-1998/99	T2: 1999/00-2001/02	T3: 2002/03-2004/05	T4: 2005/06-2007/08
Urban Disparity Rate Differences	-10.04	-2.95	-3.60	-1.99
Rural Disparity Rate Differences	-11.60	-9.75	-9.90	-7.37

Time Period (fiscal years)

Urban Disparity Rate Differences T5 to T1: 0.2, p<.05
Rural Disparity Rate Differences T5 to T1: 0.64, NS

Source: Manitoba Centre for Health Policy, 2010

Reference

Fransoo R, Martens P, Burland E, *The Need to Know* Team, Prior H, Burchill C. Manitoba RHA Indicators Atlas 2009. Manitoba Centre for Health Policy. 2009. http://mchp-appserv.cpe.umanitoba.ca/reference/RHA_Atlas_Report.pdf. Accessed July 20, 2010.

Chapter 9: Summary and Conclusion: Closing the Gap

The purpose of this report is to document health inequities across socioeconomic groups in Manitoba, and to determine if the gap is widening or narrowing over time. Various measures were used to identify whether or not there was a gap and whether or not this was changing over time—Disparity Rate Ratios (DRRs), Disparity Rate Differences (DRDs), comparing both of these over time, comparing within and between urban and rural neighbourhood income quintile groupings, and using Lorenz curves and Gini coefficients. It appears useful to quantify gaps with a variety of statistical measures since we observed different patterns depending upon the measure. In general, the measures were internally consistent with each other. But at other times, there were mixed conclusions with some measures indicating no change over time and others showing an increase or decrease. This chapter includes Tables 9.1 to 9.5, which show a synopsis of the findings of each health indicator—this will hopefully enable the reader to get an overall sense of the direction, magnitude, and changes over time of the inequality or lack thereof.

Debate Over the Use of Terminology Surrounding "Gaps"

There is some debate as to whether one should refer to the gap as disparity, inequality, or inequity and whether we should even strive towards reducing the gap (see Culyer, 1993). Inequity implies unfairness, as discussed in Chapter 1. Is it unfair if there is an unequal distribution of adverse health outcomes in the various neighbourhood income quintile groupings? Indeed, one would suppose that if a socioeconomic group experiences a greater burden of illness, that this should be considered "unfair" by the planners and decision–makers. On the other hand, there are possibly instances where disparity or inequality is fair. If, for example, a less healthy group receives a greater proportion of healthcare services, this may be considered inequality while at the same time considered fair (hence, "equity" was achieved). Fairness may occasionally mean that one group "has" more than another if whatever being measured (such as health services) is in proportion to need.

Throughout this report, we have sometimes used the words gap, disparity, inequality, and inequity somewhat interchangeably because all of the measures chosen in the report were in the area of health outcomes (such as diabetes, MS), health service outcomes given a certain health outcome (such as in beta–blocker prescribing of people who had a heart attack), or social service outcomes (such as high school completion). One of the reasons that the Advisory Group chose not to analyse an indicator like physician use, or hospital use, is that it is more difficult to determine if differential use is justified or not, or if it is reflecting access or need.

A Summary of Indicators: Is the gap widening or narrowing?

Table 9.1 shows a detailed comparison of the inequality measures for rural and urban neighbourhood income quintile groups—comparing these *over time* and to each other. *Is inequality increasing or decreasing over time?* According to Table 9.1, it depends upon the health indicator. Synopses of Table 9.1 are included below as Table 9.2 (derived from Table 9.1's columns 2–7) and Table 9.3 (derived from columns 8–10). These tables are meant to show change over time. However, refer to Table 9.5 later in the chapter to see which indicators show a statistically significant and high Gini coefficient, which demonstrates a large degree of inequality. An indicator could show the need for targeted programs (i.e., a high Gini coefficient), but may not have changed over time (i.e., the Gini coefficient remained high throughout the time period studied). For example, dental extractions appear in Table 9.1 as NS (no statistically significant change over time in the degree of inequality); but in Table 9.5, they appear having a very high Gini coefficient warranting targeted programs.

Table 9.1: Changes in Health inequalities Over Time: Summary of Results by indicator*

NS means not statistically significantly different

Indicator	Change in inequality over time (first to last time period "T") by neighbourhood income quintile–DRR and DRD measure the inequality between the lowest and highest neighbourhood income quintile groups						Comparison of inequality between rural and urban neighbourhood income quintile groups		
	RURAL neighbourhood income quintiles			*URBAN neighbourhood income quintiles*			*RURAL vs. URBAN*		
	Disparity Rate ratio, DRR (% change over time)	Disparity Rate difference DRD (% change over time)	Gini Coefficient	Disparity Rate ratio, DRR (% change over time)	Disparity Rate difference DRD (% change over time)	Gini Coefficient	Trends in Disparity Rate ratio (DRR) over time	Trends in Disparity Rate difference (DRD) over time	**Most recent time period only:** comparison of Gini Coefficients, rural vs. urban
Chapter 3: Mortality									
Premature Mortality Rate PMR (average annual number of people aged 0-74 who died, per 1,000 people aged 0-74)	↑ (38%)	↑ (58%)	↑	↑ (50%)	↑ (27%)	↑	Higher in urban	Higher in urban	Greater inequality in urban
	T1: 1.35 T5: 1.86	T1: 1.39 T5: 2.19 per 1,000	T1: 0.058 T5: 0.119	T1: 1.91 T5: 2.88	T1: 2.72 T5: 3.46 per 1,000	T1: .131 T5: .205			T5 rural: 0.119 urban: 0.205
Potential Years of Life Lost PYLL (average annual years of life lost per 1,000 aged 0-74)	NS	↑ (17%)	↑	↑ (55%)	↑ (19%)	↑	NS	Higher in urban (mostly)	Greater inequality in urban
	T1: 1.77 T5: 2.29	T1: 53.8 T5: 62.9 per 1,000	T1: 0.103 T5: 0.168	T1: 2.32 T5: 3.59	T1: 61.2 T5: 72.8 per 1,000	T1: 0.169 T5: 0.255			T5 rural: 0.168 urban: 0.255
Under Age 5 Mortality Rate (average annual rate of deaths per 1,000 under age five)	NS	↓ (64%)	NS	NS	NS	NS	NS	NS	NS
	T1: 2.19 T5: 1.66	T1: 2.33 T5: 0.83 per 1,000	T1: 0.155 T5: 0.110	T1: 2.19 T5: 2.32	T1: 1.74 T5: 1.20 per 1,000	T1: 0.160 T5: 0.129			T5 rural: 0.110 urban: 0.129

Table 9.1: Continued

Indicator	RURAL change over time			URBAN change over time			RURAL vs. URBAN		
	DRR	DRD	Gini	DRR	DRD	Gini	DRR	DRD	Gini R vs. U
Chapter 4: Child Health									
Teenage Pregnancy (average annual rate of pregnancies per 1,000 females aged 15-19)	↑ (80%)	↑ (34%)	↑	↑ (102%)	↑ (25%)	↑	Higher in urban	Higher in urban	Greater inequality in urban
	T1: 2.21 T8: 3.98	T1: 60.5 T8: 80.6	T1: 0.197 T8: 0.286	T1: 4.93 T8: 9.95	T1: 76.4 T8: 95.0	T1: 0.303 T8: 0.406			T8 rural: 0.286 urban: 0.406
High School Completion (% Grade 9 students graduating from Grade 12 within six years)**	NS	↑ (19%)	NS	↑ (8%)	↑ (18%)	NS	T2-T5 rural higher than urban; T1, T6, T7 NS	T2-T7 rural higher than urban; T1 NS	NS
	T1: 0.63 T7: 0.60	T1: -28.50 T7: -33.97	T1: 0.069 T7: 0.079	T1: 0.61 T7: 0.56	T1: -34.67 T7: -41.07	T1: 0.089 T7: 0.098			T7 rural: 0.079 urban: 0.098
Dental Extraction Rate (number of children aged 0-5 hospitalized for dental extractions per 1,000 children aged 0-5)	NS	↑ (245%)	NS	NS	↑ (146%)	NS (p=.053)	NS	All times, rural higher than urban	NS (p=.064)
	T1: 4.15 T5: 6.45	T1: 14.58 T5: 50.28	T1: 0.363 T5: 0.383	T1: 7.79 T5: 13.09	T1: 6.82 T5: 16.76	T1: 0.356 T5: 0.421			T5 rural: 0.383 urban: 0.421
Breastfeeding Initiation Rate (% live born newborns being breastfed upon hospital discharge)**	↑ (14%)	↑ (86%)	↑	↓ (9%)	↓ (22%)	NS	NS except T7 where rural is greater	T1, T2 urban greater, T4 to T7 rural greater	Greater inequality in rural
	T1: 0.82 T7: 0.71	T1: -13.8 T7: -25.8	T1: 0.040 T7: 0.070	T1: 0.76 T7: 0.82	T1: -20.4 T7: -15.9	T1: 0.051 T7: 0.039			T7 rural: 0.070 urban: 0.039
Chapter 5: Adult Health									
Diabetes Prevalence (percentage of people aged 19+ having a diagnosis of diabetes over a three-year period)	↑ (25%)	↑ (187%)	↑	↑ (20%)	↑ (173%)	↑	NS	Higher in rural	Greater inequality in rural
	T1: 1.67 T8: 2.08	T1: 2.54 T8: 7.29	T1: 0.097 T8: 0.143	T1: 1.54 T8: 1.85	T1: 1.75 T8: 4.76	T1: 0.092 T8: 0.119			T8 rural: 0.143 urban: 0.119

Table 9.1: Continued

Indicator	RURAL change over time			URBAN change over time			RURAL vs. URBAN		
	DRR	DRD	Gini	DRR	DRD	Gini	DRR	DRD	Gini R vs. U
Amputations due to Diabetes (rate of amputations per 1,000 people aged 19+ with diabetes)	NS T1: 2.00 T8: 3.38	NS T1: 13.9 T8: 18.3	↑ T1: 0.138 T8: 0.255	NS T1: 2.53 T8: 2.77	NS T1: 11.3 T8: 9.9	NS T1: 0.170 T8: 0.211	NS	Higher in rural (since T4)	NS T8 rural: 0.266 urban: 0.211
Ischemic Heart Disease (% of persons aged 19+ with a diagnosis of IHD)	↑ (45%) T1: 1.07 T8: 1.55	↑ (422%) T1: 0.50 T8: 2.59	↑ T1: 0.019 T8: 0.074	NS T1: 1.07 T8: 1.33	↑ (196%) T1: 0.51 T8: 1.51	↑ T1: 0.011 T8: 0.057	NS	Higher in urban T2; higher in rural T4, T6-T8	NS T8 rural: 0.074 urban: 0.057
Multiple Sclerosis (persons aged 16+ diagnosed with MS over a six-year period, per 100,000 persons aged 16+)	NS T1: 0.78 T4: 0.61	NS T1: -45.3 T4: -110.9	NS T1: 0.042, NS T4: 0.054	NS T1: 0.99 T4: 0.96	NS T1: -2.3 T4: -10.7	NS T1: 0.010, NS T4: 0.008, NS	NS except at T4, where greater in rural	NS except at T4, where greater in rural	NS T4 rural: 0.054 urban: 0.008
Chapter 6: Primary Care and Prevention									
Continuity of Care (% of population having at least 50% of their physician visits over a two-year period to the same physician)**	NS T1: 0.88 T12: 0.83	↑ (26%) T1: -9.31 T12: -11.70	↑ T1: 0.026 T12: 0.037	NS T1: 0.93 T12: 0.92	NS T1: -5.76 T12: -5.99	NS T1: 0.015 T12: 0.016	NS to mid-1990s; very slightly greater in rural after	Greater gap in rural	Greater inequality in rural T12 rural: 0.037 urban: 0.016
Hospitalizations for TB (average annual rate of persons per 100,000 who were hospitalized for TB)	↑(114%) T1: 2.72 T5: 5.83	↑(83%) T1: 26.22 T5: 47.91	↑ T1: 0.260 T5: 0.463	NS T1:14.46 T5: 9.43	↓ (45%) T1: 35.20 T5: 19.19	NS T1: 0.496 T5: 0.401	NS except at T1 where urban is higher	NS except at T5 where rural is greater	NS T5 rural: 0.463 urban: 0.401
Cervical Cancer Screening (% females aged 18-69 having at least one Pap test over three years)**	↑ (12%) T1: 0.82 T8: 0.72	↑ (53%) T1: -12.03 T8: -18.37	↑ T1: 0.035 T8: 0.059	NS T1: 0.84 T8: 0.80	↑ (27%) T1: -11.55 T8: -14.62	↑ T1: 0.033 T8: 0.041	NS or slightly greater in rural	Mostly greater in rural	Greater inequality in rural T8 rural: 0.059 urban: 0.041

This page edited May 18, 2011.

Table 9.1: Continued

Indicator	RURAL change over time			URBAN change over time			RURAL vs. URBAN		
	DRR	DRD	Gini	DRR	DRD	Gini	DRR	DRD	Gini R vs. U
Chapter 7: Mental Health									
Cumulative Mental Illness (% of persons aged 10+ having a diagnosis of one or more of anxiety, personality disorders, depression, substance abuse, or schizophrenia over a five-year period)	↑ (12%)	↑ (757%)	↑	NS	↑ (27%)	NS	Higher in urban	Higher in urban	Greater inequality in urban
	T1: 0.98 T5: 1.10	T1: -0.21 T5: 1.83	T1: 0.001 T5: 0.012	T1: 1.50 T5: 1.43	T1: 6.92 T5: 8.82	T1: 0.076 T5: 0.071			T5: rural: 0.012 urban: 0.071
Dementia (% of persons aged 55+ with a diagnosis of dementia over a five-year period)	NS	NS	NS	NS	↑ (96%)	NS	NS	Mostly higher in urban, and increasing over time	Greater inequality in urban
	T1: 1.08 T5: 1.03	T1: 0.48 T5: 0.23	T1: 0.010, NS T5: 0.003, NS	T1: 1.25 T5: 1.28	T1: 1.39% T5: 2.73%	T1: 0.050 T5: 0.056			T5: rural: 0.003 urban: 0.056
Suicide Deaths and Suicide attempts (number of persons per 1,000 aged 10+ who either completed or attempted suicide at least once in a three-year period)	↑ (149%)	↑ (181%)	↑	NS	↑ (46%)	NS	Until mid-1990s, higher in urban; after mid-1990s similar in urban and rural	Until mid-1990s, similar in rural and urban; after mid-1990s, higher in rural	NS
	T1: 2.01 T8: 5.01	T1: 0.55 T8: 1.53	T1: 0.181 T8: 0.295	T1: 4.40 T8: 4.85	T1: 0.68 T8: 0.99	T1: 0.273 T8: 0.305			T8 rural: 0.295 urban: 0.305

Table 9.1: Continued

Chapter 8: Pharmaceutical Use									
Post-Acute Myocardial Infarction (AMI) Care: Beta-Blocker Prescribing (% AMI patients aged 20+ with prescription within four months of the AMI)**	NS T1: 0.83 T4: 0.91	NS T1: -11.60 T4: -7.37	NS T1: 0.041 T4: 0.018, NS	NS T1: 0.86 T4: 0.98	↓ (80%) T1: -10.04 T4: -1.99	NS T1: 0.028, NS T4: 0.005, NS	NS	NS	NS T4 rural: 0.018, NS urban: 0.005, NS

*Note: if there is no statistically significant difference between the comparative numbers, then NS indicates this (i.e., rates are similar). Arrows increasing or decreasing are only shown if the change is statistically significant (p<.05).

** in the case of certain indicators where fewer events or percentages occur in the lowest compared to the highest quintile (such as breastfeeding, or high school completion), DRRs are below 1, and DRDs are negative – the directions of differences are somewhat non-intuitive. The "lower" the ratio below 1.0 (for example, 0.7 rather than 0.8), the greater the disparity (i.e., 30% compared to 20% difference). As well, the more negative the difference (for example, -20 compared to -10), the greater the disparity. So what appears as a positive outcome ("lower" disparity) of lower DRRs or lower DRDs on the y-axis is actually a greater disparity.

Source: Manitoba Centre for Health Policy, 2010

Table 9.2: Is the socioeconomic gap widening or narrowing over time?

Trends in inequality over time for the health and social indicators

Socioeconomic gap is widening over time	Socioeconomic gap is similar over time	Socioeconomic gap is narrowing over time
Premature Mortality Rate Potential Years of Life Lost Teen pregnancy Breastfeeding (rural only) High school completion (urban mainly) Diabetes Ischemic heart disease Continuity of care (rural only) Hospitalizations for TB (rural only) Cervical cancer screening Cumulative mental illness (rural only) Suicide deaths and suicide attempts (rural only)	Under age 5 mortality High school completion (rural mainly) Dental Extractions (NS or possible increase) Amputation due to diabetes Multiple Sclerosis Continuity of care (urban only) Hospitalizations for TB (urban only—NS or possible decrease) Cumulative mental illness (urban only) Dementia Post–AMI beta–blocker prescription use	Breastfeeding (urban only)

Source: Manitoba Centre for Health Policy, 2010

Table 9.3: Is the socioeconomic gap wider or narrower in rural or urban neighbourhood income groups?

Trends for rural and urban income groupings for the health and social indicators

Socioeconomic gap (inequality) is wider in rural	Socioeconomic gap (inequality) is similar between rural and urban	Socioeconomic gap (inequality) is wider in urban
Comparing rural and urban inequality over time (using DRR and DRD trends over time)*		
High school completion (higher or similar) Breastfeeding Dental extractions Diabetes Amputation due to diabetes IHD (most recent time periods) Continuity of care Cervical cancer screening	Under age 5 mortality Hospitalizations for TB MS Post-AMI beta-blocker prescription use	PMR PYLL Teen pregnancy Cumulative mental illness Dementia
Comparing rural to urban in the most recent time period only (using Gini Coefficients only)		
Breastfeeding Diabetes Continuity of care Cervical cancer screening	Under age 5 mortality High school completion Dental extraction (though a trend to higher in urban) Amputation due to diabetes IHD MS Hospitalizations for TB Suicide deaths/suicide attempts Post-AMI beta-blocker prescription use	PMR PYLL Teen pregnancy Cumulative mental illness Dementia

*Mixed results were seen for suicide deaths/suicide attempts over time, depending upon the measure.

Source: Manitoba Centre for Health Policy, 2010

This page edited May 18, 2011.

The "Not Found" Neighbourhood Income Group: A group with a high risk profile

The "Not Found" (NF) group was rarely discussed in the text despite the data available in the time trend graphs. This group includes people residing in postal codes which may represent an institution (such as a jail or nursing home) or who are wards of the province (such as Child & Family Services or the Public Trustee). Chapters 1, 2, and the Glossary go into greater detail in describing this group. "NF" could represent a mix of persons who may be at risk of poorer health outcomes than the general population. This may be a group of interest in a future study, especially given their profile. Table 9.4 shows a comparison in the *most recent time period* for the 18 indicators. It compares NF rates with the overall Manitoba rate and the lowest rural and urban neighbourhood income quintile rates.

Table 9.4: Comparison of the Not Found (NF) Neighbourhood Income Group
with the overall Manitoba rate and the lowest neighbourhood income quintile group rates, for the most recent period

Indicator	Manitoba rate	NF rate	Lowest rural neighbourhood income group (R1) rate	Lowest urban neighbourhood income group (U1) rate
PMR (per 1,000)	3.33	23.28	4.76	5.31
PYLL (years per 1,000)	60.53	554.18	111.57	100.89
Under age 5 Mortality (per 1,000)	1.58	12.08	2.09	2.10
Teenage pregnancy (per 1,000)	49.91	53.98	107.66	105.56
High school completion (includes band schools)	77.31%	57.47%	52.01%	53.29%
Dental extraction (per 1,000 aged 0-5)	17.06	23.46	59.51	18.14
Breastfeeding initiation (% newborns)	80.13%	69.19%	62.51%	74.71%
Diabetes prevalence (%)	8.17%	11.24%	14.01%	10.36%
Amputations due to diabetes (per 1,000 with diabetes)	11.58	20.12	26.01	15.53
Ischemic heart disease (%)	4.47	6.06	7.27	6.14
MS (per 100,000)	275.65	1922.36	175.63	266.33
Continuity of care (%)	69.63%	73.00%	58.30%	67.97%
Hospitalization for TB (per 100,000)	12.81	28.63	57.83	21.47
Cervical cancer screening (%)	65.50%	43.80%	48.10%	59.74%
Prevalence of cumulative mental illness (%)	23.56%	74.28%	20.43%	29.13%
Prevalence of dementia (% aged 55+)	7.35%	68.24%	8.96%	12.36%
Suicide and suicide attempts (per 1,000)	0.71	2.20	1.91	1.25
Post–AMI beta-blockers (% having an AMI)	81.28%	65.45%	75.30%	81.50%

Source: Manitoba Centre for Health Policy, 2010

Given Table 9.4, it appears as if the NF group is at particular risk of early death (PMR) even when compared to the high risk socioeconomic groups of R1 and U1. The NF group is also at elevated risk of death at a younger age (as indicated by PYLL) and death under age five. Their risk of suicide/suicide attempts is elevated. In addition, the NF group is at extremely high risk of MS and mental illness (cumulative mental illness, dementia). This may be due to the people being cared for in long–term care situations. However, somewhat surprising is the relatively high level of continuity of care, but low cervical cancer screening and post–AMI beta–blocker use (the latter being two indicators of quality of care). All other indicators seem relatively similar to the R1 and U1 groups. So in a future research study, this group needs more careful analysis—who are these people and why are they at such high risk of mortality and mental illness? Why are some quality of care indicators so much lower for the NF group than for those people even in the high risk groups of R1 and U1? These questions are beyond the scope of this report, but it would behoove us to follow up with further study in the future.

Types of Program or Policy Interventions

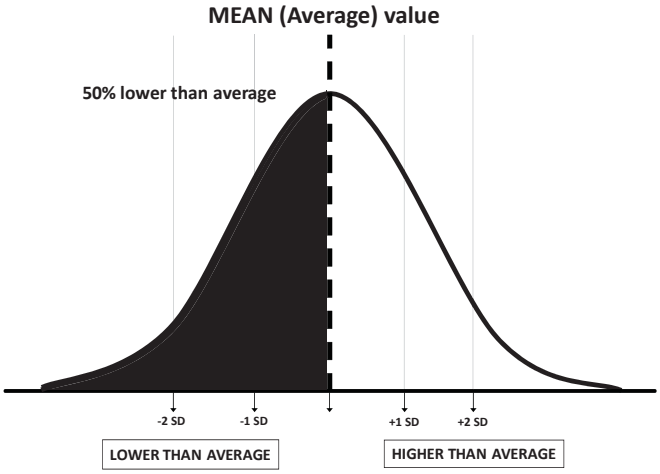
There is much debate as to whether programs should be universal or aimed at specific "at risk" groups. According to Geoffry Rose's Theorem (1992), a large number of people at small risk may give rise to more cases of disease than a small number who are at high risk. In other words, a small change over a large population gives a greater overall benefit than a large change over a small at–risk group within that population. If each person changes positively, even by a small amount, the population distribution will be profoundly affected. By shifting the population curve (normal distribution curve) by only a small amount, say one–half a standard deviation, one changes the percentage of the population below the mean from 50% to 31%—a substantial decrease in those considered 'below' the original average (mean) cut–off. See Figures 9.1 and 9.2 for an illustration of this.

If everyone experiences a similar improvement, resulting in a true population shift, the overall mean shows improvement. However, the gap between the healthiest and the least healthy remains the same in absolute difference terms. So planners and policy–makers need to strive towards improving the overall health of the entire population, but also simultaneously reducing the gap between the most and least healthy by differentially improving the health of the least healthy (see Figures 9.3 and 9.4). So we need to focus on shifting the entire population to improved health while "squishing" the distribution—in other words, giving targeted interventions to the least healthy so they will 'catch up' to attain the health status of the most healthy. There are also other situations where there is a need to target specific interventions to the at–risk group when that particular group is not improving as rapidly as the rest of the population. One can envision a group that remains unchanged while the rest of the population has an improvement in health, resulting in a skewed distribution where one "tail" essentially gets left behind in a trend to improved health. This would increase the gap and necessitate rapid catch up to even be able to maintain the gap that existed previously. Once again, a targeted intervention for this at–risk group, along with the universal intervention, must be considered both to catch up the group which lags behind and, once caught up, to shrink the gap.

Given the results of this research report, the Gini coefficients and the Lorenz curves may give decision–makers evidence upon which to base either the universal population approach or simultaneous universal and targeted approaches. If the Gini coefficient is 0 (the Lorenz curve approximates the line of equality), then the health risk is equally distributed throughout the socioeconomic groups. This would imply the need for a universal approach, since there is presumably no 'at risk' group in the R1 to R5 and

Figure 9.1: The Normal Distribution of a Population

(SD=Standard Deviation)*



*SD = Standard Deviation. Approximately 95% of the population values lie within ±2SDs of the mean value.

Figure 9.2: Shifting the Population Mean by ½ Standard Deviation*

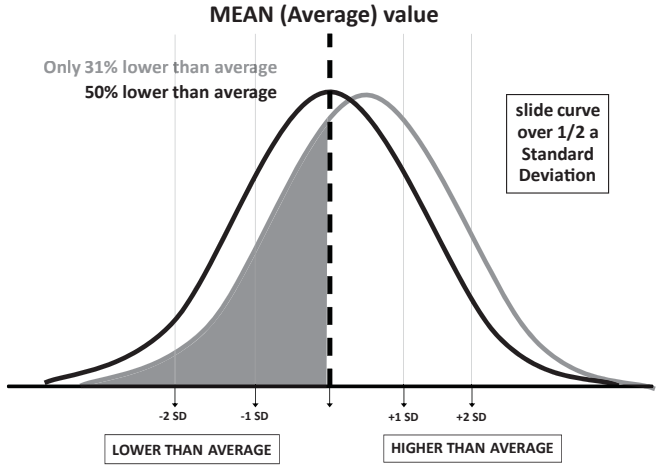
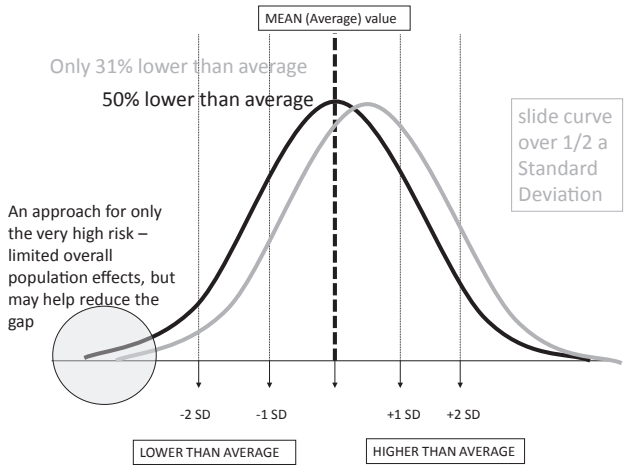


Figure 9.3: Targeting the High Risk Group Only

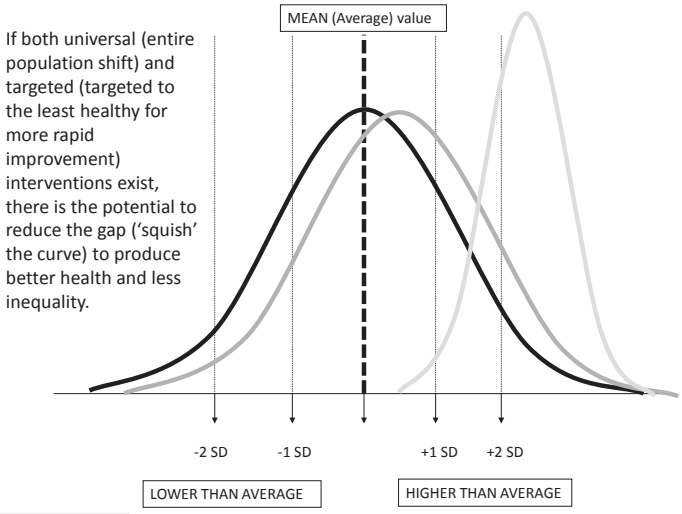
In a normal distribution*



* By only targeting a high risk group, very little change will occur in the overall population shift towards health. However, if a target group is not experiencing the population shift (i.e., is being "left behind") or if you wish to reduce the gap between the healthiest and the least healthy, then a targeted program alongside a universal 'population–shift' program would both make a dramatic change in the overall population health and potentially reduce the absolute difference in the gap by rapidly increasing the least healthy population's outcomes.

Figure 9.4: Increasing Overall Population Health

and targeting those at most risk to decrease the overall gap in health*



* By simultaneously improving population health overall through universal programs or policies and by targeting interventions to the least healthy group, one may be able to increase overall health status while increasing the health status of the least healthy more rapidly, thereby decreasing the gap, or overall variation, between the most and least healthy.

U1 to U5 neighbourhood income groupings. However, if the Gini coefficient is statistically different than 0 and the Lorenz curve bends away from the line of equality, then the health risk is unequally distributed. The more the bend, the more inequality exists, and the more a targeted policy or program (in addition to a universal program) is needed to increase the overall health of the population. An effective targeted program needs to be designed to increase the health of the least healthy group along with the rest of the population and even increase health at a more rapid pace (thereby shrinking the gap and reducing the absolute difference in inequality).

For example, as illustrated in Figure 9.5, the dental extractions graph for children in the rural neighbourhood income quintile groups (and also mirrored in the urban groups) shows large disparity in dental extraction rates. This indicates a large disparity in dental health for those in the lowest neighbourhood income quintile. This may be indicative of nutritional deficiencies, lack of breastfeeding, lack of access to preventive dentistry, lack of access to fluoridated water, or a combination of these. It follows that a targeted approach to R1 and R2 may help in catching these groups up to the rest of the population, whereas universal approaches to the whole population will benefit everyone across all neighbourhood income groups through reduction of severe dental caries and, therefore, dental extractions.

In contrast, the Multiple Sclerosis Gini coefficient for urban neighbourhood income quintiles is not statistically different than 0 and the Lorenz curve approximates the line of equality (see Figure 9.6). This implies that there is, at present, no need for a targeted approach to a certain socioeconomic group, but rather a universal approach when risk factors are more understood by those researching MS.

Looking at our measures of inequity, when do we continue to stick with a more universal approach only and when do we approach programs and policies from both the universal and the targeted directions?

Figure 9.5: Graph of Dental Extractions for Rural Areas (from Chapter 4)

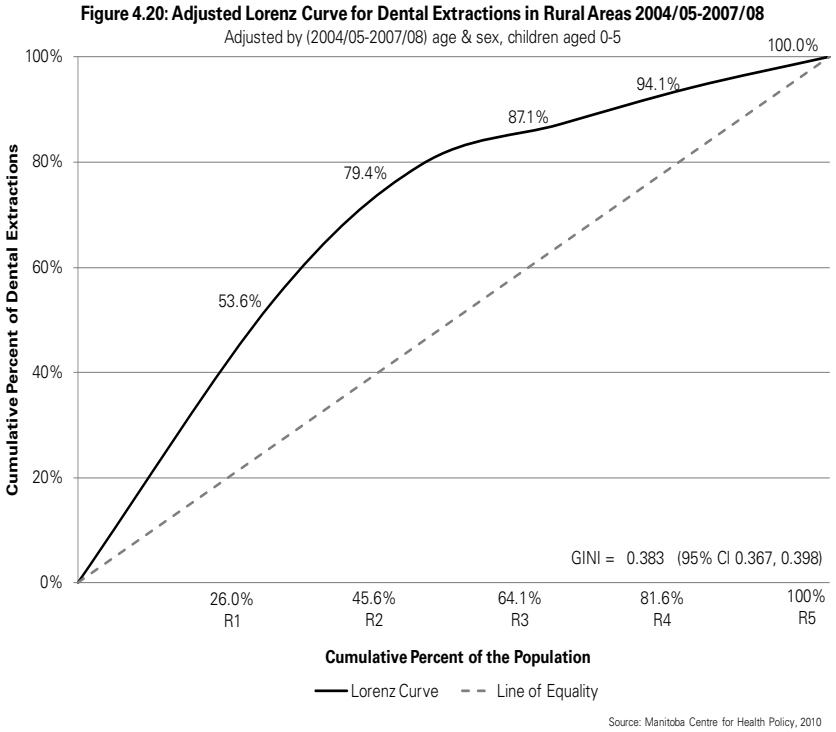
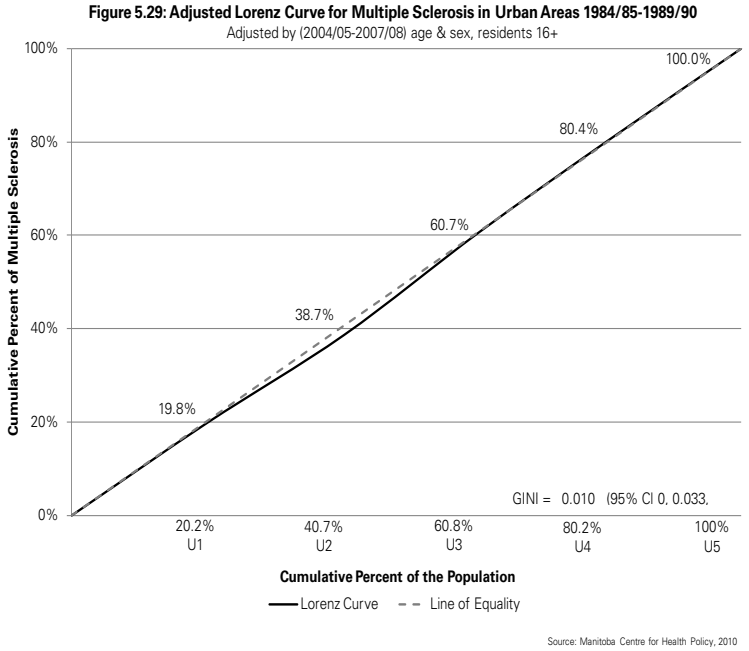


Figure 9.6: Graph of Multiple Sclerosis for Urban Areas (from Chapter 5)



Lorenz curves that approximate the line of equality may demonstrate a situation best addressed through universal programs, whereas significant Gini coefficient "bends" require the targeted program approach along with any universal efforts.

The following health indicators produced Lorenz curves close to the line of equality or a very small Gini coefficient values less than 6% (0.060)—so improvements would most likely be aimed at the entire population: breastfeeding (urban only), IHD (urban only), MS, continuity of care, cervical cancer screening, cumulative mental illness (rural only), dementia, and post–AMI beta–blocker prescription use.

Examples of Lorenz curves with large "bends" and large Gini coefficients are evident in this report. Those health indicators with a Gini coefficient of over 0.20 (the bend in the curve contains at least 20% of the area above or below the line of equality) indicate a high degree of disparity. This may or may not have changed over time; however, despite any change overtime, the large Gini coefficient points out the need for targeted programs for the lowest neighbourhood income quintile groups, along with the universal programs. The following health indicators showed Gini coefficients of over 0.20: PMR (urban), PYLL (urban), teen pregnancy, dental extractions, amputations due to diabetes, hospitalizations for TB, and suicide/suicide attempts. These will need to be discussed in terms of what works, but it is interesting to note how these cluster. There are the indicators related to injury (PMR, PYLL, suicide/suicide attempts), chronic and infectious disease (amputations due to diabetes, hospitalizations for TB), reproductive health (teen pregnancy), and early childhood nutrition and care (dental extractions).

There are health indicators that show a medium degree of bend (Gini coefficients from 6% to 20%— 0.060 to 0.200): PMR (rural), PYLL (rural), under age five mortality, high school completion, breastfeeding (rural), diabetes, IHD (rural), and cumulative mental illness (urban).

This may give a hint to planners and policy–makers as to the continuum of universal versus targeted + universal programs, since as the Gini coefficient increases, the larger the inequality, and the more necessity for targeted programs to affect lowest neighbourhood income groups differentially. See Table 9.5.

Table 9.5: Degree of Socioeconomic Inequality
(as measured by Gini Coefficients) in the most recent time period, and the need for targeted programs or policies

Low degree of inequality Gini Coefficient < 0.060	Medium degree of inequality Gini Coefficient 0.060-0.200	High degree of inequality Gini Coefficient > 0.200
Universal programs are needed for all indicators to ensure increasing health of the entire population		
universal programs and policies	universal and targeted programs and policies	highly targeted programs and policies to supplement universal approaches
Breastfeeding (urban)	PMR (rural)*	PMR (urban)*
IHD (urban)*	PYLL (rural)*	PYLL (urban)*
MS	Under age 5 mortality	Teen pregnancy*
Continuity of Care*	High school completion*	Dental extractions
Cervical Cancer Screening*	Breastfeeding (rural)*	Amputation due to diabetes
Cumulative mental illness (rural)*	Diabetes*	Hospitalizations for TB*
Dementia	IHD (rural)*	Suicide/suicide attempts*
Post–AMI beta–blocker prescription use	Cumulative mental illness (urban)	

*Note: The asterisk indicates that, according to Table E.1, there was an increase in inequality over time in the following health indicators: PMR, PYLL, Teen pregnancy, Breastfeeding (rural only), High school completion (urban mainly), Diabetes, Ischemic heart disease, Continuity of care (rural only), Hospitalizations for TB (rural only), Cervical cancer screening, Cumulative mental illness (rural only), and Suicide deaths and suicide attempts (rural only).

Source: Manitoba Centre for Health Policy, 2010

Recommendations:

The WHO and the Commission on Social Determinants of Health, in the 2008 document "closing the gap in a generation: health equity through action on the social determinants of health", calls us all to action. Although health inequities have been documented throughout the world, we need to understand particular areas of great inequity (i.e., unfair or avoidable inequality), or particular areas of increasing gaps, to target future resources.

Given the information contained in this report, the following recommendations can be made:

- For those health indicators with moderate to substantial Gini coefficients and evidence of increasing inequality over time, targeted intervention strategies along with universal approaches need to be considered. These include:
  - injuries (related to early death as indicated by PMR, PYLL, and to suicide/suicide attempts);
  - teen pregnancy reduction
  - prevention and primary care strategies for TB
  - high school completion programs
  - breastfeeding programs (especially in rural areas)
  - chronic disease management and prevention (diabetes prevention, ischemic heart disease prevention)
- For those health indicators with substantial Gini coefficients and evidence of no change in inequality over time, targeted interventions along with universal approaches need to be considered knowing that the inequality seems entrenched. These include:
  - Prevention of the necessity of dental extractions for children under five
  - Prevention of the adverse outcome of lower limb amputation for people with diabetes through appropriate care
  - Reduction of under age five mortality through directed strategies to prevent causes of death in this group (note: in Brownell et al. 2008, the major cause of child mortality was injury, at 49% of the total deaths)

- For those people who are in the "neighbourhood income not found (NF)" group, further study should be done to understand their elevated risk of death at a younger age (as indicated by PYLL), under age five mortality, suicide/suicide attempts, MS, cumulative mental illness, and dementia, and their lower quality of care indicators (low cervical cancer screening and post–AMI beta–blocker use).
- For a marker of good quality of care in the healthcare system, it is interesting to note that post–AMI beta–blocker prescription use shows very little disparity by neighbourhood income group. It has actually showed trends to equity or improved equity over time. This may indicate a needs–based approach, or good clinical practice guidelines, whereby all people with AMIs have similar treatment in the healthcare system no matter what the neighbourhood income group or geographical location (urban or rural).

The authors realize that the results of this report are only a starting point. This research does not pick out particular programs or policies that work to reduce inequity. It merely shows where socioeconomic inequity is the most profound or increasing over time. We hope that this will lead to further discussion by planners and policy–makers throughout the province, as a catalyst to closing the gap in Manitoba.

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Appendix 1: Glossary

Acronyms used in this report:

AMI–Acute Myocardial Infarction

CCHS–Canadian Community Health Survey

CSD–Census Sub–Divisions

DA–Dissemination area

DRD–Disparity Rate Difference

DRR–Disparity Rate Ratio

DPIN–Drug Programs Information Network

GLM–Generalized Linear Model

GP/FP–General Practitioner/Family Practitioner

ICD–9–CM–International Classification of Diseases, 9th Revision with Clinical Modifications

ICD–10–CA–International Classification of Diseases, 10th Revision with Canadian Enhancements

IHD–Ischemic Heart Disease

MCHP–Manitoba Centre for Health Policy

MS–Multiple Sclerosis

NF–Not found

NS–Not statistically significant

Pap–Papanicolaou test

PCCF–Postal code conversion file

PHIN–Personal Health Information Number

PMR–Premature Mortality Rate

PYLL–Potential Years of Life Lost

RHA–Regional Health Authority

TB–Tuberculosis

WHO–World Health Organization

Adjusted Rates

These are rate values that are statistically adjusted to control for different age and sex distributions to ensure that the rates for all groups can be fairly compared. The adjusted values are those which the group would have had if their age and sex distribution was the same as for a standard population.

Amputations Among Residents with Diabetes

Residents with diabetes (aged 19 and older) who had a lower limb amputation (below or including the knee) within a three–year period. Amputation was defined by ICD–9–CM procedure codes 84.1–84.17 (ICD–10–CCI codes: 1.VC.93, 1.VG.93, 1.VQ.93, 1.WA.93, 1.WE.93, 1.WJ.93, 1.WL.93, 1.WM.93) in any procedure field. Amputations associated with accidental injury were excluded (see below for codes). Rates per 1,000 residents with diabetes were calculated for eight 3–year periods, 1984/85–2007/08 and were age– and sex–adjusted to the Manitoba population aged 19 and older in the last time period.

Exclusions for accidental injury: ICD–9–CM diagnosis codes 895, 896, 897 or ICD–10–CA codes S78, S88, S98, T05.3, T05.4, T05.5, T13.6.

Anxiety

The proportion of residents aged 10 or older diagnosed with any of the following over a five–year period:

- One or more hospitalizations with a diagnosis for anxiety states, phobic disorders or obsessive–compulsive disorders, ICD–9–CM codes 300.0, 300.2, 300.3; ICD–10–CA codes F40, F41.0, F41.1, F41.3, F41.8, F41.9, F42
- Three or more physician visits with a diagnosis for anxiety disorders, ICD–9–CM code 300

Average Household Income (Neighbourhood income)

The average household income is the mean income of households at the neighbourhood income level from the Canadian census. In the census, a household refers to all persons who live within the same dwelling, regardless of their relationship to each other. Household income is the sum of incomes of all persons in the household. Individual level household income values are not available, so residents are assigned the average household income of the neighbourhood income in which they reside.

In this report, average household income was calculated for the 1986, 1996 and 2006 Canadian census. Statistics Canada suppresses average household income values for dissemination areas (DAs) with populations less than 250 persons: these DAs are not included in the calculation of average household income, unless these are imputed.

Beta–blockers—see Post–Acute Myocardial Infarction (AMI) Beta–Blocker Prescriptions

Cervical Cancer Screening

Also called a Pap (Papanicolaou) test, cervical cancer screening is based on the examination of cells collected from the cervix to reveal pre–malignant (before cancer) and malignant (cancer) changes as well as changes due to non–cancerous conditions such as inflammation from infections.

In this study, cervical cancer screening was measured as the crude and adjusted proportion of women aged 18–69 who received at least one Pap test in three fiscal years was defined by:

- A physician visit with a tariff code for a Pap test:
    - 8470—regional gynaecological exam, including cytological smear of the cervix, provided by a (GP/FP)
    - 8495—complete physical and gynaecological exam, including cytological smear of the cervix, provided by an OB/GYN specialist

  - 8496—regional gynaecological exam, including cytological smear of the cervix, provided by an OB/GYN specialist
  - 8498—complete physical and gynaecological exam, including cytological smear of the cervix, provided by a GP/FP
  - 9795—cytological smear of the cervix for cancer screening
- A pathology or laboratory claim with a tariff code for a Pap test:
  - 9470—Cytological Examination—Vaginal Smear

The denominator includes all Manitoba female residents aged 18–69 in the three–year period, except as noted below.

Note that if a laboratory claim and a physician claim for a Pap test for the same individual are within 54 days of each other, they are counted as one Pap test to reduce double counting over three–year periods. Nearly all of lab claims are within 54 days of the physician claim.

Women who have had a complete hysterectomy surgery were excluded from both the numerator and denominator. Hysterectomy surgeries were defined by hospital separations with ICD–9–CM procedure codes 68.4–68.9 and ICD–10–CCI codes 1.RM.89, 1.RM.91, 5.CA.89.CK, 5.CA.89.DA, 5.CA.89.GB, 5.CA.89.WJ, and 5.CA.89.WK. These codes include only total hysterectomies, not partial, as women who have a partial hysterectomy may still have a cervix and would require cervical cancer screening.

Rates for northern and remote areas served by nursing stations may be underestimated due to missing data. Prior to 2005, only physicians were able to code into the administrative billing system for Pap tests. As of 2005, nurses officially called "Nurse Practitioners" by Manitoba Health were able to record claims in the physician data system. However, "Advanced Practice Nurses" or other designations are not included in the Nurse Practitioner designation, despite the fact that some do Pap tests. Nurses working at federally–operated Nursing Stations also do not record their work in the billing claims system. However, most nurses who are not nurse practitioners would be doing Pap tests under the supervision of a physician, who would most likely be billing for these. At the time of this study, the Repository at MCHP did not have access to laboratory data, so Pap tests are only observable through the billing system.

Continuity of Care

The extent to which individuals see a given healthcare provider (versus one or more other providers) over a two–year period. In this study, 'good' continuity of care is when a resident receives at least 50% of his or her ambulatory care from the same healthcare provider over the time period. A provider may be defined either as an individual physician, a physician group practice, or a clinic. Individuals with less than three visits to a healthcare provider were excluded from analyses. Tables describing the proportion of the population excluded from these analyses are below.

Proportion Excluded from Analyses (because they had less than three MD visits over two years)
For Children aged 14 and younger

Time Period	Frequency	Percent
T1: 1984/85–85/86	51954	8.78
T2: 1986/87–87/88	48278	8.16
T3: 1988/89–89/90	47291	7.99
T4: 1990/91–91/92	43987	7.43
T5: 1992/93–93/94	45908	7.76
T6: 1994/95–95/96	42425	7.17
T7: 1996/97–97/98	49001	8.28
T8: 1998/99–99/00	48720	8.23

T9: 2000/01–01/02	48905	8.26
T10: 2002/03–03/04	53558	9.05
T11: 2004/05–05/06	53820	9.09
T12: 2006/07–07/08	58063	9.81

Proportion Excluded from Analyses (because they had less than three MD visits over two years)
For Adults aged 15–59

Time Period	Frequency	Percent
T1: 1984/85–85/86	159714	8.88
T2: 1986/87–87/88	153515	8.54
T3: 1988/89–89/90	150904	8.39
T4: 1990/91–91/92	144865	8.06
T5: 1992/93–93/94	143121	7.96
T6: 1994/95–95/96	144480	8.04
T7: 1996/97–97/98	151619	8.43
T8: 1998/99–99/00	145415	8.09
T9: 2000/01–01/02	146129	8.13
T10: 2002/03–03/04	148333	8.25
T11: 2004/05–05/06	151135	8.41
T12: 2006/07–07/08	158853	8.83

Proportion Excluded from Analyses (because they had less than three MD visits over two years)
For Seniors aged 60+

Time Period	Frequency	Percent
T1: 1984/85–85/86	24734	11.09
T2: 1986/87–87/88	22738	10.20
T3: 1988/89–89/90	21764	9.76
T4: 1990/91–91/92	20559	9.22
T5: 1992/93–93/94	19741	8.85
T6: 1994/95–95/96	19185	8.60
T7: 1996/97–97/98	18557	8.32
T8: 1998/99–99/00	16175	7.25
T9: 2000/01–01/02	15003	6.73
T10: 2002/03–03/04	14226	6.38
T11: 2004/05–05/06	14512	6.51
T12: 2006/07–07/08	15775	7.07

Crude Rate

The number of persons with a given condition divided by the number of persons living in that area; often multiplied by 1,000 to give a rate per 1,000 (or 100,000 to give a rate per 100,000). In contrast to adjusted rates, crude rates are helpful in figuring out how many people are walking through the door for treatment. When making comparisons between areas, it is important to use adjusted rates to take into account differences in age and sex distributions of the regional population compared to the overall Manitoba population.

Cumulative Mental Illness

The grouping "Cumulative Mental Illness" was created to provide an overall indicator of the prevalence of mental illness, accounting for the co–occurrence among mental illnesses. Cumulative prevalence was defined as the proportion of the population who received a diagnosis for one or more of the following: **depression, anxiety, substance abuse, personality disorders,** or **schizophrenia**. Refer to elsewhere in the Glossary for the coding for each of the separate diagnoses listed above.

Note: Cumulative mental illness rates from previous recent findings are slightly higher than results in this report, due to the exclusion of drugs in the definitions for this report compared to the RHA Indicators Atlas 2009 (Fransoo et al., 2009). This is in an attempt to make the definition consistent across all time periods, whereas the drug data are only available after 1995.

Data suppression

Data is suppressed when the number of persons or events involved is five or less in order to avoid identification of individuals in an area. Data is not suppressed when the actual event count is zero. This process of suppressing data is conducted to protect the anonymity of study participants.

Dementia

Dementia is a loss of brain function. It is not a single disease. Instead, dementia refers to a group of illnesses that involve memory, behaviour, learning and communication problems, judgment, and problem solving. The problems are progressive, which means they get worse overtime.

In this report, people are considered to have dementia if they meet one of the following conditions:

- one or more hospitalizations in five years with a diagnosis for dementia, including organic psychotic conditions, cerebral degenerations and senility, ICD–9–CM diagnosis codes 290, 291.1, 292.2, 292.82, 294, 331, 797; ICD–10–CA diagnosis codes F00, F01, F02, F03, F04, F05.1, F06.5, F06.6, F06.8, F06.9, F09, F10.7, F11.7, F12.7, F13.7, F14.7, F1.57, F16.7, F18.7, F19.7, G30, G31.0, G31.1, G31.9, G32.8, G91, G93.7, G94, R54
- one or more physician visits in five years with a diagnosis for dementia, ICD–9–CM diagnosis codes 290, 294, 331, 797

The denominator includes all Manitoba residents aged 55 and older who were continuously registered with Manitoba Health for at least one year in the five–year period.

Dental Extraction

The removal of a tooth from the mouth—in this report, only including those taking place in a hospital. In this report, hospital–based dental extraction rates are reported for children under age five, when severe tooth decay is the most common reason for dental extractions. The following codes identifying hospital–based dental extractions were used: ICD–9–CM codes: 23.01 (extraction of deciduous tooth), 23.09 (extraction of other tooth), 23.11 (removal of residual root), and 23.19 (other surgical extraction of tooth). ICD–10–CA codes: 1.FE.89 (total excision, includes excision (surgical) tooth, excision tooth (impacted) and enucleation tooth (non erupted)) and 1.FE.57 (tooth extraction, includes tooth removal, using forceps). A limitation with this measure is that dental extractions performed in a surgery clinic or a private dentist's office cannot be identified.

Depression

The proportion of residents aged 10 or older diagnosed with depression over a five–year period, by any of the following:

- one or more hospitalizations with a diagnosis for depressive disorder, affective psychoses, neurotic depression or adjustment reaction, ICD–9–CM codes 296.2–296.8, 300.4, 309, 311; ICD–10–CA codes F31, F32, F33, F34.1, F38.0, F38.1, F41.2, F43.1, F43.2, F43.8, F53.0, F93.0
- one or more physician visits with a diagnosis for depressive disorder, affective psychoses or adjustment reaction, ICD–9–CM codes 296, 309, 311
- one or more hospitalizations with a diagnosis for anxiety disorders, ICD–9–CM code 300; ICD–10–CA codes F32.0, F34.1, F40, F41, F42, F44, F45.0, F451, F452, F48, F68.0, F99
- one or more physician visits with a diagnosis for anxiety disorders, ICD–9–CM code 300

Diabetes

Diabetes mellitus is a chronic condition in which the pancreas no longer produces enough insulin (type 1 diabetes) or when cells stop responding to the insulin that is produced (type 2 diabetes), so that glucose in the blood cannot be absorbed into the cells of the body. The most common endocrine disorder, diabetes mellitus affects many organs and body functions, especially those involved in metabolism, and can cause serious health complications including renal failure, heart disease, stroke, and blindness. Symptoms include frequent urination, fatigue, excessive thirst, and hunger. Also called insulin–dependent diabetes, type 1 diabetes begins most commonly in childhood or adolescence and is controlled by regular insulin injections. The more common form of diabetes, type 2, can usually be controlled with diet and oral medication. Another form of diabetes called gestational diabetes can develop during pregnancy and generally resolves after the baby is delivered.

In this report, diabetes prevalence was calculated as the proportion of residents aged 19 and older diagnosed with diabetes in a three–year period, by at least two physician visits or one hospitalization with a diagnosis of diabetes (ICD–9–CM code 250; ICD–10–CA codes E10–E14). Because data on prescription medications is not available for all time periods in this analysis, prescription medication use to treat diabetes was not included in the calculation of diabetes prevalence. The definition excludes gestational diabetes.

Disparity Rate Difference (DRD)

Disparity Rate Difference (DRD) is one measure of a socioeconomic gap, subtracting the rate of the lowest neighbourhood income group from the rate of the highest neighbourhood income group (i.e., R1 minus R5 or U1 minus U5). This is sometimes referred to in the text as the "rate difference". There is also a statistical test for the time comparison of the DRD, measuring the change in the DRD or rate difference from the first to the last time period. This is given as a ratio of DRDs from the last time period to the first time period. The p–value associated with this is also provided. DRDs can be thought of as a way to express how many "more" (or "less") events occur in the lowest neighbourhood income quintile group compared to the highest.

Disparity Rate Ratio (DRR)

Disparity Rate Ratio (DRR) is one measure of a socioeconomic gap, dividing the rate of the lowest neighbourhood income group by the rate of the highest neighbourhood income group (i.e., R1/R5 or U1/U5). This is sometimes referred to in the text as the "rate ratio". There is also a statistical test for the time comparison of the DRR, measuring the change in the DRR or rate ratio from the first to the last time period. This is given as a ratio of DRRs from the last time period to the first time period. We also supply its 95% confidence interval and the p–value. DRRs can be thought of as a way to express the relative increase or decrease in inequality between the lowest and highest neighbourhood income quintile groups over time.

Dissemination Area (DA)

"A small, relatively stable geographic unit composed of one or more blocks. It is the smallest standard geographic area for which all census data are disseminated. DAs cover all the territory of Canada." As of 2001, the DA replaces the enumeration area as a basic unit for dissemination (Statistics Canada, 2007).

Drug Programs Information Network (DPIN)

DPIN is an electronic, on–line, point–of–sale prescription drug database. It links all community pharmacies (but not pharmacies in hospitals or nursing homes/personal care homes) and captures information about all Manitoba residents, including most prescriptions dispensed to status Indians. DPIN contains information such as unique patient identification, medication history, over–the–counter medication history, new drug prescribed, date dispensed, and unique pharmacy identification number. DPIN is maintained by Manitoba Health.

Fiscal Year

The fiscal year starts on April 1 and ends the following March 31. For example, the 2003/04 fiscal year would be April 1, 2003 to March 31, 2004, inclusive.

General Practitioner/Family Practitioner (GP/FP)

A physician who operates a general or family practice and is not certified in another specialty in Manitoba.

Gini Coefficient

The Gini coefficient is a measure of disparity in a population. It is the ratio of the area between the line of equality and the **Lorenz curve** divided by the total area under the line of equality. The calculated Gini coefficient can take on a value from 0 to 1. A Gini coefficient equal to 0 indicates that there is zero disparity in the population such as in the case where there is perfect equality. A Gini coefficient equal to one indicates that there is perfect inequality in the population. A general rule is that the closer the Gini is to zero the less disparity there is between the neighbourhood income quintile groups and hence the overall population.

A formula for calculating a Gini coefficient is as follows (adapted from Gini, 1955):

GINI = abs(A–B)

Where A = sum[X(i) * Y(i+1)]

B = sum[X(i+1) * Y(i)]

X = proportion of income in the population

Y = proportion of events in the population

X(i+1) = lag(X(i))

Y(i+1) = lag(Y(i))

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Gini Comparisons Over Time by Indicator

Indicator	Area	GINI in first time period	95% Confidence interval for GINI in first time period	GINI in last time period	95% Confidence interval for GINI in last time period	Statistical difference over time
PMR	Urban	0.131	0.118, 0.143	0.205	0.192, 0.218	**p<0.0001**
	Rural	0.058	0.042, 0.073	0.119	0.100, 0.138	**p<0.0001**
PYLL	Urban	0.169	0.138, 0.200	0.255	0.219, 0.291	**0.01193**
	Rural	0.103	0.069, 0.138	0.168	0.122, 0.214	**0.00023**
Under 5 Mortality	Urban	0.160	0.112, 0.208	0.129	0.046, 0.211	0.64085
	Rural	0.155	0.104, 0.207	0.110	0.037, 0.183	0.07867
Teenage Pregnancy	Urban	0.303	0.285, 0.321	0.406	0.389, 0.423	**p<0.0001**
	Rural	0.197	0.179, 0.215	0.286	0.266, 0.306	**p<0.0001**
High School Completion	Urban	0.089	0.067, 0.112	0.098	0.080, 0.116	0.67711
	Rural	0.069	0.044, 0.095	0.079	0.057, 0.101	0.46183
Dental Extraction	Urban	0.356	0.315, 0.397	0.421	0.396, 0.447	0.05329
	Rural	0.363	0.332, 0.393	0.383	0.367, 0.398	0.19691
Breastfeeding	Urban	0.051	0.040, 0.063	0.039	0.028, 0.050	0.27381
	Rural	0.040	0.026, 0.055	0.070	0.057, 0.084	**0.00004**
Diabetes	Urban	0.087	0.076, 0.097	0.116	0.110, 0.123	**0.00062**
	Rural	0.097	0.084, 0.109	0.142	0.135, 0.150	**p<0.0001**
Amputations due to Diabetes	Urban	0.170	0.090, 0.251	0.211	0.146, 0.277	0.58030
	Rural	0.138	0.047, 0.228	0.255	0.201, 0.308	**0.01078**
Ischemic Heart Disease	Urban	0.011	0.000, 0.022	0.057	0.047, 0.067	**0.00001**
	Rural	0.020	0.007, 0.032	0.074	0.062, 0.085	**p<0.0001**
Multiple Sclerosis	Urban	0.010	-0.014, 0.033	0.008	-0.011, 0.026	0.92126
	Rural	0.042	-0.004, 0.088	0.054	0.014, 0.094	0.59712
Continuity of Care	Urban	0.015	0.011, 0.019	0.016	0.013, 0.020	0.67434
	Rural	0.026	0.021, 0.030	0.037	0.032, 0.041	**p<0.0001**
Hospitalizations for TB	Urban	0.496	0.449, 0.543	0.401	0.335, 0.467	0.10118
	Rural	0.260	0.187, 0.333	0.463	0.403, 0.523	**p<0.0001**
Cervical Cancer Screening	Urban	0.033	0.030, 0.037	0.041	0.037, 0.046	**0.03356**
	Rural	0.035	0.029, 0.040	0.059	0.053, 0.065	**p<0.0001**
Cumulative Mental Illness	Urban	0.076	0.070, 0.081	0.071	0.065, 0.078	0.48818
	Rural	0.001	-0.006, 0.009	0.012	0.004, 0.020	**0.00461**
Dementia	Urban	0.050	0.032, 0.067	0.056	0.040, 0.073	0.68538
	Rural	0.010	-0.008, 0.029	0.003	-0.007, 0.013	0.40727
Suicide Deaths and Suicide Attempts	Urban	0.273	0.246, 0.301	0.305	0.272, 0.338	0.31414
	Rural	0.181	0.153, 0.210	0.295	0.263, 0.328	**0.00000**
Post-Acute Myocardial Infarction (AMI) Care	Urban	0.028	-0.002, 0.058	0.005	-0.012, 0.022	0.34625
	Rural	0.041	0.002, 0.080	0.018	-0.007, 0.043	0.24029

Source: Manitoba Centre for Health Policy, 2010

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Health Equity

Health equity suggests that all people can reach their full health potential and should not be disadvantaged from attaining it because of their race, ethnicity, religion, gender, age, social class, socioeconomic status, or other socially determined circumstance (Dahlgren & Whitehead, 2006).

Health Inequality

Variations in health status across individuals in a population.

Health Inequity

Unfair and avoidable or remediable differences in health among social groups (Bonnefoy et al; 2007)

High School Completion (Graduation)

Level of educational attainment where the individual has completed high school (completed Grade 12). Graduated students are identified in the student record or if the student has earned 28 or more credits or if the student earned four or more Grade 12 credits during high school. In this report, individuals were followed from Grade 9 for six years to ensure that those graduating late are identified as high school graduates.

Hospitalization due to Tuberculosis (TB)

Tuberculosis (TB) is a disease that is acquired through an infection from a bacterium called *Mycobacterium tuberculosis*. TB is highly contagious: it is spread through the air by individuals with infected lungs or throats when they cough, sneeze, or talk. An individual with a spreading TB disease will become sick; and if left untreated, the individual may die.

In this report, we calculated the hospital episode rates for TB per 100,000 residents for all ages. We used ICD–9 codes 011–018 and ICD–10 codes A15–A19 to identify these hospital visits. We included all diagnosis fields for TB in dX01–dX16 (all diagnosis fields for TB in up to 16 diagnoses which are recorded on each hospital claim). Only those who have developed the TB disease were counted for this indicator; therefore, the code for "primary tuberculosis infection" (010.xx—coded for individuals who have a skin test for TB) has been excluded.

Income Quintile (definition based upon census data)

Assignment of an income quintile to a DA in the census is done at an aggregate level rather than at an individual level. Dissemination areas (formally enumeration areas prior to 2001) are assigned to an income quintile based on the average household income cut–offs, developed by MCHP to create income quintiles. Each income quintile based on the Manitoba population, U1 through to U5 and R1 through to R5, have corresponding minimum and maximum average household income values. To classify DAs to one of the income quintiles, each DA was first determined to be either urban (Winnipeg and Brandon) or rural. Then the DA was sorted into one of the quintiles based on where the average household income of that DA lay within the quintile cut–offs. For DAs with missing or suppressed income, imputation for an average household income was attempted. Where possible, the Census Sub–Division's (CSD) average household income was used to approximate the DA's average household income. However, DAs associated with First Nations communities often have a missing average household income at both the DA and CSD level. Therefore, a different imputation was done; the mean household income for the North and South First Nation communities were calculated and then assigned to each North and South First Nation DA respectively.

Income Quintile created for the Manitoba population (definition using the Repository)

Income quintiles developed at MCHP divide the Manitoba population into five income quintile groups (from lowest income to highest income) such that approximately 20% of the population is in each group. Individuals in the population are divided into two populations: urban (Winnipeg and Brandon) and rural (other Manitoba areas). An average household income (reported in the census) is assigned to each individual based upon their postal code via the Postal Code Conversion File (PCCF) provided by Statistics Canada. The PCCF links postal codes to the Census Dissemination Areas. The average household incomes in the two populations are then sorted from lowest to highest and then divided into five groups, thereby assigning approximately 20% of the population in each U1–U5 and R1–R5 income quintile. Each income quintile will have a minimum and maximum average household income value. Note that the income quintiles are calculated separately for the Manitoba population for each year;

Rural and Urban Income Quintile Ranges by Census Year

Area	Income Quintile	1986 Range		1996 Range		2006 Range	
		Min	Max	Min	Max	Min	Max
Rural	1	$8,731	$21,503	$14,858	$32,159	$22,449	$41,576
	2	$21,508	$24,921	$32,185	$36,428	$41,615	$47,929
	3	$24,942	$27,653	$36,428	$40,629	$47,967	$53,810
	4	$27,797	$32,505	$40,650	$47,882	$53,829	$65,235
	5	$32,563	$63,704	$47,889	$90,712	$65,339	$148,242
Urban	1	$8,767	$23,411	$10,577	$31,207	$14,640	$42,407
	2	$23,445	$29,455	$31,207	$39,848	$42,463	$54,663
	3	$29,463	$35,970	$39,848	$49,817	$54,696	$68,132
	4	$36,020	$44,081	$49,817	$62,231	$68,140	$87,201
	5	$44,149	$126,512	$62,231	$170,386	$87,214	$406,531

Source: Manitoba Centre for Health Policy, 2010

hence there will also be different income cut–offs in rural or urban income quintile groupings.

Income Unknown (income not found, or NF)

A group of individuals who cannot be assigned a neighbourhood income from census data. They are therefore excluded from all neighbourhood income quintile analyses. Individuals included in the "Income Unknown" group include:

- residents of **long–term care facilities**
- residents of some **personal care homes**
- residents of **psychiatric facilities**
- federal and **long–term prisoners**
- wards of the **Public Trustee and Child and Family Services**
- residents of **various areas** reporting no income in the census

Note: For the census, Statistics Canada suppresses average household income values for DAs with populations less than 250 persons: these are grouped into income unknown for analyses using the census.

Ischemic Heart Disease (IHD)

Ischemia is a condition in which the blood flow (and thus oxygen) is restricted to a part of the body. Cardiac ischemia is the name for lack of blood flow and oxygen to the heart muscle. Thus, the term 'ischemic heart disease' refers to heart problems caused by narrowed heart arteries. When arteries are narrowed, less blood and oxygen reaches the heart muscle. This is also called coronary artery disease and coronary heart disease. It can ultimately lead to heart attack.

In this study, the crude and adjusted prevalence of IHD was measured for residents aged 19 and older over eight 3-year periods. Residents were considered to have IHD if they met one of the following conditions:

- one or more hospitalizations with a diagnosis of IHD: ICD–9–CM codes 410–414; ICD–10–CA codes I20–I22, I24, I25
- two or more physician visits with a diagnosis of IHD (ICD–9–CM codes as above)

The denominator includes all Manitoba residents aged 19 and older in the specified time period.

Lorenz Curve

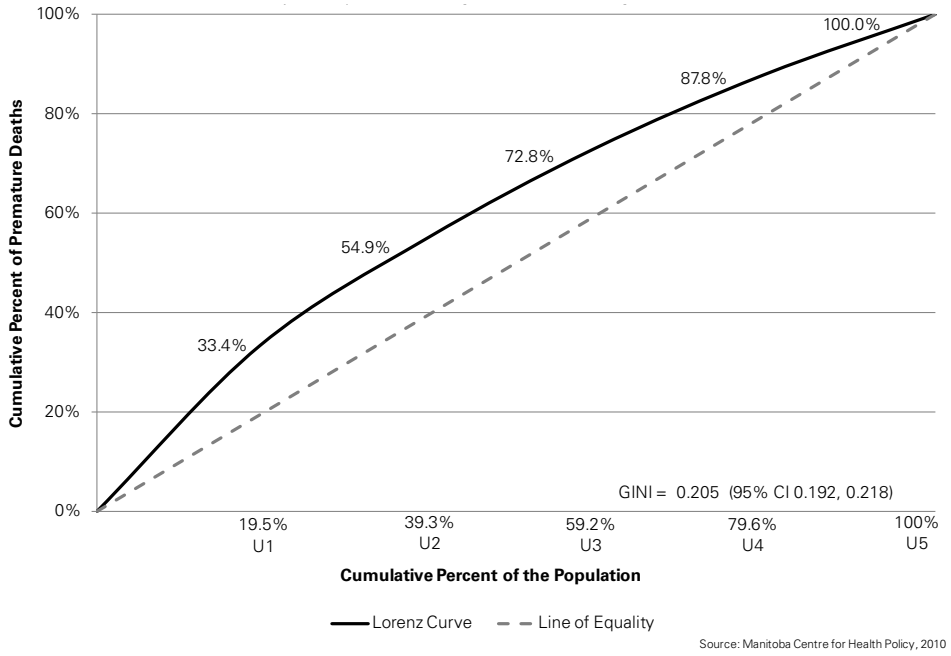
In this study, the Lorenz curve is a graphical display of the distribution of the cumulative percent of events by the cumulative percent of people in the five neighbourhood income quintiles in the population, by increasing income. The horizontal axis (x–axis) of the curve displays the cumulative percent of people in the population (by increasing neighbourhood income quintile group) and the vertical axis (y–axis) displays the cumulative percent of events in the population. The Lorenz curve can be expressed as what percentage of the population represented by the neighbourhood income quintile holds what percentage of the events in the population. Each neighbourhood income quintile represents approximately 20% of the Manitoba population, divided into rural or urban (Winnipeg and Brandon). In a perfectly equitable situation, one would expect that 20% of events (i.e., premature deaths, teenage pregnancies, etc.) would occur in each income quintile group: U1 would contribute 20% of all events in the population; U2 would contribute another 20% of all events in the population and so forth. As a reference, a line of equality is also displayed on the graph to indicate this perfectly equitable situation; however, most cases present some inequality between the percentage of events and the income quintiles of the population. A Lorenz curve is generated when at least one of the income quintiles that captures N% of the population does not contribute the same N% on the Y axis. If a larger proportion of events occur in lower neighbourhood income quintile groups, the Lorenz curve will bend above the line of equality; if a larger proportion of events occur in higher neighbourhood income quintile groups, the Lorenz curve will bend below the line of equality (Lorenz, 1905).

The total area lying in–between the line of equality and the Lorenz curve is known as the GINI coefficient; larger areas represent larger disparities between neighbourhood income groups and smaller areas represent smaller disparities between neighbourhood income groups. Please see **Gini coefficient** for more information.

On the next page is an example of a Lorenz curve. Here we see that U1 (lowest urban neighbourhood income quintile representing 19.5% of the population) accounts for 33.4% of all premature deaths.

Adjusted Lorenz Curve for Premature Mortality in Urban Areas for 2004–2007

Adjusted by (2004–2007) age & sex, residents aged 0–74



Source: Manitoba Centre for Health Policy, 2010

Manitoba Health

Manitoba Health is a term describing the provincial government department in Manitoba responsible for healthcare services.

Multiple Sclerosis (MS)

Multiple sclerosis is a degenerative disease of the central nervous system (brain and spinal cord). Its effects are diverse and may include problems in balance, vision, communication, memory, and movement, as well as more general symptoms such as pain and fatigue. The course of disease varies between people. Some may have long periods of remission between active episodes, while others may have progression of symptoms from the time of onset, and still others may have an initial period of relapses and remissions followed by a progressive course. MS is treatable through a variety of modalities, with variable impact on the progress of the disease; however, a cure for MS is not yet available.

MS prevalence has been calculated as the number of cases per 100,000 population aged 16 or older. In this report, we identified cases of MS meeting the following criteria: at least three hospital visits, three physician visits, or a combination of these, where each visit included a diagnosis code for MS (ICD9 code 340, ICD–10–CA code G35) within a period of six years.

Additional tables of statistical testing for MS:

Disparity Rate Ratios for Prevalence of MS

Neighbourhood Income Quintile	Time	p−value
R1 vs. R5	1984/85–1989/90	.084306
R1 vs. R5	1990/91–1995/96	**.011808***
R1 vs. R5	1996/97–2001/02	**.014211***
R1 vs. R5	2002/03−2007/08	**.000085***
U1 vs. U5	1984/85–1989/90	.924705
U1 vs. U5	1990/91–1995/96	.152733
U1 vs. U5	1996/97–2001/02	**.029181***
U1 vs. U5	2002/03–2007/08	.652793

* = p<.05

Model Results for MS

Neighbourhood Income Quintile Compared to MB Average

Neighbourhood Income Quintile	p-value			
	T1	T2	T3	T4
NF	**0.0000***	**0.0000***	**0.0000***	**0.0000***
R1	**0.0001***	**0.0003***	**0.0010***	**0.0000***
R2	0.0380	0.6873	**0.0007***	0.7646
R3	0.0639	0.6601	0.2819	0.1373
R4	0.1906	**0.0013***	**0.0088***	**0.0073***
R5	0.0514	0.5576	0.6871	0.6245
U1	0.8863	0.3213	0.0705	0.6254
U2	0.4964	0.4077	0.7068	0.7143
U3	0.1018	0.0266	0.4682	0.1889
U4	0.4992	0.7661	0.1931	0.9271
U5	0.7852	0.3999	0.3418	0.9392

(*= p< .01)

Neighbourhood Income Quintile Groupings—see Income Quintile

NF (not found)—see Income Unknown

Papanicolaou (Pap) tests—see Cervical Cancer Screening

Personality Disorder

The proportion of residents aged 10 or older diagnosed with personality disorders (ICD–9–CM code 301; ICD–10–CA codes F34.0, F60, F61, F62, F68.1, F68.8, F69) inhospital abstracts or physician claims.

Post–Acute Myocardial Infarction (AMI) Beta–Blocker Prescriptions

Beta–blockers, properly known as beta–adrenergic blocking drugs, have been shown to lower the risk of subsequent heart attacks after patients have suffered an AMI.

Definition: the proportion of patients age 20 and older hospitalized for Acute Myocardial Infarction (ICD–9CM code 410; ICD–10 code I21) who filled at least one prescription for a beta–blocker (ATC C07AA, C07AB) within four months of their AMI. Patients with a diagnosis of asthma, COPD, or peripheral vascular disease were excluded because beta–blockers are contra–indicated for those patients.

Patients with a hospitalization for AMI in the preceding three years were also excluded to remove those experiencing multiple heart attacks in a relatively short period.
Exclusions for contra–indications:

- asthma, ICD–9–CM code 493; ICD–10–CA code J45
- chronic obstructive pulmonary disease, ICD–9–CM codes 491 and 492; ICD–10–CA codes J41–J44
- peripheral vascular disease, ICD–9–CM codes 443 and 459; ICD–10–CA codes I73, I79.2, I87

NOTE: up until the year 2005, northern First Nations community pharmaceutical data may be missing due to lack of prescription data being entered into the DPIN system. However, as of 2005 to the present, prescriptions for First Nations communities are dispensed through a private pharmaceutical company that reports all prescriptions through DPIN.

Potential Years of Life Lost (PYLL)

PYLL is an indicator of early death (before age 75), which gives greater weight to deaths occurring at a younger age than to those at later ages. PYLL emphasizes the loss to society of the potential contribution that younger individuals can make. By emphasizing the loss of life at an early age, PYLL focuses attention on the need to deal with the major causes of early deaths, such as injury, in order to improve health status. For example, the death of a 50–year–old contributes 'one death' to premature mortality, but '25 years' to PYLL; whereas the death of a 70–year–old also contributes 'one death' to premature mortality, but only 'five years' to PYLL.

In this report, PYLL is the number of potential years of life lost among area residents dying up to age 74, per 1,000 residents from birth through age 74. For each death, the PYLL value is calculated as: PYLL = 75 – age at death. This indicator has some similarity to premature mortality and life expectancy, but PYLL is more sensitive to deaths at younger ages. Rates were calculated for four 5—year periods and a final four—year period and were age– and sex–adjusted to the Manitoba population in the last time period.

Premature Mortality Rate (PMR)

Premature mortality rates are often used as an overall indicator of population health status and are correlated with other commonly used measures. It is an important indicator of general health of a population with high premature mortality rates indicating poor health.

In this report, PMR is the number of deaths among area residents aged 75 and under, per 1,000 residents. Rates were calculated for four 5–year periods and a final four–year period, and were age– and sex–adjusted to the Manitoba population in the last time period.

Prevalence

The term prevalence refers to the proportion of the population that has a given disease at a given time. The administrative data used for this study do not directly indicate who has a disease, but rather who received health services treatment for that disease; that is, they received some combination of physician visits, hospitalizations, or prescription drugs.

Regional Health Authority (RHA)

In 1997, the province of Manitoba established the Regional Health Authorities (RHA) as governance and management structures to be responsible for the delivery and administration of selected health services for geographically defined areas. As of July 1, 2002, there are 11 RHAs in Manitoba: Winnipeg, Brandon, South Eastman, Assiniboine, Central, Parkland, North Eastman, Interlake, Burntwood, NOR–MAN, and Churchill.

Schizophrenia

The percentage of residents aged 10 or older diagnosed with schizophrenia (ICD–9–CM code 295; ICD–10–CA codes F20, F21, F23.2, F25) in hospital abstracts or physician visits. Values were calculated for two 5–year periods, 1996/97–2000/01 and 2001/02–2005/06. Within each period, records going back 12 years were examined to ensure inclusion of residents diagnosed earlier, but who have not had the diagnosis attributed to recent service use records.

Substance Abuse

The proportion of residents aged 10 or older diagnosed with any of the following codes in one or more physician visits or hospital abstracts over a five–year period: alcoholic or drug psychoses, alcohol or drug dependence or nondependent abuse of drugs, ICD–9–CM codes 291, 292, 303, 304, 305; ICD–10–CA codes F10–F19, F55.

Suicide Deaths or Suicide Attempts

Suicide is the act of intentionally killing oneself. Suicide attempt, also known as "self–inflicted injury" or para–suicide, does not result in death. The three–year prevalence of suicide or suicide attempts is the rate per 1,000 of the population aged 10 or older who attempted or completed suicide at least once in a three–year period. The most recent event (suicide or suicide attempt) in each calendar year is counted, adjusted by age at the time of the event. The total number of events over each three–year period is used as the numerator. The denominator is the December 31 population age 10 or older summed over each three–year period.

Suicidal individuals were identified by the presence of any of ICD–9–CM or ICD–10–CA codes in Vital Statistics records, physician billing claims, or hospital discharge abstracts.

Suicide was defined as the presence of any cause of death in Vital Statistics data with a code of:

- ICD–9–CM codes: E850–E854, E858, E862, E868 (accidental poisoning), E950–E952 (self–inflicted poisoning), E953 (self–inflicted injury by hanging), E954 (self–inflicted injury by submersion), E955 (self–inflicted injury by firearms), E956 (self–inflicted injury by cutting), E957 (self–inflicted injury by jumping from high places), E958 (other/unspecified self–inflicted injury), E959 (late effects of self–inflicted injury); or
- ICD–10–CA codes: X40– X42, X46, X47 (accidental poisoning by analgesics, antipyretics, anti–rheumatics, sedative–hypnotic, narcotics), X46 (solvents and vapours), X47 (other gasses and vapours), X60–X69 (intentional self poisoning), X70 (suicide hanging), X72–X74 (suicide by gunshot), X78 (suicide by cutting), X71, X75–X77, X79–X84 (other suicide).

Suicide attempts were defined as the presence of any of hospital or physician claims coding a suicide attempt using the following definitions:

1. A hospitalization with a diagnosis code of E950–E959 for suicide and self–inflicted injury.
2. A hospitalization with a diagnosis code for accidental poisoning only if there is a physician visit with a diagnosis code for accidental poisoning and a psychiatric tariff code either during the hospital stay or within 30 days post–discharge.

Accidental poisoning ICD–9–CM diagnosis codes are as follows:

- 965 poisoning by analgesics
- 967 poisoning by sedatives and hypnotics
- 969 poisoning by psychotropic agents
- 977.9 poisoning by unspecified drug or medicinal substance
- 986 toxic effects of carbon monoxide
- E850 accidental poisoning by analgesics, antipyretics, antirheumatics
- E851 accidental poisoning by barbiturates
- E852 accidental poisoning by other sedatives and hypnotics
- E853 accidental poisoning by tranquilizers
- E854 accidental poisoning by other psychotropic agents
- E858 a accidental poisoning by unspecified drug
- E862 accidental poisoning by petroleum products and vapours
- E868 accidental poisoning by other utility gas and carbon monoxide

Psychiatric tariff codes are as follows:

From the psychiatric schedule:

- 8444 Psychotherapy—group of two to four patients
- 8446 Psychotherapy—group of five or more patients
- 8472 Child and Youth Management Conference
- 8475 Psychiatry—Patient Care Family Conference
- 8476 Psychiatric Social Interview
- 8503 Complete history and psychiatric examination—adult
- 8504 Complete history and psychiatric examination—child
- 8553 Consultation—adult
- 8554 Consultation—child
- 8581 Psychotherapy—individual
- 8584 Psychiatric care—individual
- 8588 Electroshock therapy
- 8596 Consultation—Unassigned patient—child

From the general schedule:

- 8580 Psychotherapy—individual
- 8587 Electroshock therapy
- 8589 Psychotherapy—Group

Suppressed—see Data suppression

Teenage Pregnancy

Teenage pregnancy includes live births, stillbirths, abortions and ectopic pregnancies of women under the age of twenty. In this report, rates of teenage pregnancy are calculated for females aged 15–19 over 1984/85–2007/08. Age is calculated as of date of admission to hospital in the numerator and December 31 of each fiscal year in the denominator. Teenage pregnancy is defined as one hospitalization with one of diagnosis codes: V27 (live birth), 632 (missed abortion), 633 (ectopic pregnancy), 634 (spontaneous abortion), 635 (legally induced abortion), 636 (illegally induced abortion), 637 (unspecified abortion) or 656.4 (intrauterine death), or with one of procedure codes: 66.62 (salpingectomy with removal of tubal pregnancy), 69.01 (dilation and curettage for termination of pregnancy), 69.51 (aspiration curettage of uterus for termination of pregnancy), 74.3 (removal of extratubal ectopic pregnancy),74.91 (hysterotomy to terminate pregnancy) or 75.0 (intra–amniotic injection for abortion). Note that abortions performed in private clinics are not included in the count of teen pregnancies. The rate of pregnancies in teenagers

aged 10–14 was not analysed due to the small number of events. There is a possibility that there is missing data for this indicator because of an inability to pick up nurse practitioner, nursing station, and salaried physician work.

Time Comparison of Disparity Rate Ratios (DRR)

Measure of change in a socioeconomic gap over time. This is calculated using the difference between the lowest and highest neighbourhood income groups and measuring the change in these differences from the latest time period relative to the oldest time period.

Tuberculosis (TB)—see Hospitalization due to Tuberculosis (TB)

Under Age Five Mortality

An indicator of death among infants and children under age five. This indicator is calculated by the number of deaths per 1,000 children under age five, in each time period. Rates of death under the age of five is seen as an indicator of health status, level of healthcare in an area, and the effectiveness of prenatal and child care.

Urban

Urban is an aggregate geography which includes the two urban centres in Manitoba, Winnipeg and Brandon.

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Appendix 2: Crude Rate Tables for Each Indicator

Note: the average number of events has been annualized. The Population figures in each table are a cumulative population over the given number of years, so to annualize these, one would need to divide by the number of years indicated for that particular indicator.

Crude counts between 1 and 5 have been suppressed; however, because some events have been annualized, average annualized numbers between 1 and 5 may have been calculated. For example, a count of 6 in year one and 0 in year two would become an average annualized rate of 3 over that two-year period.

Table A2.1: Crude Numbers for Premature Mortality

Income Quintile	1984-1988			1989-1993			1994-1998		
	Average Number of Premature Deaths Per Year	Population	Crude Rate per 1,000	Average Number of Premature Deaths Per Year	Population	Crude Rate per 1,000	Average Number of Premature Deaths Per Year	Population	Crude Rate per 1,000
Income Not Found	125	20,316	30.86	148	28,515	30.86	191	30,300	25.95
Lowest Rural R1	410	416,636	4.92	373	415,557	4.92	375	414,847	4.49
R2	361	410,087	4.40	348	401,321	4.40	341	406,963	4.34
R3	332	412,353	4.03	318	410,211	4.03	308	410,848	3.87
R4	295	418,092	3.53	289	416,216	3.53	259	418,126	3.48
Highest Rural R5	245	425,992	2.88	223	412,802	2.88	226	441,377	2.70
Lowest Urban U1	696	617,431	5.63	646	633,338	5.63	664	634,431	5.10
U2	595	632,725	4.70	542	644,192	4.70	502	634,552	4.21
U3	498	637,344	3.91	484	649,631	3.91	431	646,438	3.73
U4	342	652,934	2.62	347	667,592	2.62	324	659,913	2.60
Highest Urban U5	333	658,802	2.53	292	670,132	2.53	273	656,906	2.18

Income Quintile	1999-2003			2004-2007		
	Average Number of Premature Deaths Per Year	Population	Crude Rate per 1,000	Average Number of Premature Deaths Per Year	Population	Crude Rate per 1,000
Income Not Found	187	20,131	46.50	171	24,815	34.37
Lowest Rural R1	362	421,235	4.30	281	343,604	4.09
R2	313	408,728	3.83	237	335,878	3.53
R3	297	411,289	3.61	219	337,816	3.24
R4	256	419,265	3.05	208	342,640	3.04
Highest Rural R5	231	453,675	2.55	173	362,282	2.38
Lowest Urban U1	642	629,416	5.10	513	514,408	4.99
U2	455	643,084	3.53	345	523,465	3.30
U3	427	648,913	3.29	314	524,817	2.99
U4	323	663,874	2.43	255	537,436	2.37
Highest Urban U5	261	665,743	1.96	203	539,752	1.88

s = suppressed

Source: Manitoba Centre for Health Policy, 2010

Table A2.2: Crude Numbers for Potential Years of Life Lost

Income Quintile	1984-1988			1989-1993			1994-1998		
	Average Number of Potential Years of Life Lost Per Year	Population	Crude Rate per 1,000	Average Number of Potential Years of Life Lost Per Year	Population	Crude Rate per 1,000	Average Number of Potential Years of Life Lost Per Year	Population	Crude Rate per 1,000
Income Not Found	1,534	20,316	377.63	1,752	28,515	377.63	2,195	30,300	307.14
Lowest Rural R1	9,759	416,636	117.11	7,883	415,557	117.11	8,198	414,847	94.85
R2	6,292	410,087	76.72	5,685	401,321	76.72	6,549	406,963	70.83
R3	5,521	412,353	66.95	5,291	410,211	66.95	5,070	410,848	64.49
R4	5,847	418,092	69.92	5,516	416,216	69.92	4,948	418,126	66.27
Highest Rural R5	5,532	425,992	64.93	4,691	412,802	64.93	4,540	441,377	56.82
Lowest Urban U1	12,510	617,431	101.31	11,474	633,338	101.31	12,232	634,431	90.58
U2	9,655	632,725	76.30	8,811	644,192	76.30	7,954	634,552	68.38
U3	8,131	637,344	63.79	7,773	649,631	63.79	6,865	646,438	59.82
U4	6,402	652,934	49.02	6,313	667,592	49.02	5,242	659,913	47.28
Highest Urban U5	6,074	658,802	46.10	5,182	670,132	46.10	4,749	656,906	38.66

Income Quintile	1999-2003			2004-2007		
	Average Number of Potential Years of Life Lost Per Year	Population	Crude Rate per 1,000	Average Number of Potential Years of Life Lost Per Year	Population	Crude Rate per 1,000
Income Not Found	2,070	20,131	514.03	2,335	24,815	470.52
Lowest Rural R1	8,632	421,235	102.46	6,638	343,604	96.59
R2	5,490	408,728	67.16	4,469	335,878	66.52
R3	5,130	411,289	62.36	3,942	337,816	58.35
R4	4,601	419,265	54.87	3,623	342,640	52.87
Highest Rural R5	4,320	453,675	47.61	3,358	362,282	46.34
Lowest Urban U1	12,503	629,416	99.32	10,031	514,408	97.50
U2	7,788	643,084	60.55	5,889	523,465	56.25
U3	6,894	648,913	53.12	5,150	524,817	49.06
U4	5,272	663,874	39.70	4,387	537,436	40.81
Highest Urban U5	4,582	665,743	34.41	3,281	539,752	30.40

s = suppressed

Source: Manitoba Centre for Health Policy, 2010

Table A2.3: Crude Numbers of Mortality to Children Under the Age of Five

Income Quintile	1984-1988			1989-1993			1994-1998		
	Average Number of Mortality to Children Under the Age of Five Per Year	Population	Crude Rate per 1,000	Average Number of Mortality to Children Under the Age of Five Per Year	Population	Crude Rate per 1,000	Average Number of Mortality to Children Under the Age of Five Per Year	Population	Crude Rate per 1,000
Income Not Found	4	1,096	12.77	s	s	s	s	s	s
Lowest Rural R1	45	42,281	4.21	34	43,270	4.21	33	42,605	3.17
R2	23	34,511	2.67	16	32,823	2.67	21	35,006	1.92
R3	18	33,974	2.12	14	33,771	2.12	13	29,852	1.66
R4	20	36,104	2.24	16	34,468	2.24	14	33,896	1.89
Highest Rural R5	17	37,458	1.79	11	33,798	1.79	12	31,924	1.30
Lowest Urban U1	42	51,364	3.25	31	56,638	3.25	34	55,050	2.15
U2	28	44,635	2.49	23	48,635	2.49	16	46,779	1.87
U3	23	44,524	2.04	17	48,264	2.04	16	44,798	1.43
U4	20	50,377	1.57	15	49,698	1.57	11	44,260	1.23
Highest Urban U5	14	42,865	1.33	13	45,082	1.33	9	40,779	1.18

Income Quintile	1999-2003			2004-2007		
	Average Number of Mortality to Children Under the Age of Five	Population	Crude Rate per 1,000	Average Number of Mortality to Children Under the Age of Five	Population	Crude Rate per 1,000
Income Not Found	0	466	0.00	5	1,389	9.36
Lowest Rural R1	31	42,278	2.89	59	33,803	2.16
R2	13	30,950	1.68	31	25,362	2.25
R3	11	28,992	1.48	24	23,812	1.64
R4	14	29,481	1.83	27	22,409	1.38
Highest Rural R5	7	28,379	1.02	22	23,469	1.19
Lowest Urban U1	33	48,700	2.69	56	37,837	2.22
U2	18	42,391	1.67	37	31,546	0.82
U3	16	39,707	1.56	30	29,480	1.46
U4	10	38,062	1.00	26	29,770	1.24
Highest Urban U5	8	35,871	0.89	19	28,745	0.83

s = suppressed

Source: Manitoba Centre for Health Policy, 2010

Table A2.4: Crude Numbers for Teen Pregnancies

Income Quintile	1984/85-1986/87			1987/88-1989/90			1990/91-1992-93		
	Average Number of Teen Pregnancies Per year	Population	Crude Rate per 1,000	Average Number of Teen Pregnancies Per year	Population	Crude Rate per 1,000	Average Number of Teen Pregnancies Per year	Population	Crude Rate per 1,000
Income Not Found	5	270	51.85	8	384	51.85	11	333	65.10
Lowest Rural R1	471	12,702	111.32	440	12,024	111.32	450	11,201	109.70
R2	234	11,025	63.67	226	10,592	63.67	209	10,205	64.10
R3	145	10,570	41.25	160	10,292	41.25	149	9,949	46.74
R4	148	11,268	39.40	168	11,068	39.40	183	10,757	45.54
Highest Rural R5	190	11,538	49.49	149	11,059	49.49	135	10,470	40.42
Lowest Urban U1	449	13,122	102.73	513	12,303	102.73	557	11,865	125.01
U2	262	12,647	62.23	299	12,320	62.23	300	11,676	72.89
U3	186	13,484	41.46	225	13,484	41.46	229	12,631	50.13
U4	161	15,290	31.52	165	14,981	31.52	172	14,794	33.11
Highest Urban U5	112	17,367	19.35	134	17,476	19.35	98	16,127	23.06

Income Quintile	1993/94-1995/96			1996/97-1998/99			1999/00-2001/02		
	Average Number of Teen Pregnancies Per year	Population	Crude Rate per 1,000	Average Number of Teen Pregnancies Per year	Population	Crude Rate per 1,000	Average Number of Teen Pregnancies Per year	Population	Crude Rate per 1,000
Income Not Found	17	711	70.32	17	620	80.65	7	237	92.83
Lowest Rural R1	439	10,874	121.02	389	10,196	114.55	408	10,944	111.84
R2	233	9,834	71.18	256	9,892	77.64	200	9,687	61.94
R3	134	9,745	41.15	141	10,026	42.19	127	9,758	39.15
R4	166	10,478	47.53	130	10,479	37.12	136	10,704	38.02
Highest Rural R5	152	10,324	44.27	141	10,694	39.46	115	11,199	30.90
Lowest Urban U1	588	11,872	148.58	556	11,064	150.85	522	11,542	135.68
U2	303	11,067	82.14	304	10,810	84.37	288	11,730	73.57
U3	211	12,464	50.71	227	12,493	54.43	206	12,411	49.71
U4	194	14,199	41.06	201	14,187	42.50	172	14,866	34.71
Highest Urban U5	119	15,478	23.13	144	15,530	27.75	114	15,697	21.79

Income Quintile	2002/03-2004/05			2005/06-2007/08		
	Average Number of Teen Pregnancies Per year	Population	Crude Rate per 1,000	Average Number of Teen Pregnancies Per year	Population	Crude Rate per 1,000
Income Not Found	10	367	84.47	13	795	49.06
Lowest Rural R1	387	11,422	101.65	430	12,369	104.21
R2	163	9,990	49.05	200	10,853	55.28
R3	131	9,808	40.07	131	10,484	37.58
R4	119	10,226	35.01	112	10,061	33.40
Highest Rural R5	92	11,099	24.96	99	11,197	26.61
Lowest Urban U1	486	12,135	120.07	449	12,312	109.32
U2	248	12,237	60.72	221	13,025	50.98
U3	180	13,112	41.26	152	13,448	33.83
U4	139	14,943	27.91	112	14,947	22.55
Highest Urban U5	77	16,306	14.23	61	17,174	10.71

s = suppressed

Source: Manitoba Centre for Health Policy, 2010

Table A2.5: Crude Numbers for High School Completion (Including Band-Operated Schools)

Income Quintile	1996			1997			1998		
	Number of High School Completion Band Schools Included	Population	Crude Rate per 100	Number of High School Completion Band Schools Included	Population	Crude Rate per 100	Number of High School Completion Band Schools Included	Population	Crude Rate per 100
Income Not Found	27	69	39.13	40	98	39.13	29	79	40.82
Lowest Rural R1	435	884	49.21	662	1,136	49.21	678	1,115	58.27
R2	657	930	70.65	778	1,089	70.65	881	1,224	71.44
R3	698	919	75.95	1,048	1,317	75.95	992	1,244	79.57
R4	768	987	77.81	1,056	1,359	77.81	1,063	1,305	77.70
Highest Rural R5	824	1,062	77.59	1,190	1,462	77.59	1,173	1,459	81.40
Lowest Urban U1	648	1,179	54.96	607	1,152	54.96	737	1,320	52.69
U2	807	1,222	66.04	896	1,323	66.04	923	1,348	67.72
U3	1,021	1,363	74.91	1,230	1,543	74.91	1,190	1,559	79.71
U4	1,491	1,741	85.64	1,545	1,863	85.64	1,607	1,914	82.93
Highest Urban U5	1,757	1,960	89.64	1,850	2,023	89.64	1,800	1,952	91.45

Income Quintile	1999			2000			2001		
	Number of High School Completion Band Schools Included	Population	Crude Rate per 100	Number of High School Completion Band Schools Included	Population	Crude Rate per 100	Number of High School Completion Band Schools Included	Population	Crude Rate per 100
Income Not Found	s	s	s	11	21	52.38	22	44	50.00
Lowest Rural R1	691	1,211	57.06	718	1,324	54.23	710	1,307	54.32
R2	877	1,146	76.53	948	1,252	75.72	917	1,326	69.16
R3	974	1,236	78.80	956	1,247	76.66	1,013	1,219	83.10
R4	1,075	1,341	80.16	1,035	1,318	78.53	1,133	1,365	83.00
Highest Rural R5	1,263	1,547	81.64	1,358	1,593	85.25	1,158	1,387	83.49
Lowest Urban U1	655	1,214	53.95	722	1,327	54.41	772	1,417	54.48
U2	1,000	1,431	69.88	985	1,429	68.93	1,056	1,480	71.35
U3	1,171	1,518	77.14	1,296	1,614	80.30	1,338	1,684	79.45
U4	1,635	1,878	87.06	1,709	1,932	88.46	1,725	1,944	88.73
Highest Urban U5	1,862	2,011	92.59	2,108	2,230	94.53	1,969	2,113	93.19

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Source: Manitoba Centre for Health Policy, 2010

Table A2.6: Crude Numbers for High School Completion Rates (Excluding Band-Operated Schools)

Income Quintile	1996			1997			1998		
	Number of High School Completion Rates Excluding Band Schools	Population	Crude Rate per 100	Number of High School Completion Rates Excluding Band Schools	Population	Crude Rate per 100	Number of High School Completion Rates Excluding Band Schools	Population	Crude Rate per 100
Income Not Found	27	68	39.71	39	95	39.71	29	77	41.05
Lowest Rural R1	365	588	62.07	559	837	62.07	548	777	66.79
R2	631	862	73.20	759	1,042	73.20	844	1,128	72.84
R3	692	893	77.49	1,036	1,287	77.49	982	1,214	80.50
R4	766	978	78.32	1,047	1,329	78.32	1,054	1,288	78.78
Highest Rural R5	824	1,057	77.96	1,188	1,452	77.96	1,171	1,451	81.82
Lowest Urban U1	643	1,159	55.48	595	1,116	55.48	731	1,291	53.32
U2	804	1,212	66.34	895	1,315	66.34	921	1,342	68.06
U3	1,018	1,354	75.18	1,226	1,534	75.18	1,190	1,553	79.92
U4	1,490	1,737	85.78	1,545	1,859	85.78	1,606	1,912	83.11
Highest Urban U5	1,756	1,957	89.73	1,850	2,023	89.73	1,799	1,951	91.45

Income Quintile	1999			2000			2001		
	Number of High School Completion Rates Excluding Band Schools	Population	Crude Rate per 100	Number of High School Completion Rates Excluding Band Schools	Population	Crude Rate per 100	Number of High School Completion Rates Excluding Band Schools	Population	Crude Rate per 100
Income Not Found	s	s	s	11	21	52.38	21	40	52.50
Lowest Rural R1	538	813	66.17	535	887	60.32	589	940	62.66
R2	850	1,081	78.63	922	1,169	78.87	856	1,159	73.86
R3	969	1,220	79.43	954	1,240	76.94	1,010	1,205	83.82
R4	1,065	1,302	81.80	1,028	1,283	80.12	1,129	1,360	83.01
Highest Rural R5	1,258	1,538	81.79	1,355	1,586	85.44	1,152	1,363	84.52
Lowest Urban U1	647	1,178	54.92	718	1,293	55.53	760	1,382	54.99
U2	998	1,423	70.13	981	1,416	69.28	1,051	1,470	71.50
U3	1,169	1,513	77.26	1,295	1,606	80.64	1,331	1,673	79.56
U4	1,634	1,874	87.19	1,709	1,932	88.46	1,723	1,940	88.81
Highest Urban U5	1,862	2,011	92.59	2,107	2,229	94.53	1,968	2,111	93.23

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Source: Manitoba Centre for Health Policy, 2010

Table A2.7: Crude Numbers for Dental Extractions

Income Quintile	1984/85-1988/89			1989/90-1993/94			1994/95-1998/99		
	Average Number of Dental Extractions Per Year	Population	Crude Rate per 1,000	Average Number of Dental Extractions Per Year	Population	Crude Rate per 1,000	Average Number of Dental Extractions Per Year	Population	Crude Rate per 1,000
Income Not Found				2	1,960		4	2,218	5.61
Lowest Rural R1	196	50,433	19.41	196	51,386	19.41	302	51,320	19.11
R2	68	41,447	8.25	56	39,366	8.25	120	42,159	7.11
R3	24	41,111	2.97	48	40,828	2.97	55	36,372	5.88
R4	26	43,456	2.95	43	41,536	2.95	60	41,140	5.15
Highest Rural R5	42	45,494	4.59	37	41,102	4.59	46	39,170	4.50
Lowest Urban U1	76	60,389	6.26	102	66,358	6.26	126	65,160	7.66
U2	36	52,991	3.43	39	57,376	3.43	54	55,826	3.42
U3	20	53,237	1.84	33	57,480	1.84	33	53,973	2.89
U4	20	60,477	1.65	21	60,154	1.65	19	53,805	1.73
Highest Urban U5	9	52,193	0.88	10	55,039	0.88	13	50,548	0.87

Income Quintile	1999/00-2003/04			2004/05-2007/08		
	Average Number of Dental Extractions Per Year	Population	Crude Rate per 1,000	Average Number of Dental Extractions Per Year	Population	Crude Rate per 1,000
Income Not Found	6	569	52.72	10	1,723	22.63
Lowest Rural R1	446	50,866	43.86	573	40,356	56.74
R2	149	37,451	19.92	289	30,434	37.95
R3	98	35,229	13.91	95	28,698	13.28
R4	81	35,802	11.26	88	27,139	12.93
Highest Rural R5	47	34,950	6.75	75	28,528	10.52
Lowest Urban U1	165	58,229	14.17	186	44,955	16.55
U2	61	51,218	5.97	69	37,814	7.33
U3	38	47,983	3.96	50	35,407	5.65
U4	25	46,755	2.63	29	36,059	3.19
Highest Urban U5	13	44,499	1.46	14	35,100	1.54

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Source: Manitoba Centre for Health Policy, 2010

Table A2.8: Crude Numbers for Breastfeeding Initiation

Income Quintile	1987/88-1989/90			1990/91-1992/93			1993/94-1995/96		
	Average Number of Breastfeeding Initiation Per Year	Population	Crude Rate per 100	Average Number of Breastfeeding Initiation Per Year	Population	Crude Rate per 100	Average Number of Breastfeeding Initiation Per Year	Population	Crude Rate per 100
Income Not Found	47	210	67.62	32	126	67.62	59	220	75.40
Lowest Rural R1	993	4,938	60.35	1,027	5,026	60.35	1,002	4,859	61.32
R2	813	3,506	69.54	825	3,386	69.54	937	3,771	73.10
R3	895	3,518	76.29	936	3,713	76.29	816	3,079	75.65
R4	948	3,805	74.74	936	3,680	74.74	1,017	3,723	76.28
Highest Rural R5	916	3,615	76.04	901	3,484	76.04	889	3,239	77.61
Lowest Urban U1	1,433	6,974	61.66	1,499	7,175	61.66	1,611	7,077	62.66
U2	1,455	6,045	72.22	1,528	6,173	72.22	1,542	5,876	74.28
U3	1,439	5,635	76.61	1,495	5,802	76.61	1,463	5,338	77.30
U4	1,496	5,668	79.18	1,501	5,557	79.18	1,449	5,151	81.03
Highest Urban U5	1,301	4,640	84.12	1,311	4,595	84.12	1,234	4,192	85.61

Income Quintile	1996/97-1998/99			1999/00-2001/02			2002/03-2004/05		
	Average Number of Breastfeeding Initiation Per Year	Population	Crude Rate per 100	Average Number of Breastfeeding Initiation Per Year	Population	Crude Rate per 100	Average Number of Breastfeeding Initiation Per Year	Population	Crude Rate per 100
Income Not Found	s	s	s	16	64	76.56	25	110	69.09
Lowest Rural R1	916	4,431	62.04	1,040	4,817	64.75	1,045	4,865	64.44
R2	965	3,852	75.16	887	3,454	77.07	828	3,226	76.97
R3	798	2,967	80.69	798	2,971	80.55	852	3,105	82.35
R4	987	3,461	85.58	897	3,159	85.19	897	3,119	86.25
Highest Rural R5	844	3,037	83.37	848	2,970	85.62	847	2,959	85.87
Lowest Urban U1	1,480	6,151	72.18	1,464	5,837	75.24	1,439	5,753	75.02
U2	1,422	5,261	81.11	1,397	5,056	82.91	1,347	4,846	83.39
U3	1,384	4,875	85.17	1,311	4,613	85.24	1,285	4,368	88.26
U4	1,277	4,440	86.26	1,225	4,149	88.55	1,192	4,014	89.09
Highest Urban U5	1,140	3,749	91.25	1,104	3,603	91.92	1,083	3,534	91.96

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Source: Manitoba Centre for Health Policy, 2010

Table A2.9: Crude Numbers for Diabetes

Income Quintile	1984/85-1986/87			1987/88-1989/90			1990/91-1992/93		
	Average Number of Individuals with Diabetes	Population	Crude Rate per 100	Average Number of Individuals with Diabetes	Population	Crude Rate per 100	Average Number of Individuals with Diabetes	Population	Crude Rate per 100
Income Not Found	598	5,804	10.30	669	7,905	10.30	745	6,859	8.46
Lowest Rural R1	3,036	55,705	5.45	3,548	58,150	5.45	3,878	57,409	6.10
R2	2,816	60,409	4.66	3,221	60,480	4.66	3,240	61,826	5.33
R3	2,322	61,185	3.80	2,607	64,572	3.80	3,028	62,328	4.04
R4	2,228	59,723	3.73	2,491	60,708	3.73	2,563	61,135	4.10
Highest Rural R5	1,573	57,223	2.75	1,795	54,980	2.75	1,923	56,357	3.26
Lowest Urban U1	4,433	100,628	4.41	4,998	102,816	4.41	5,488	104,005	4.86
U2	3,835	102,439	3.74	4,276	103,893	3.74	4,636	105,465	4.12
U3	3,420	100,300	3.41	3,705	101,339	3.41	4,155	104,229	3.66
U4	2,380	94,308	2.52	2,678	96,617	2.52	3,159	98,269	2.77
Highest Urban U5	2,311	94,971	2.43	2,503	98,530	2.43	2,808	100,683	2.54

Income Quintile	1993/94-1995/96			1996/97-1998/99			1999/00-2001/02		
	Average Number of Individuals with Diabetes	Population	Crude Rate per 100	Average Number of Individuals with Diabetes	Population	Crude Rate per 100	Average Number of Individuals with Diabetes	Population	Crude Rate per 100
Income Not Found	1,011	8,645	11.69	993	9,403	10.56	1,178	7,828	15.05
Lowest Rural R1	4,643	59,520	7.80	5,597	58,599	9.55	6,341	56,623	11.20
R2	3,523	61,918	5.69	4,081	61,412	6.65	4,620	63,828	7.24
R3	3,145	62,552	5.03	3,617	64,738	5.59	4,313	64,408	6.70
R4	2,739	59,987	4.57	2,893	61,040	4.74	3,669	63,428	5.78
Highest Rural R5	2,132	61,535	3.46	2,703	64,897	4.17	3,346	66,839	5.01
Lowest Urban U1	6,126	108,192	5.66	7,013	103,817	6.76	8,342	104,973	7.95
U2	5,050	106,616	4.74	5,709	105,530	5.41	6,779	106,471	6.37
U3	4,557	103,439	4.41	4,975	103,455	4.81	6,248	106,120	5.89
U4	3,646	100,465	3.63	4,195	100,649	4.17	5,240	102,923	5.09
Highest Urban U5	3,035	95,742	3.17	3,328	99,173	3.36	4,233	101,622	4.17

Income Quintile	2002/03-2004/05			2005/06-2007/08		
	Number of Individuals with Diabetes	Population	Crude Rate per 100	Number of Individuals with Diabetes	Population	Crude Rate per 100
Income Not Found	1,389	7,791	17.83	1,562	8,336	18.74
Lowest Rural R1	7,123	57,359	12.42	7,521	59,368	12.67
R2	5,272	65,930	8.00	6,239	65,391	9.54
R3	5,104	66,412	7.69	5,492	66,606	8.25
R4	4,311	64,235	6.71	5,182	67,139	7.72
Highest Rural R5	3,789	67,113	5.65	4,323	68,559	6.31
Lowest Urban U1	9,605	106,264	9.04	10,825	109,942	9.85
U2	7,983	108,380	7.37	9,056	110,014	8.23
U3	7,524	108,571	6.93	8,431	110,671	7.62
U4	6,473	106,210	6.09	7,310	108,325	6.75
Highest Urban U5	5,174	104,629	4.95	6,060	106,592	5.69

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Source: Manitoba Centre for Health Policy, 2010

Table A2.10: Crude Numbers for Amupations Among Residents with Diabetes

Income Quintile	1984/85-1986/87			1987/88-1989/90			1990/91-1992/93		
	Average Number of Amputations Among Residents with Diabetes Per Year	Population	Crude Rate per 1,000	Average Number of Amputations Among Residents with Diabetes Per Year	Population	Crude Rate per 1,000	Average Number of Amputations Among Residents with Diabetes Per Year	Population	Crude Rate per 1,000
Income Not Found	10	598	50.17	8	669	50.17	8	744	37.37
Lowest Rural R1	26	3,036	26.02	26	3,548	26.02	33	3,878	21.98
R2	14	2,816	15.27	16	3,221	15.27	15	3,240	15.21
R3	9	2,322	11.20	9	2,607	11.20	14	3,028	10.36
R4	13	2,228	17.95	14	2,491	17.95	12	2,563	16.46
Highest Rural R5	7	1,573	13.35	10	1,795	13.35	6	1,923	17.27
Lowest Urban U1	28	4,433	18.72	25	5,000	18.72	28	5,487	15.20
U2	17	3,835	13.04	23	4,274	13.04	21	4,637	16.38
U3	14	3,420	12.57	19	3,705	12.57	18	4,156	15.65
U4	7	2,380	8.40	6	2,678	8.40	12	3,159	6.35
Highest Urban U5	6	2,311	7.36	4	2,503	7.36	5	2,808	4.39

Income Quintile	1993/94-1995/96			1996/97-1998/99			1999/00-2001/02		
	Average Number of Amputations Among Residents with Diabetes Per Year	Population	Crude Rate per 1,000	Average Number of Amputations Among Residents with Diabetes Per Year	Population	Crude Rate per 1,000	Average Number of Amputations Among Residents with Diabetes Per Year	Population	Crude Rate per 1,000
Income Not Found	13	1,009	37.66	9	993	28.20	12	1,178	30.56
Lowest Rural R1	56	4,644	36.18	62	5,597	33.05	54	6,340	25.39
R2	19	3,521	15.90	19	4,082	13.96	30	4,620	19.26
R3	17	3,146	16.53	21	3,617	17.69	20	4,313	13.68
R4	14	2,739	15.70	16	2,893	16.59	18	3,669	14.45
Highest Rural R5	12	2,132	16.89	10	2,703	10.73	14	3,347	12.25
Lowest Urban U1	28	6,124	13.72	43	7,014	18.39	47	8,342	16.78
U2	21	5,051	12.67	23	5,709	12.09	24	6,779	10.47
U3	18	4,560	11.62	19	4,974	11.46	23	6,248	11.04
U4	11	3,645	9.05	18	4,195	12.87	11	5,240	6.49
Highest Urban U5	9	3,036	9.22	10	3,327	9.32	8	4,233	5.43

Source: Manitoba Centre for Health Policy, 2010

Table A2.11: Crude Numbers for Ischemic Heart Disease

Income Quintile	1984/85-1986/87			1987/88-1989/90			1990/91-1992/93		
	Number with Ischemic Heart Disease	Population	Crude Rate per 100	Number with Ischemic Heart Disease	Population	Crude Rate per 100	Number with Ischemic Heart Disease	Population	Crude Rate per 100
Income Not Found	420	5,804	21.71	389	7,905	21.71	421	6,859	14.76
Lowest Rural R1	1,028	55,705	5.53	1,101	58,150	5.53	1,105	57,409	5.68
R2	1,233	60,409	6.12	1,267	60,480	6.12	1,254	61,826	6.29
R3	1,227	61,185	6.02	1,218	64,572	6.02	1,194	62,328	5.66
R4	979	59,723	4.92	988	60,708	4.92	930	61,135	4.88
Highest Rural R5	667	57,223	3.50	661	54,980	3.50	650	56,357	3.61
Lowest Urban U1	2,078	100,628	6.19	2,173	102,816	6.19	2,144	104,005	6.34
U2	1,924	102,439	5.64	1,950	103,893	5.64	1,963	105,465	5.63
U3	1,803	100,300	5.39	1,737	101,339	5.39	1,817	104,229	5.14
U4	1,212	94,308	3.86	1,290	96,617	3.86	1,300	98,269	4.01
Highest Urban U5	1,242	94,971	3.92	1,268	98,530	3.92	1,313	100,683	3.86

Income Quintile	1993/94-1995/96			1996/97-1998/99			1999/00-2001/02		
	Number with Ischemic Heart Disease	Population	Crude Rate per 100	Number with Ischemic Heart Disease	Population	Crude Rate per 100	Number with Ischemic Heart Disease	Population	Crude Rate per 100
Income Not Found	497	8,645	17.24	479	9,403	15.29	474	7,828	18.15
Lowest Rural R1	1,264	59,520	6.37	1,358	58,599	6.95	1,180	56,623	6.25
R2	1,225	61,918	5.94	1,197	61,412	5.85	1,346	63,828	6.33
R3	1,199	62,552	5.75	1,205	64,738	5.58	1,252	64,408	5.83
R4	931	59,987	4.65	901	61,040	4.43	1,126	63,428	5.33
Highest Rural R5	714	61,535	3.48	791	64,897	3.66	869	66,839	3.90
Lowest Urban U1	2,183	108,192	6.05	2,198	103,817	6.35	2,403	104,973	6.87
U2	2,043	106,616	5.75	2,051	105,530	5.83	2,007	106,471	5.66
U3	1,805	103,439	5.23	1,790	103,455	5.19	1,943	106,120	5.49
U4	1,391	100,465	4.15	1,472	100,649	4.39	1,516	102,923	4.42
Highest Urban U5	1,248	95,742	3.91	1,267	99,173	3.83	1,379	101,622	4.07

Source: Manitoba Centre for Health Policy, 2010

Table A2.12: Crude Numbers for Multiple Sclerosis

Income Quintile	1984/85-1989/90			1990/91-1995/96			1996/97-2001/02		
	Average Number of Individuals with Multiple Sclerosis	Population	Crude Rate per 100,000	Average Number of Individuals with Multiple Sclerosis	Population	Crude Rate per 100,000	Average Number of Individuals with Multiple Sclerosis	Population	Crude Rate per 100,000
Income Not Found	83	6,811	1218.62	104	13,929	1218.62	115	8,196	746.64
Lowest Rural R1	82	60,764	134.95	95	62,929	134.95	109	60,821	150.96
R2	118	65,892	179.08	150	66,200	179.08	130	67,675	226.59
R3	120	65,195	184.06	146	65,245	184.06	201	68,591	223.77
R4	124	64,572	192.03	110	64,884	192.03	142	67,354	169.53
Highest Rural R5	119	64,691	183.95	141	61,143	183.95	196	70,925	230.61
Lowest Urban U1	225	106,908	210.46	222	107,662	210.46	243	108,971	206.20
U2	227	108,971	208.31	246	110,329	208.31	310	110,290	222.97
U3	272	106,699	254.92	308	108,904	254.92	326	110,431	282.82
U4	250	102,386	244.17	273	105,778	244.17	341	107,901	258.09
Highest Urban U5	258	105,182	245.29	298	108,009	245.29	342	107,119	275.90

Income Quintile	2002/03-2007/08		
	Average Number of Individuals with Multiple Sclerosis	Population	Crude Rate per 100,000
Income Not Found	125	8,939	1398.37
Lowest Rural R1	104	64,053	162.37
R2	182	69,877	260.46
R3	170	71,312	238.39
R4	157	71,113	220.78
Highest Rural R5	210	70,884	296.26
Lowest Urban U1	278	112,645	246.79
U2	310	114,674	270.33
U3	354	114,630	308.82
U4	327	113,747	287.48
Highest Urban U5	335	113,940	294.01

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Source: Manitoba Centre for Health Policy, 2010

Table A2.13: Crude Numbers for Continuity of Care

Income Quintile	1984/85-1985/86			1986/87-1987/88			1988/89-1989/90		
	Number of Individuals with Continuity of Care	Population	Crude Rate per 100	Number of Individuals with Continuity of Care	Population	Crude Rate per 100	Number of Individuals with Continuity of Care	Population	Crude Rate per 100
Income Not Found	4,176	4,701	88.83	4,420	5,137	88.83	5,352	6,592	86.04
Lowest Rural R1	34,194	54,222	63.06	35,952	58,108	63.06	36,717	61,290	61.87
R2	42,081	62,451	67.38	44,191	64,775	67.38	41,467	64,554	68.22
R3	46,334	61,788	74.99	46,514	63,455	74.99	47,218	67,709	73.30
R4	43,872	60,500	72.52	43,831	62,988	72.52	42,391	64,303	69.59
Highest Rural R5	43,137	60,862	70.88	44,415	64,470	70.88	40,314	60,804	68.89
Lowest Urban U1	66,064	93,699	70.51	67,652	101,434	70.51	67,601	104,669	66.70
U2	68,403	91,190	75.01	69,026	98,961	75.01	69,191	101,752	69.75
U3	69,897	90,914	76.88	68,588	97,525	76.88	68,926	100,599	70.33
U4	68,192	88,961	76.65	67,091	95,618	76.65	68,229	99,006	70.17
Highest Urban U5	65,087	86,149	75.55	63,921	92,832	75.55	65,504	96,554	68.86

Income Quintile	1990/91-1991/92			1992/93-1993/94			1994/95-1995/96		
	Number of Individuals with Continuity of Care	Population	Crude Rate per 100	Number of Individuals with Continuity of Care	Population	Crude Rate per 100	Number of Individuals with Continuity of Care	Population	Crude Rate per 100
Income Not Found	s	s	s	5,770	7,054	81.80	5983	7462	80.18
Lowest Rural R1	36,343	60,904	59.67	35,818	61,560	58.18	34,981	62,882	55.63
R2	42,946	65,217	65.85	42,469	65,294	65.04	44,836	65,299	68.66
R3	45,289	66,729	67.87	44,234	65,597	67.43	45,247	66,359	68.19
R4	42,016	63,670	65.99	42,546	63,348	67.16	43,073	64,060	67.24
Highest Rural R5	42,617	62,924	67.73	41,997	62,696	66.99	44,842	65,529	68.43
Lowest Urban U1	67,681	107,526	62.94	66,855	108,447	61.65	70,327	114,296	61.53
U2	70,586	105,275	67.05	69,943	105,786	66.12	70,282	106,138	66.22
U3	69,307	103,843	66.74	71,296	106,009	67.25	70,714	104,723	67.52
U4	68,434	101,964	67.12	70,412	103,991	67.71	70,501	104,552	67.43
Highest Urban U5	66,769	99,270	67.26	68,053	99,520	68.38	66,312	97,215	68.21

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Source: Manitoba Centre for Health Policy, 2010

Table A2.14: Crude Numbers for Continuity of Care Continued

Income Quintile	1996/97-1997/98			1998/99-1999/00			2000/01-2001/02		
	Number of Individuals with Continuity of Care	Population	Crude Rate per 100	Number of Individuals with Continuity of Care	Population	Crude Rate per 100	Number of Individuals with Continuity of Care	Population	Crude Rate per 100
Income Not Found	6,405	8,273	77.42	6,985	8,786	79.50	5,844	7,042	82.99
Lowest Rural R1	33,249	60,209	55.22	33,171	60,661	54.68	32,738	60,353	54.24
R2	39,835	62,688	63.54	39,533	63,385	62.37	40,323	65,237	61.81
R3	43,259	64,778	66.78	44,859	67,531	66.43	40,992	66,578	61.57
R4	40,814	61,813	66.03	41,184	63,553	64.80	39,669	65,127	60.91
Highest Rural R5	44,507	66,049	67.38	46,041	65,653	70.13	45,040	67,566	66.66
Lowest Urban U1	68,086	107,828	63.14	68,329	108,631	62.90	69,084	108,872	63.45
U2	69,257	103,819	66.71	70,694	104,928	67.37	72,644	105,522	68.84
U3	70,176	102,767	68.29	71,135	104,000	68.40	72,800	104,779	69.48
U4	69,210	101,152	68.42	71,289	102,462	69.58	74,385	103,039	72.19
Highest Urban U5	67,174	96,732	69.44	69,499	98,339	70.67	72,247	100,151	72.14

Income Quintile	2002/03-2003/04			2004/05-2005/06			2006/07-2007/08		
	Number of Individuals with Continuity of Care	Population	Crude Rate per 100	Number of Individuals with Continuity of Care	Population	Crude Rate per 100	Number of Individuals with Continuity of Care	Population	Crude Rate per 100
Income Not Found	5,958	6,986	85	6,891	8,734	79	6,900	8,399	82
Lowest Rural R1	33,332	60,728	55	31,818	59,286	54	32,357	57,094	57
R2	40,934	64,741	63	37,514	61,275	61	38,114	60,281	63
R3	42,097	66,072	64	41,271	65,434	63	42,677	64,610	66
R4	39,460	64,023	62	45,443	66,344	68	44,833	64,363	70
Highest Rural R5	45,921	66,557	69	44,277	65,485	68	44,685	65,075	69
Lowest Urban U1	72,021	108,735	66	72,921	109,366	67	72,890	108,420	67
U2	74,876	104,646	72	75,950	105,340	72	74,854	103,852	72
U3	75,568	105,157	72	77,599	105,719	73	76,524	104,471	73
U4	77,225	102,832	75	78,088	104,415	75	77,209	103,439	75
Highest Urban U5	74,531	99,952	75	75,290	101,693	74	75,153	101,831	74

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Source: Manitoba Centre for Health Policy, 2010

Table A2.15: Crude Numbers for Hospitalization Due to Tuberculosis

Income Quintile	1984/85-1988/89			1989/90-1993/94			1994/95-1998/99		
	Average Number of Hospitalizations Due to Tuberculosis Per Year	Population	Crude Rate per 100,000	Average Number of Hospitalizations Due to Tuberculosis Per Year	Population	Crude Rate per 100,000	Average Number of Hospitalizations Due to Tuberculosis Per Year	Population	Crude Rate per 100,000
Income Not Found	2	36,279	22.05	2	47,782	22.05	4	53,663	23.02
Lowest Rural R1	32	439,370	36.64	21	442,223	36.64	29	447,071	23.74
R2	20	439,280	23.22	8	436,924	23.22	9	441,529	9.61
R3	8	441,717	8.60	4	442,047	8.60	3	445,324	4.98
R4	9	439,993	9.77	5	438,105	9.77	5	440,551	5.93
Highest Rural R5	11	436,815	12.36	3	424,288	12.36	5	455,699	3.54
Lowest Urban U1	49	668,135	36.67	37	688,879	36.67	35	695,366	27.15
U2	18	669,599	13.29	11	687,556	13.29	14	686,273	7.71
U3	9	669,118	6.73	15	687,952	6.73	7	685,216	11.19
U4	4	669,997	3.28	8	687,739	3.28	7	686,429	5.53
Highest Urban U5	3	674,889	2.37	4	690,503	2.37	3	678,971	2.61

Income Quintile	1999/00-2003/04			2004/05-2007/08		
	Average Number of Hospitalizations Due to Tuberculosis Per Year	Population	Crude Rate per 100,000	Average Number of Hospitalizations Due to Tuberculosis Per Year	Population	Crude Rate per 100,000
Income Not Found	3	43,078	37.14	4	41,615	33.64
Lowest Rural R1	23	446,346	26.21	48	367,579	52.51
R2	13	447,202	14.09	25	366,579	26.73
R3	9	447,349	10.28	s	s	s
R4	6	447,087	6.49	5	365,399	5.47
Highest Rural R5	4	470,255	4.25	9	376,067	9.31
Lowest Urban U1	35	695,589	25.45	32	568,796	22.33
U2	10	695,690	6.90	11	566,453	7.41
U3	12	695,582	8.34	8	566,095	5.83
U4	4	695,529	2.59	7	566,412	4.59
Highest Urban U5	3	695,001	2.01	3	569,295	2.28

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Source: Manitoba Centre for Health Policy, 2010

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Table A2.16: Crude Numbers for Papanicolaou Test

Income Quintile	1984/85-1986/87			1987/88-1989/90			1990/91-1992/93		
	Average Number of Papanicolaou Tests Per Year	Population	Crude Rate per 100	Average Number of Papanicolaou Tests Per Year	Population	Crude Rate per 100	Average Number of Papanicolaou Tests Per Year	Population	Crude Rate per 100
Income Not Found	40	984	36.48	91	1,978	36.48	58	1,146	41.51
Lowest Rural R1	1,471	23,531	56.27	1,532	24,154	56.27	1,455	23,164	57.08
R2	1,733	24,925	62.59	1,763	24,405	62.59	1,710	24,512	65.02
R3	1,803	25,847	62.77	1,823	26,540	62.77	1,796	24,740	61.80
R4	1,896	25,594	66.66	1,949	25,771	66.66	1,865	25,739	68.06
Highest Rural R5	2,018	26,171	69.38	2,060	24,792	69.38	1,979	24,941	74.77
Lowest Urban U1	3,188	43,968	65.26	3,426	43,881	65.26	3,256	43,803	70.27
U2	3,537	46,974	67.76	3,723	46,356	67.76	3,582	45,834	72.29
U3	3,620	46,349	70.29	3,826	46,151	70.29	3,649	45,927	74.62
U4	3,678	44,991	73.58	3,864	45,440	73.58	3,731	45,193	76.53
Highest Urban U5	3,705	45,080	73.96	3,942	46,154	73.96	3,831	46,179	76.87

Income Quintile	1993/94-1995/96			1996/97-1998/99			1999/00-2001/02		
	Average Number of Papanicolaou Tests Per Year	Population	Crude Rate per 100	Average Number of Papanicolaou Tests Per Year	Population	Crude Rate per 100	Average Number of Papanicolaou Tests Per Year	Population	Crude Rate per 100
Income Not Found	144	1,532	84.33	70	1,683	37.20	48	1,144	37.41
Lowest Rural R1	1,419	23,506	54.34	1,349	22,924	52.97	1,336	22,973	52.34
R2	1,638	24,306	60.64	1,571	23,982	58.96	1,602	24,103	59.82
R3	1,735	24,548	63.59	1,756	25,294	62.49	1,745	24,914	63.03
R4	1,794	25,183	64.12	1,744	25,286	62.09	1,853	25,509	65.36
Highest Rural R5	1,989	26,431	67.74	2,120	27,645	69.03	2,212	28,251	70.47
Lowest Urban U1	3,148	44,116	64.22	3,025	41,605	65.44	2,985	41,324	65.00
U2	3,415	45,002	68.31	3,358	43,744	69.08	3,398	44,166	69.24
U3	3,510	45,275	69.78	3,497	44,328	71.00	3,540	44,372	71.80
U4	3,642	45,183	72.55	3,604	44,426	73.00	3,669	44,813	73.68
Highest Urban U5	3,636	43,616	75.03	3,675	44,268	74.71	3,721	44,714	74.90

Source: Manitoba Centre for Health Policy, 2010

Table A2.17: Crude Numbers for Cumulative Mental Illness Disorders

Income Quintile	1984-1988			1989-1993			1994-1998		
	Numbers of Cumulative Disorders	Population	Crude Rate per 100	Numbers of Cumulative Disorders	Population	Crude Rate per 100	Numbers of Cumulative Disorders	Population	Crude Rate per 100
Income Not Found	3,330	6,358	52.37	4,015	7,217	52.37	5,204	9,803	55.63
Lowest Rural R1	9,065	70,977	12.77	10,729	71,392	12.77	11,835	71,942	15.03
R2	10,192	74,352	13.71	11,133	73,978	13.71	12,340	73,760	15.05
R3	10,182	73,736	13.81	11,282	74,818	13.81	13,035	76,576	15.08
R4	9,677	73,372	13.19	11,026	74,646	13.19	12,165	74,127	14.77
Highest Rural R5	9,514	72,980	13.04	10,212	69,696	13.04	13,158	78,902	14.65
Lowest Urban U1	25,057	115,222	21.75	28,133	117,379	21.75	31,271	117,068	23.97
U2	20,962	117,382	17.86	23,406	119,186	17.86	27,236	119,503	19.64
U3	19,533	116,787	16.73	22,806	119,486	16.73	24,951	119,199	19.09
U4	17,659	113,962	15.50	19,496	116,979	15.50	22,194	118,640	16.67
Highest Urban U5	16,743	117,012	14.31	18,127	119,701	14.31	20,418	118,525	15.14

Income Quintile	1999-2003			2004-2008		
	Numbers of Cumulative Disorders	Population	Crude Rate per 100	Numbers of Cumulative Disorders	Population	Crude Rate per 100
Income Not Found	6,153	9,802	62.77	7,620	9,284	82.08
Lowest Rural R1	14,390	72,512	19.84	15,408	74,838	20.59
R2	14,353	74,946	19.15	14,930	78,654	18.98
R3	14,722	76,283	19.30	15,723	79,353	19.81
R4	15,319	77,241	19.83	16,317	79,695	20.47
Highest Rural R5	16,058	80,934	19.84	16,064	82,626	19.44
Lowest Urban U1	38,443	119,910	32.06	39,641	124,792	31.77
U2	32,549	121,651	26.76	32,854	125,855	26.10
U3	31,389	122,288	25.67	31,278	126,851	24.66
U4	27,675	122,356	22.62	27,899	126,058	22.13
Highest Urban U5	25,936	122,066	21.25	25,856	126,122	20.50

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Source: Manitoba Centre for Health Policy, 2010

Table A2.18: Crude Numbers for Dementia

Income Quintile	1984/85-1988/89			1989/90-1993/94			1994/95-1998/99		
	Number of Individuals with Dementia	Population	Crude Rate per 100	Number of Individuals with Dementia	Population	Crude Rate per 100	Number of Individuals with Dementia	Population	Crude Rate per 100
Income Not Found	2,439	4,298	56.75	3,292	5,062	56.75	5,132	6,417	65.03
Lowest Rural R1	935	18,222	5.13	1,021	18,701	5.13	1,449	19,602	5.46
R2	1,255	21,940	5.72	1,671	23,406	5.72	2,014	21,363	7.14
R3	1,361	21,569	6.31	1,296	21,676	6.31	1,761	22,892	5.98
R4	957	18,190	5.26	868	18,014	5.26	1,006	17,155	4.82
Highest Rural R5	452	12,381	3.65	442	11,653	3.65	730	14,646	3.79
Lowest Urban U1	1,928	32,243	5.98	2,111	32,299	5.98	3,240	31,917	6.54
U2	1,409	32,568	4.33	1,553	32,665	4.33	2,338	33,009	4.75
U3	1,358	30,448	4.46	1,498	30,832	4.46	1,695	30,749	4.86
U4	607	21,209	2.86	684	22,936	2.86	1,621	25,928	2.98
Highest Urban U5	659	23,025	2.86	724	24,508	2.86	1,047	24,177	2.95

Income Quintile	1999/00-2003/04			2004/05-2008/09		
	Number of Individuals with Dementia	Population	Crude Rate per 100	Number of Individuals with Dementia	Population	Crude Rate per 100
Income Not Found	6,412	6,323	101.41	5,960	5,934	100.44
Lowest Rural R1	1,370	18,100	7.57	1,631	18,660	8.74
R2	2,234	20,880	10.70	2,164	24,472	8.84
R3	2,089	22,851	9.14	2,317	24,612	9.41
R4	1,607	20,080	8.00	1,728	23,308	7.41
Highest Rural R5	910	18,218	5.00	1,055	19,395	5.44
Lowest Urban U1	4,345	33,204	13.09	4,866	35,503	13.71
U2	3,019	32,047	9.42	2,939	33,945	8.66
U3	2,531	33,247	7.61	2,890	36,887	7.83
U4	1,717	28,906	5.94	1,898	33,873	5.60
Highest Urban U5	1,875	28,342	6.62	2,519	33,501	7.52

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Source: Manitoba Centre for Health Policy, 2010

Table A2.19: Crude Numbers for Completed or Attempted Suicides

Income Quintile	1984-1986			1987-1989			1990-1992		
	Number of Completed or Attempted Suicides	Population	Crude Rate per 1,000	Number of Completed or Attempted Suicides	Population	Crude Rate per 1,000	Number of Completed or Attempted Suicides	Population	Crude Rate per 1,000
Income Not Found	33	18,755	1.76	34	22,698	1.76	44	22,442	1.50
Lowest Rural R1	422	213,026	1.98	500	216,327	1.98	495	213,836	2.31
R2	330	222,388	1.48	340	222,861	1.48	233	222,219	1.53
R3	166	221,383	0.75	231	224,993	0.75	244	225,236	1.03
R4	158	219,693	0.72	186	220,887	0.72	231	220,813	0.84
Highest Rural R5	201	216,166	0.93	186	214,657	0.93	214	211,662	0.87
Lowest Urban U1	469	343,229	1.37	599	350,499	1.37	562	352,371	1.71
U2	297	348,942	0.85	315	355,516	0.85	301	358,026	0.89
U3	237	347,619	0.68	237	352,863	0.68	258	357,435	0.67
U4	162	339,089	0.48	182	345,300	0.48	199	352,202	0.53
Highest Urban U5	113	347,297	0.33	129	354,264	0.33	148	356,887	0.36

Income Quintile	1993-1995			1996-1998			1999-2001		
	Number of Completed or Attempted Suicides	Population	Crude Rate per 1,000	Number of Completed or Attempted Suicides	Population	Crude Rate per 1,000	Number of Completed or Attempted Suicides	Population	Crude Rate per 1,000
Income Not Found	35	33,750	1.04	39	30,801	1.27	38	26,122	1.45
Lowest Rural R1	540	218,894	2.47	553	216,042	2.56	543	214,707	2.53
R2	321	222,792	1.44	396	221,934	1.78	241	226,978	1.06
R3	193	223,535	0.86	180	232,233	0.78	194	229,658	0.84
R4	202	220,176	0.92	207	223,750	0.93	168	229,977	0.73
Highest Rural R5	196	220,533	0.89	181	235,746	0.77	152	242,752	0.63
Lowest Urban U1	599	359,241	1.67	521	351,495	1.48	455	357,784	1.27
U2	281	358,496	0.78	326	357,612	0.91	292	362,584	0.81
U3	257	356,470	0.72	203	357,220	0.57	197	364,749	0.54
U4	157	355,084	0.44	149	356,212	0.42	144	363,742	0.40
Highest Urban U5	124	351,365	0.35	130	355,777	0.37	124	363,606	0.34

Income Quintile	2002-2004			2005-2007		
	Number of Completed or Attempted Suicides	Population	Crude Rate per 1,000	Number of Completed or Attempted Suicides	Population	Crude Rate per 1,000
Income Not Found	27	27,164	0.99	41	18,902	2.17
Lowest Rural R1	610	219,289	2.78	469	149,561	3.14
R2	258	232,538	1.11	195	157,440	1.24
R3	229	234,708	0.98	169	159,173	1.06
R4	148	231,806	0.64	139	159,325	0.87
Highest Rural R5	159	243,264	0.65	96	162,746	0.59
Lowest Urban U1	492	364,200	1.35	472	247,439	1.91
U2	244	369,917	0.66	222	250,923	0.88
U3	216	372,126	0.58	181	252,326	0.72
U4	130	371,138	0.35	130	251,516	0.52
Highest Urban U5	122	370,505	0.33	99	253,117	0.39

s = suppressed

Source: Manitoba Centre for Health Policy, 2010

Table A2.20: Crude Numbers for Post-AMI Care with Beta-Blocker

Income Quintile	1996/97-1998/99			1999/00-2001/02			2002/03-2004/05		
	Average Numbers of Individuals with Post-AMI Care with Beta-Blocker Per Year	Population	Crude Rate per 100	Average Numbers of Individuals with Post-AMI Care with Beta-Blocker Per Year	Population	Crude Rate per 100	Average Numbers of Individuals with Post-AMI Care with Beta-Blocker Per Year	Population	Crude Rate per 100
Income Not Found	12	105	35.24	15	35	35.24	32	168	42.45
Lowest Rural R1	89	469	56.72	111	162	56.72	114	473	68.17
R2	89	450	59.33	113	157	59.33	128	486	71.76
R3	107	484	66.53	118	159	66.53	127	472	73.85
R4	74	328	67.68	106	139	67.68	109	395	76.20
Highest Rural R5	69	297	69.70	100	126	69.70	104	378	79.37
Lowest Urban U1	158	779	60.85	224	298	60.85	252	963	75.25
U2	167	751	66.84	188	240	66.84	229	835	78.58
U3	160	684	70.32	184	232	70.32	214	778	79.34
U4	130	551	70.78	151	186	70.78	170	597	81.33
Highest Urban U5	116	473	73.36	129	161	73.36	157	566	80.12

Income Quintile	2005/06-2007/08		
	Average Numbers of Individuals with Post-AMI Care with Beta-Blocker Per Year	Population	Crude Rate per 100
Income Not Found	33	164	60.37
Lowest Rural R1	147	585	75.56
R2	140	537	78.03
R3	131	506	77.67
R4	139	504	82.74
Highest Rural R5	98	349	83.95
Lowest Urban U1	237	885	80.34
U2	221	787	84.24
U3	213	747	85.41
U4	175	613	85.48
Highest Urban U5	145	515	84.27

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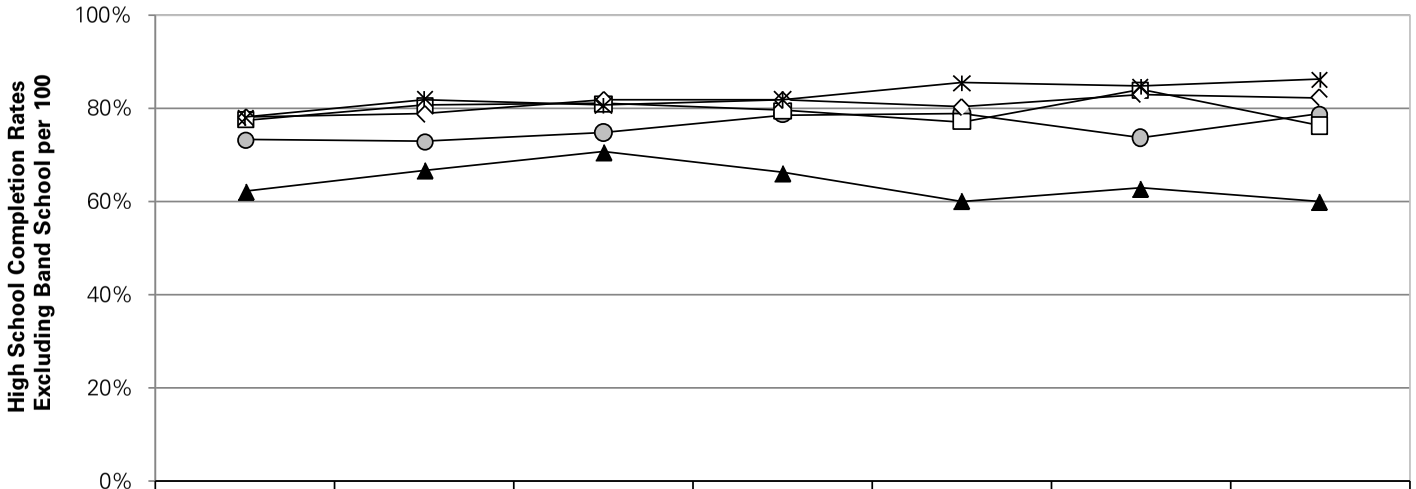
Source: Manitoba Centre for Health Policy, 2010

Appendix 3: Results for High School Completion Excluding Band-Operated Schools

Note: Please see Appendix Table 2.6 for crude numbers for high school completion rates excluding band-operated schools.

Figure A3.1: High School Completion Rates Excluding Band Schools Over Time by Rural Income Quintile

Adjusted for (2002) sex, percent of Grade 9 students who graduated within six years from time period



	T1: 1996	T2: 1997	T3: 1998	T4: 1999	T5: 2000	T6: 2001	T7: 2002
NF (Not displayed)	39.57	40.96	37.79	s	51.99	53.20	62.14
R1 (lowest income)	62.16	66.76	70.65	66.13	60.19	62.80	60.00
R2	73.16	72.81	74.82	78.65	78.99	73.72	78.81
R3	77.58	80.56	81.00	79.46	77.09	83.87	76.33
R4	78.14	78.83	81.79	81.73	80.27	82.99	82.32
R5 (highest income)	78.03	81.98	80.60	81.88	85.45	84.71	86.18
Disparity Rate Ratios (R1/R5)	0.80	0.81	0.88	0.81	0.70	0.74	0.70
Disparity Rate Differences (R1-R5)	-15.87	-15.22	-9.95	-15.75	-25.26	-21.91	-26.18

Time Period (years)

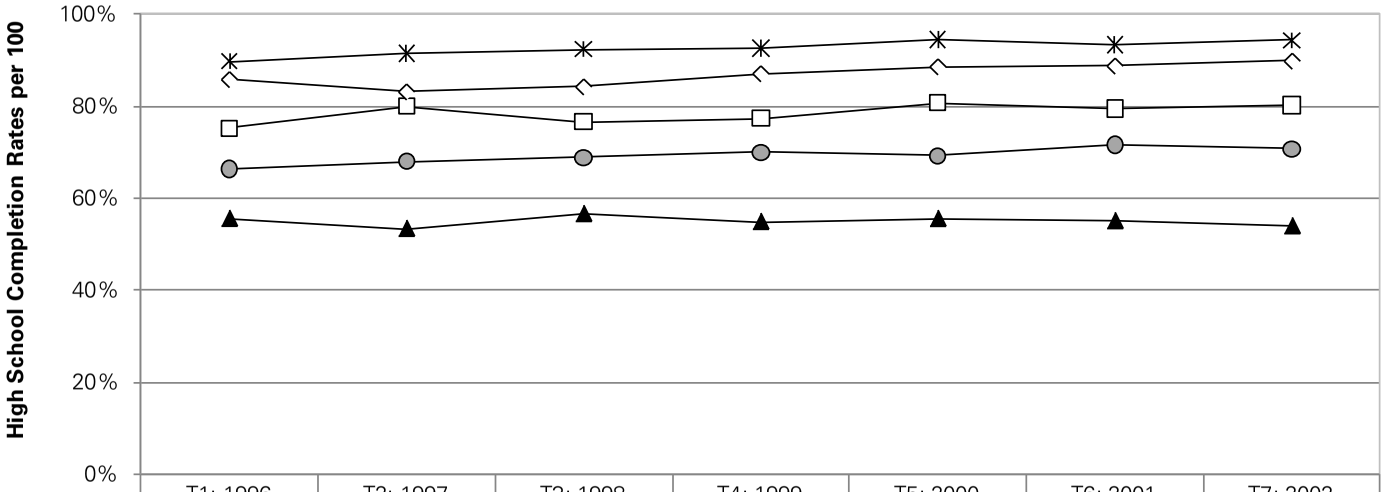
Comparison of Disparity Rate Ratios T7 to T1: 0.87 (95% CI 0.79, 0.97) p< .01

Comparison of Disparity Rate Differences T7 to T1: 1.65, p< .001

Source: Manitoba Centre for Health Policy, 2010

Figure A3.2: High School Completion Rates Excluding Band Schools Over Time by Urban Income Quintile

Adjusted by (2002) sex, percent of Grade 9 students who graduated within six years from time perio



	T1: 1996	T2: 1997	T3: 1998	T4: 1999	T5: 2000	T6: 2001	T7: 2002
NF (Not displayed)	39.57	40.96	37.79	s	51.99	53.20	62.14
U1 (lowest income)	55.53	53.37	56.56	54.86	55.50	55.03	53.93
U2	66.38	68.01	68.78	69.97	69.20	71.62	70.74
U3	75.25	79.97	76.60	77.28	80.71	79.40	80.24
U4	85.81	83.09	84.19	87.10	88.63	88.80	89.88
U5 (highest income)	89.77	91.44	92.28	92.62	94.46	93.28	94.40
Disparity Rate Ratios (U1/U5)	0.62	0.58	0.61	0.59	0.59	0.59	0.57
Disparity Rate Differences (U1-U5)	-34.24	-38.07	-35.72	-37.76	-38.96	-38.25	-40.46

Time Period (years)

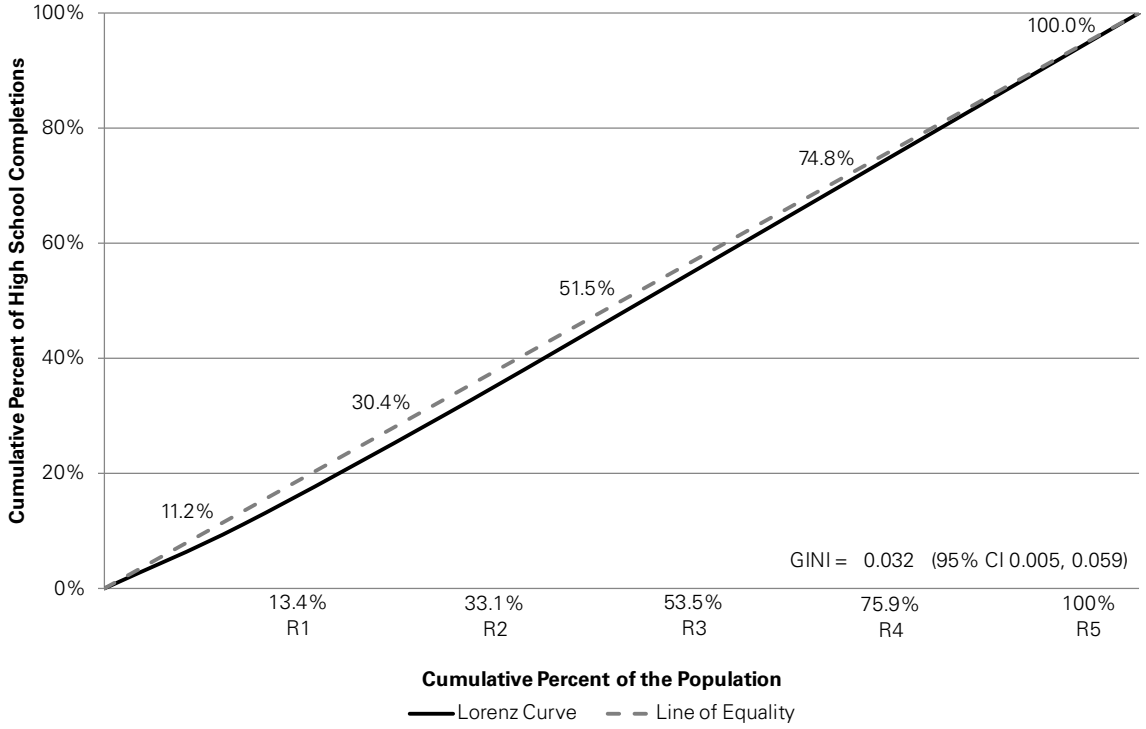
Comparison of Disparity Rate Ratios T7 to T1: 0.92 (95% CI 0.85, 1.00) p< .05

Comparison of Disparity Rate Differences T7 to T1: 1.18, p< .01

Source: Manitoba Centre for Health Policy, 2010

Figure A3.3: Adjusted Lorenz Curve for High School Completion Rates (Excluding Band-Operated Schools) in Rural Areas 1996

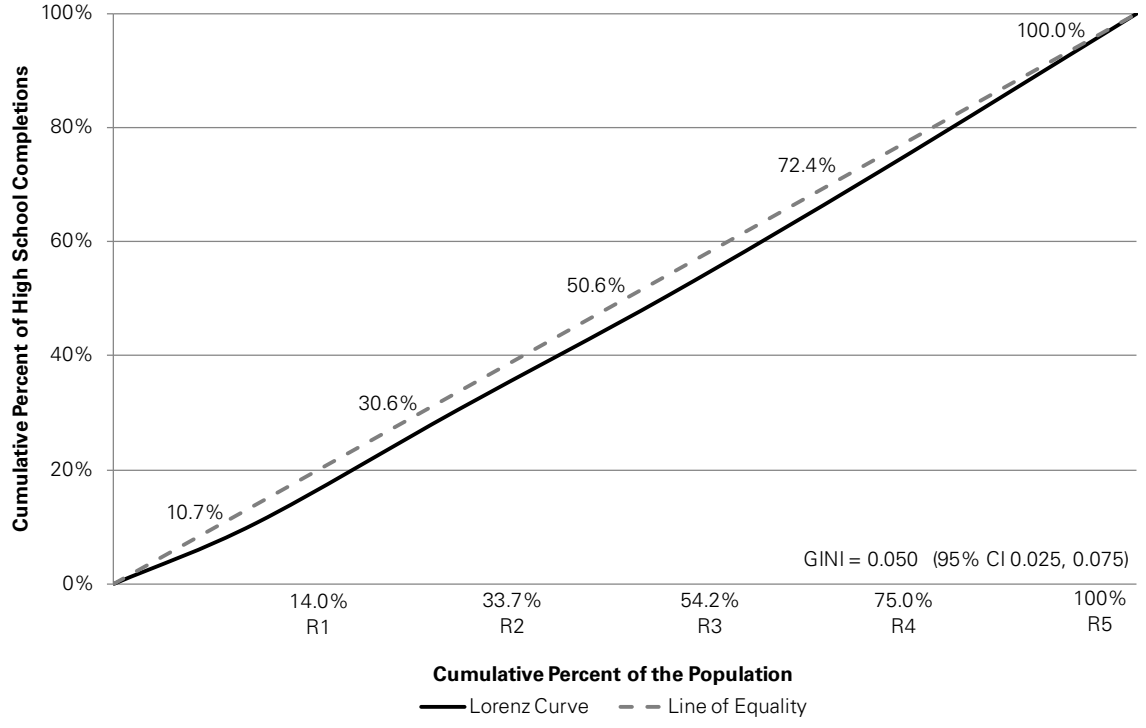
Adjusted for (2002) sex, percent of Grade 9 students who graduated within six years from time period



Source: Manitoba Centre for Health Policy, 2010

Figure A3.4: Adjusted Lorenz Curve for High School Completion Rates (Excluding Band-Operated Schools) in Rural Areas 2002

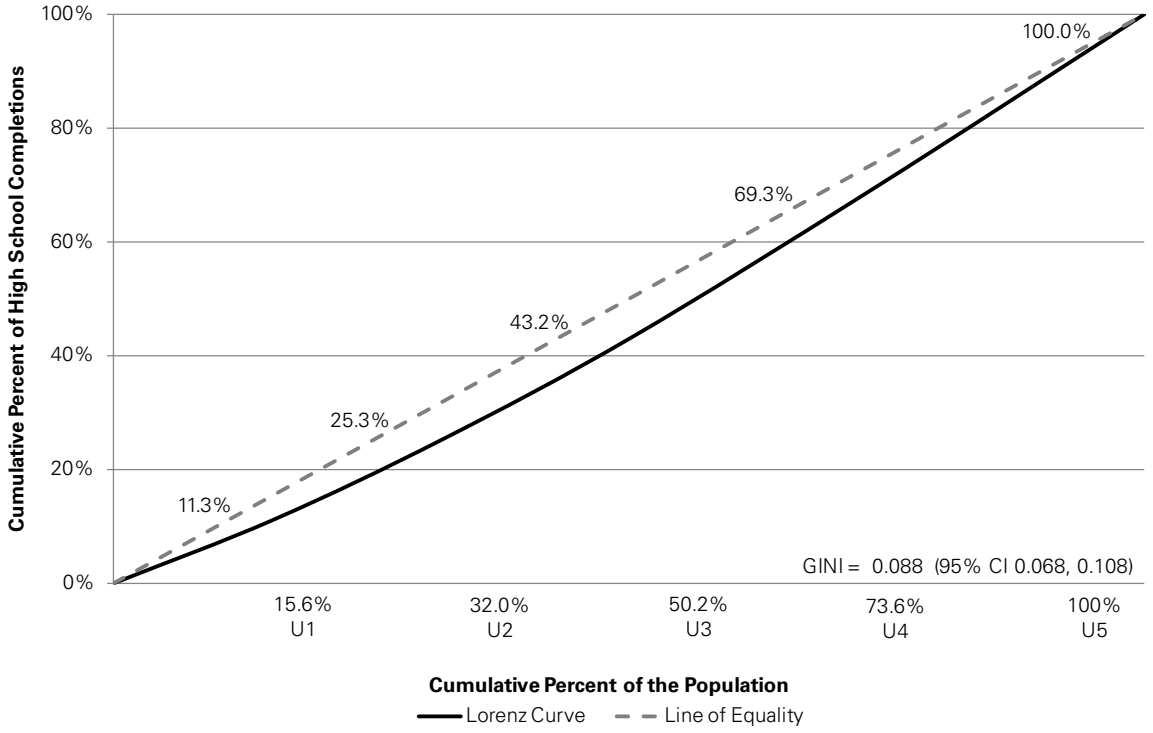
Adjusted for (2002) sex, percent of Grade 9 students who graduated within six years from time period



Source: Manitoba Centre for Health Policy, 2010

Figure A3.5: Adjusted Lorenz Curve for High School Completion Rates (Excluding Band-Operated Schools) in Urban Areas 1996

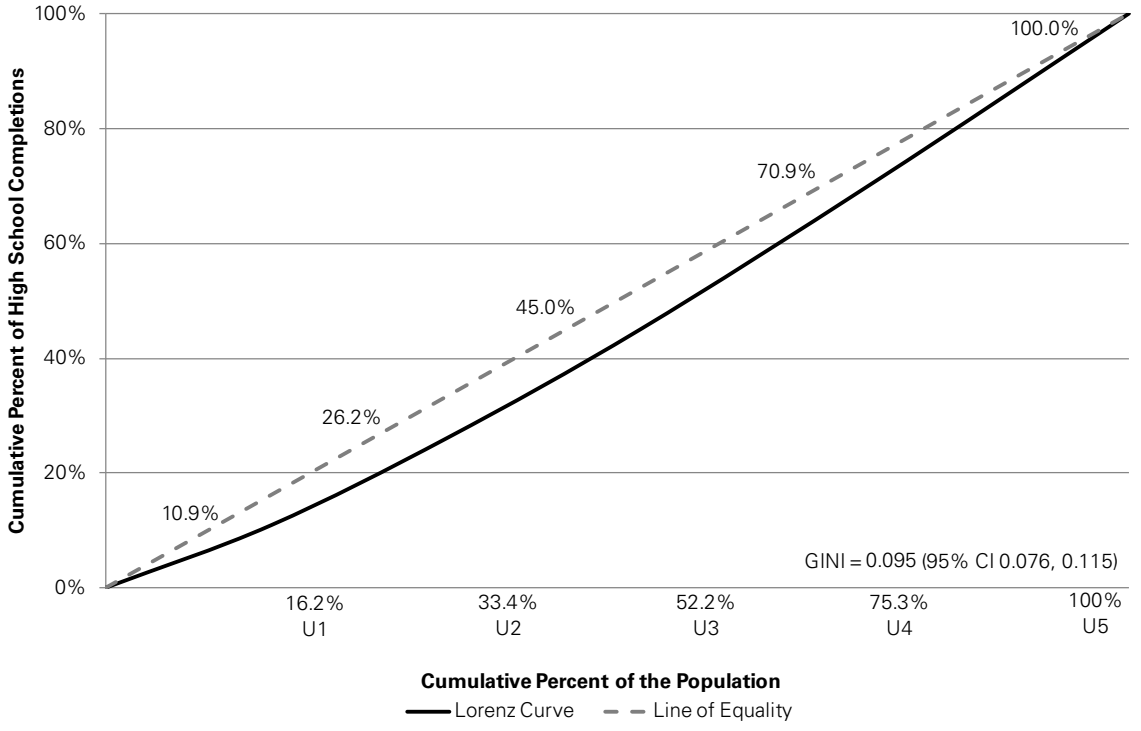
Adjusted for (2002) sex, percent of Grade 9 students who graduated within six years from time period



Source: Manitoba Centre for Health Policy, 2010

Figure A3.6: Adjusted Lorenz Curve for High School Completion Rates (Excluding Band-Operated Schools) in Urban Areas 2002

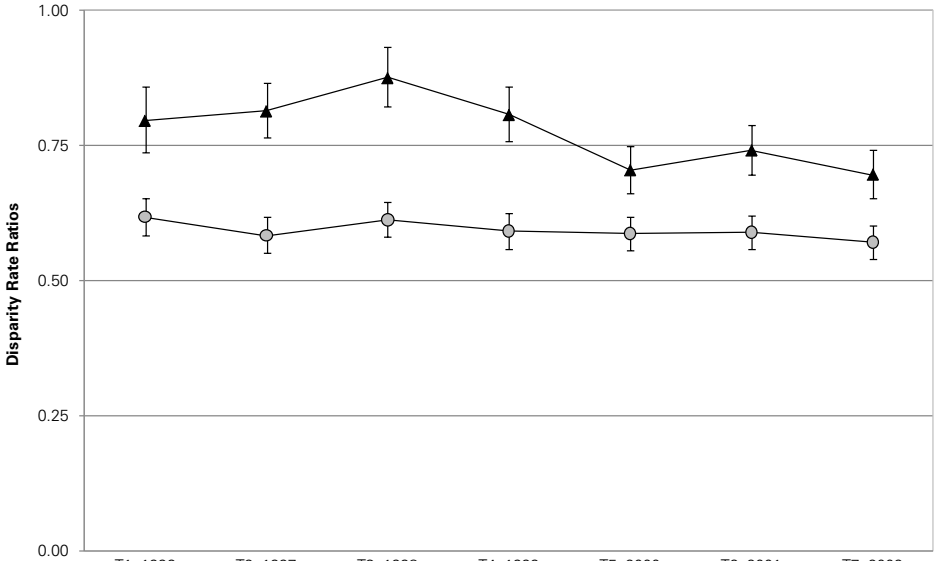
Adjusted for (2002) sex, percent of Grade 9 students who graduated within six years from time period



Source: Manitoba Centre for Health Policy, 2010

Figure A3.7: High School Completion (Excluding Band-Operated Schools) Disparity Rate Ratios by Urban and Rural Income Quintile

Adjusted for (2002) sex, percent of Grade 9 students who graduated within six years from time period



	T1: 1996	T2: 1997	T3: 1998	T4: 1999	T5: 2000	T6: 2001	T7: 2002
Rural Disparity Rate Ratios	0.80	0.81	0.88	0.81	0.70	0.74	0.70
Urban Disparity Rate Ratios	0.62	0.58	0.61	0.59	0.59	0.59	0.57

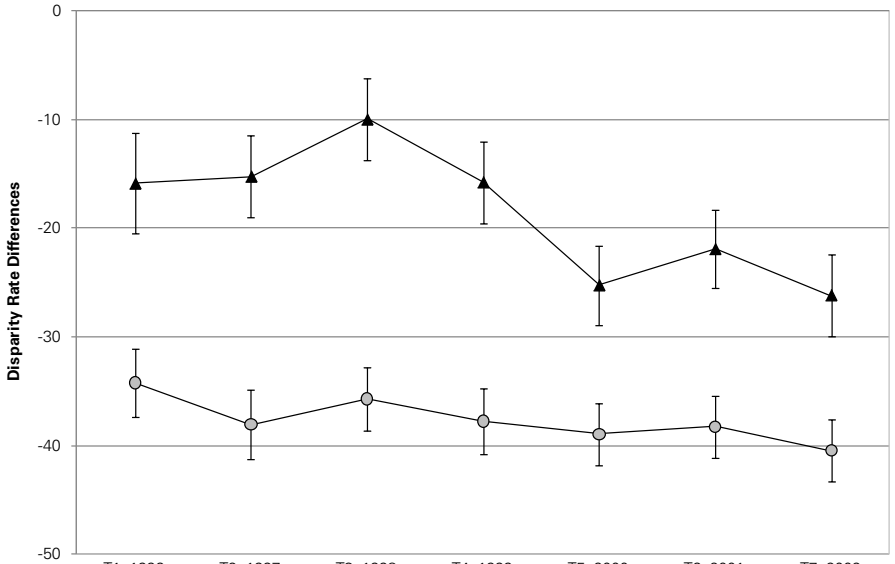
Time Period (years)

Urban Disparity Rate Ratios T7 to T1: 0.92 (95% CI 0.85, 1.00) p< .05
Rural Disparity Rate Ratios T7 to T1: 0.87 (95% CI 0.79, 0.97) p< .01

Source: Manitoba Centre for Health Policy, 2010

Figure A3.8: High School Completion (Excluding Band-Operated Schools) Disparity Rate Differences by Urban and Rural Income Quintile

Adjusted for (2002) sex, percent of Grade 9 students who graduated within six years from time period



	T1: 1996	T2: 1997	T3: 1998	T4: 1999	T5: 2000	T6: 2001	T7: 2002
Rural Disparity Rate Differences	-15.87	-15.22	-9.95	-15.75	-25.26	-21.91	-26.18
Urban Disparity Rate Differences	-34.24	-38.07	-35.72	-37.76	-38.96	-38.25	-40.46

Time Period (years)

Urban Disparity Rate Differences T7 to T1: 1.18, p< .01
Rural Disparity Rate Differences T7 to T1: 1.65, p< .001

Source: Manitoba Centre for Health Policy, 2010

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