This report was edited on June 21, 2011.

MANITOBA CHILD HEALTH ATLAS UPDATE

November 2008

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How to cite this report:

Brownell M, De Coster C, Penfold R, Derksen S, Au W, Schultz J, Dahl M. *Manitoba Child Health Atlas Update.* Winnipeg, MB: Manitoba Centre for Health Policy, November 2008.

Legal Deposit:
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ISBN 978-1-896489-47-6

1st Printing (November 2008)

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 healthcare 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, healthcare administrators, and clinicians to develop a research agenda that is topical and relevant. This strength along with its rigorous academic standards enable 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 and Healthy Living. 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 and Europe.

We thank the University of Manitoba, Faculty of Medicine, and 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 Manitoba Health and Healthy Living.

Acknowledgements

The authors wish to acknowledge the contributions of many individuals whose efforts and expertise made it possible to produce this report. We appreciate the assistance of:

The working group for their helpful advice and feedback throughout the project: Jody Allan (Assiniboine RHA), Dale Brownlee (Manitoba Health and Healthy Living), Margaret Fast (Winnipeg RHA), Gail Grimsen (Health Sciences Centre), Catherine Hynes (Nor–Man RHA), Deborah Malazdrewicz (Manitoba Health and Healthy Living), Michael Moffatt (Winnipeg RHA), Dawn Ridd (Manitoba Health and Healthy Living), Chelsea Ruth (Health Sciences Centre) and Rob Santos (Healthy Child Manitoba).

Colleagues at MCHP for their valuable input: Randy Fransoo, Alan Katz, Anita Kozyrskyj, Patricia Martens, Colleen Metge, Colette Raymond and Noralou Roos. Data and programming support from Lesley Alagar, Bogdan Bogdanovic, Charles Burchill, Dan Chateau, Oke Ekuma, Leonard MacWilliam, Pat Nicol, Heather Prior, Randy Walld and Marina Yogendran. Preparation of graphs, tables and the report, as well as administrative support from Angela Bailly, Eileen Bell and Shannon Lussier. Additional administrative support from Jo–Anne Baribeau, Paulette Collins, Kari–Lynne McGowan and Stephanie Smith.

Colleagues who provided assistance and insight: Sharon Bruce (Community Health Sciences, University of Manitoba), Linda Burnside (Manitoba Family Services and Housing) Michelle Dubik (Manitoba Family Services and Housing), Laurie Jervis (Child Protection and Support Services), Laurence Katz (Psychiatry, University of Manitoba), Brian Lowry (Alberta Children's Hospital), Teresa Mayer (Healthy Child Manitoba), Darren Macdonald (Manitoba Family Services and Housing), Richard Perrault (Manitoba Education, Citizenship and Youth), Robert Schroth (Faculty of Dentistry/Pediatrics and Child Health, University of Manitoba), Harvey Stevens (Manitoba Family Services and Housing), Tim Thorne–Tjomsland (Manitoba Education, Citizenship and Youth), and John VanWalleghem.

External reviewers: Xinjie Cui (Alberta Centre for Child, Family and Community Research) and Diane Watson (Centre for Health Services and Policy Research, University of British Columbia)

We acknowledge the University of Manitoba Health Research Ethics Board (Bannatyne Campus) for their review of this project. The Health Information Privacy Committee of Manitoba Health and Healthy Living is kept informed of all MCHP deliverables. Strict policies and procedures were followed in producing this report, to protect the privacy and security of the Repository data.

We acknowledge the financial support of the Department of Health and Healthy Living of the Province of Manitoba. The results and conclusions are those of the authors and no official endorsement by Manitoba Health and Health Living is intended or should be inferred. This report was prepared at the request of Manitoba Health and Health Living as part of the contract between the University of Manitoba and Manitoba Health and Healthy Living.

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EXECUTIVE SUMMARY

Introduction

Children in Manitoba are generally healthy, although there are significant disparities in child outcomes across socioeconomic status and region of residence, as well as by gender and age. In order to develop strategies to try to reduce health inequalities, and improve the health status of all Manitoba children, up–to–date and comprehensive information on a range of health status indicators is required. Providing information on child health status indicators at regional and sub–regional levels is necessary in order for program–developers and policy–makers to focus on areas where improvements in child outcomes are necessary.

The specific objectives of this report were:

- To provide comprehensive information on child health status indicators at regional and sub–regional levels in Manitoba.
- To provide comprehensive information on the determinants of the health of children in Manitoba.

Methods

This report focused on all Manitoba residents from birth through 19 years of age. Over 80 indicators of child health and development were analyzed covering the following areas: perinatal health, infant and child mortality, health care utilization, use of prescription medications, childhood chronic conditions, education, community and social services, nutrition, physical activity and home environment, adolescent health and reproductive health.

Most indicators in this report were calculated using data that come from a collection of administrative datasets housed at the Manitoba Centre for Health Policy called the Manitoba Population Health Research Data Repository ("the Repository"). The Repository contains only anonymized information, which is linkable across files. This information allowed us to use a population–based approach, meaning that the rates shown for the indicators are based upon virtually every child from 0 to 19 years of age living in Manitoba. Furthermore, the rates reflect where children live, not where they received services. For example, a child living in a remote area in northern Manitoba may be hospitalized in Winnipeg, but the hospitalization is attributed back to the rate for the remote area. Thus, the results offer insight into the complete health and health care use patterns of the child population living in the area, no matter where they receive their care.

For a small number of indicators, information did not come from population–based administrative datasets, but from the Canadian Community Health Survey (CCHS) conducted by Statistics Canada. This survey comprises a sample of Manitobans selected to be representative of the provincial population, but does not include residents living in First Nations communities.

In order to assist policy makers and planners at the regional level, the report provides information broken down by the 11 Manitoba Regional Health Authorities (RHAs) and by the 12 Winnipeg Community Areas (CAs) with further subdivisions by 46 RHA Districts and 25 Winnipeg Neighbourhood Clusters (NCs). Furthermore, in order to demonstrate the association between socioeconomic status and child health outcomes, we have displayed each indicator according to area–level income quintiles. Results for most indicators were provided for two time periods to provide an assessment of changes in the indicators over time.

Because rates for many of the indicators in this report vary by the age and/or the sex of the child, the results for most of the indicators presented are adjusted rates estimated from statistical models that control for age and sex differences among areas. This allows fair comparisons of health status and health service use across areas that have different population compositions.

Findings

With over 80 outcomes examined, it is difficult to summarize the findings; however, some patterns of results across indicators emerge. There is a fairly consistent relationship between area–level socioeconomic status and child outcomes, with rates of poor outcomes becoming higher as socioeconomic status decreases. For example, infant mortality rates were almost three times higher in the lowest compared to the highest urban income quintile neighbourhoods in 2001–2005. In addition, child mortality rates were two–and–a–half times higher in the lowest compared to the highest rural income quintile areas in 2001–2005, with injury mortality rates showing a four–and–a–half fold difference across rural income areas. Hospitalization rates also showed a significant socioeconomic gradient, with increases in rates found for each decrease in average area–level income; this was the case for overall hospitalization rates as well as hospitalization rates for specific conditions or procedures, such as injury, lower respiratory tract infections, vaccine–preventable infections, and dental extractions. Diabetes prevalence was over one–and–a–half times higher in the lowest rural income areas compared to the highest rural income areas

In the area of preventive health measures, breastfeeding rates were significantly related to area–level income, in both urban and rural areas, with rates decreasing as socioeconomic status decreased. The same story was true for immunization rates at 1, 2, 7 and 11 years of age where the lowest rates were found in the lowest income areas. Educational outcomes, including retention rates and high school completion, also showed very steep socioeconomic gradients, with poorer outcomes associated with lower socioeconomic status. For example, the rate of retention for students in kindergarten through grade 8 was over seven times higher for children from the lowest compared to the highest urban income quintile neighbourhoods. In addition, the high school completion rate in the highest urban income quintile neighbourhoods was over 90% compared to just over 55% for youths from the lowest income neighbourhoods.

Rural–urban differences were also evident for several indicators with much higher rates of poor outcomes in rural compared to urban areas for child mortality, overall hospitalizations, hospitalizations for injury and dental extractions, and the rate of children retained in grade.

For a number of the indicators studied, rates changed significantly over time. In the area of *perinatal health* (Chapter 3), rates of C–Sections increased while vaginal births after C–Section decreased, which is indicative of more invasive procedures at birth. Rates of preterm births and large–for–gestational–age births also increased over the study period. On a positive note, rates of both teen pregnancy and teen births decreased over the study period, as did small–for–gestational–age births. In addition, breastfeeding initiation increased over the study period.

Mortality rates (Chapter 4), including infant, child and injury mortality all remained stable throughout the study period. In the area of *health care utilization* (Chapter 5), complete immunizations at 1, 2 and 11 years of age decreased significantly over the study period. Whereas complete immunization rates at 7 years of age increased, driven mostly by increases in rural RHAs rather than in Winnipeg Community Areas. The rate of hospitalized dental extractions increased significantly over the study period. Injury hospitalizations and hospitalizations for lower respiratory tract infections decreased over the study period, as did the rate of tonsillectomy and adenoidectomy procedures performed. In addition, by the end of the study period, more children were experiencing continuity of care by receiving the majority of their care from a single physician. In the area of *prescription medication use* (Chapter 6), the overall rate of children receiving prescription medications decreased, as did the rate for antibiotics and antidepressants. Prescriptions for psychostimulants and antipsychotic medications increased significantly over the study period.

In the area of *childhood chronic conditions* (Chapter 7), prevalence of asthma remained stable over the study period, whereas the prevalence of diabetes, ADHD and autism spectrum disorders increased significantly. The changes that occurred over time in *educational outcomes* (Chapter 8) for Manitoba children were positive. Retention rates decreased significantly over the study period and rates of high school completion and pass rates on the grade 12 language arts standards test increased significantly over the study period.

Disparities in health still exist for Manitoba children, with children from areas with lower socioeconomic status experiencing more health and social difficulties than children in the rest of the province.

Chapter 1: Introduction and Methods

1.1 Background and Objectives

Children in Manitoba and in Canada are generally healthy. Rates of childhood mortality and morbidity are relatively low when compared to other countries. Whereas the overall health status of Manitoba children is good, there are significant disparities in child outcomes across **socioeconomic status (SES)**[1] and region of residence, as well as by gender and **age**. Children from lower socioeconomic backgrounds tend to have poorer health and developmental outcomes than children from higher socioeconomic backgrounds. Likewise, children living in the northern regions of the province, and in the central areas of the city of Winnipeg, tend to have poorer outcomes.

In order to develop strategies to try to reduce health inequalities, and improve the health status of all Manitoba children, up–to–date and comprehensive information on a range of health status indicators is required. Providing information on child health status indicators at regional and sub–regional levels will allow program–developers and policy–makers to focus on areas where improvements in child outcomes are necessary; areas with favourable outcomes can be examined for possible lessons about effective programs or policies. The development of effective programs and policies also requires accurate information on the determinants of child health, including social conditions, nutrition and health care utilization.

The specific objectives of this report were:

- To provide comprehensive, up–dated information on child health status indicators at regional and sub–regional levels in Manitoba.
- To provide comprehensive, up–dated information on the determinants of the health of children in Manitoba.

This report was undertaken through a grant to the Manitoba Centre for Health Policy (MCHP) from Manitoba Health and Healthy Living, as a deliverable for the Healthy Child Committee of Cabinet. Many of the child health indicators chosen for this report were based on the variables in the original MCHP Child Health report (Brownell et al., 2001) and the on–line MCHP Child Health Atlas (Brownell et al., 2004), both of which provided comprehensive population–based descriptions of health outcomes of Manitoba children at the regional and sub–regional levels. Additional indicators were included in this report based on a literature review, advice from our Working Group, and the availability of suitable data. Representatives from Manitoba Health and Healthy Living, the **Winnipeg Regional Health Authority**, the Health Sciences Centre, Healthy Child Manitoba, and Assiniboine and Nor–Man **Regional Health Authorities (RHAs)** participated in our Working Group which facilitated the indicator selection and expansion process (see the Acknowledgements page for a list of Working Group members).

At the same time that this report was being developed, another MCHP report, the RHA Indicator Atlas 2008 (Fransoo et al., forthcoming), was also being produced. These reports are complementary,

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

and are part of a suite of population–based reports being produced for Manitoba Health and Healthy Living that are intended to assist the RHAs in preparing their third comprehensive Community Health Assessment reports.[2]

The areas covered in this report include perinatal health, infant and child mortality, health care utilization, use of prescription medications, childhood chronic conditions, education, community and social services, nutrition and **physical activity**, and adolescent health and reproductive health. Included as "children" are all Manitoba residents from birth through 19 years of age. For some of the perinatal indicators, such as **Caesarean Section**, we have included all women of child–bearing age for our analyses. Wherever possible, results are provided for two time periods to provide an assessment of changes in the indicators over time. The analyses in this kind of Atlas report are intended to be primarily descriptive, not explanatory. That is, the report shows *what* the data reveal, not *how* or *why* those results have come about. Answering the latter questions requires information about the context, history, and local circumstances, and this is not available in the administrative data used for this report.

1.2 Geographical Boundaries

This report provides data for all 11 RHAs in Manitoba (Figure 1.1), as well as for the 12 **Winnipeg Community Areas (CAs)** and 25 **Neighbourhood Clusters (NCs)** within the Winnipeg RHA (Figure 1.2). The RHAs can be further sub–divided into 46 Districts (Figures 1.3 and 1.4). Whenever possible, results are also provided at the **RHA District** level and Winnipeg NC level and reported in the Appendix. For comparison purposes, the following aggregations of rural RHAs are also shown in the RHA–level graphs of the indicators:

- the Rural South, comprising South Eastman, Central, and Assiniboine RHAs
- Mid, comprising North Eastman, Interlake, and Parkland RHAs
- North, comprising Nor–Man, Burntwood, and Churchill RHAs

The Manitoba averages for each time period are shown at the bottom of the graphs, and the vertical dashed lines correspond to these values.

Furthermore, in order to demonstrate the association between socioeconomic status and child health outcomes, we have displayed each indicator according to area–level **income quintiles**. These income quintiles were developed separately for urban (Winnipeg and Brandon) and rural (all other) areas by assigning average household income from the 2001 **Census**[3] to **dissemination areas** and ranking these from highest to lowest. Dissemination areas were then grouped into five groups or quintiles, each containing approximately 20% of the total population. In rural areas, R1 includes children living in the lowest income quintile areas, whereas R5 represents the highest income quintile areas. Likewise, in urban areas, U1 represents the lowest and U5 represents the highest income quintile neighbourhoods. Maps of quintile assignment by dissemination area for Manitoba, Brandon and Winnipeg can be found in Figure 1.5.

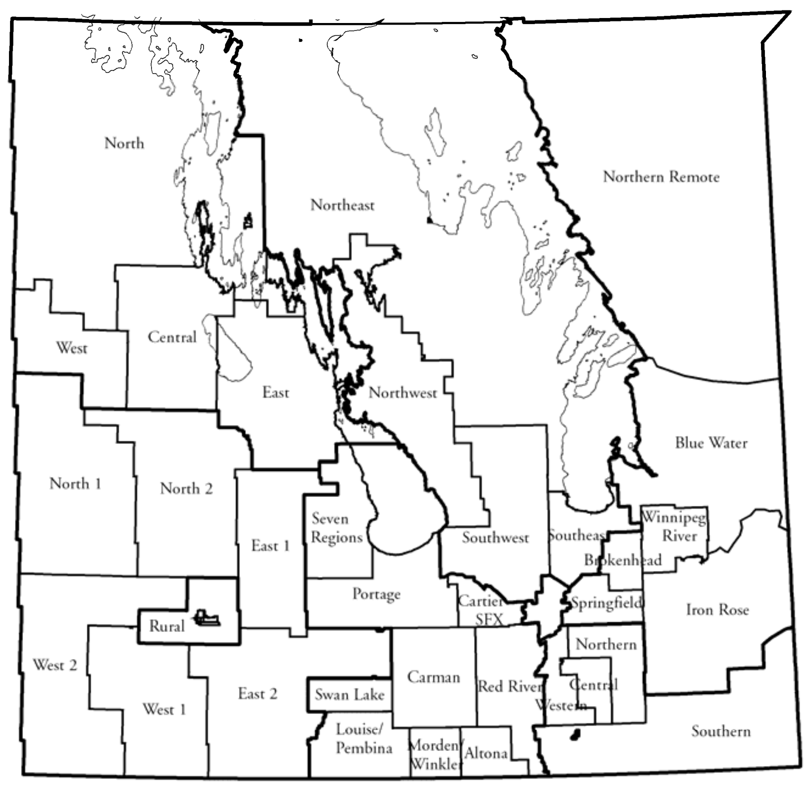
[2] CancerCare Manitoba and Health Information Management of Manitoba Health and Healthy Living are also producing reports for this process.

[3] Census data from 2006 were not available during the analysis phase of this report.

Figure 1.1: Regional Health Authorities (RHAs) of Mantioba

Figure 1.2: Winnipeg Community Areas and Neighbourhood Clusters

Figure 1.3: Districts of Southern RHAs and Brandon RHA



Brandon RHA

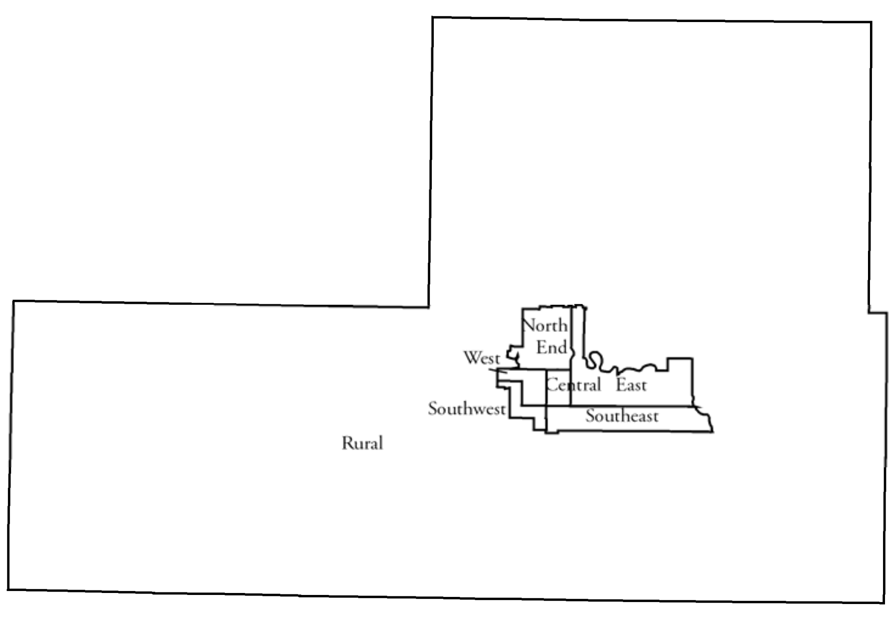


Figure 1.4: Districts of Northern RHAs

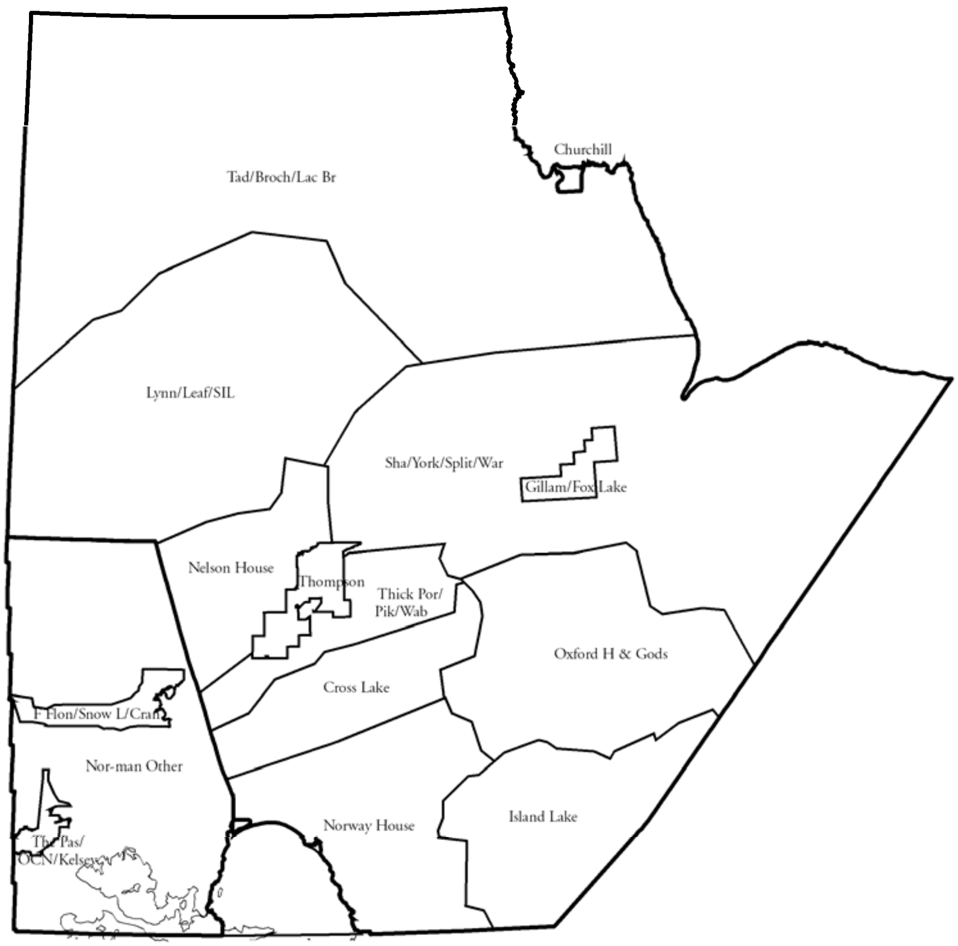
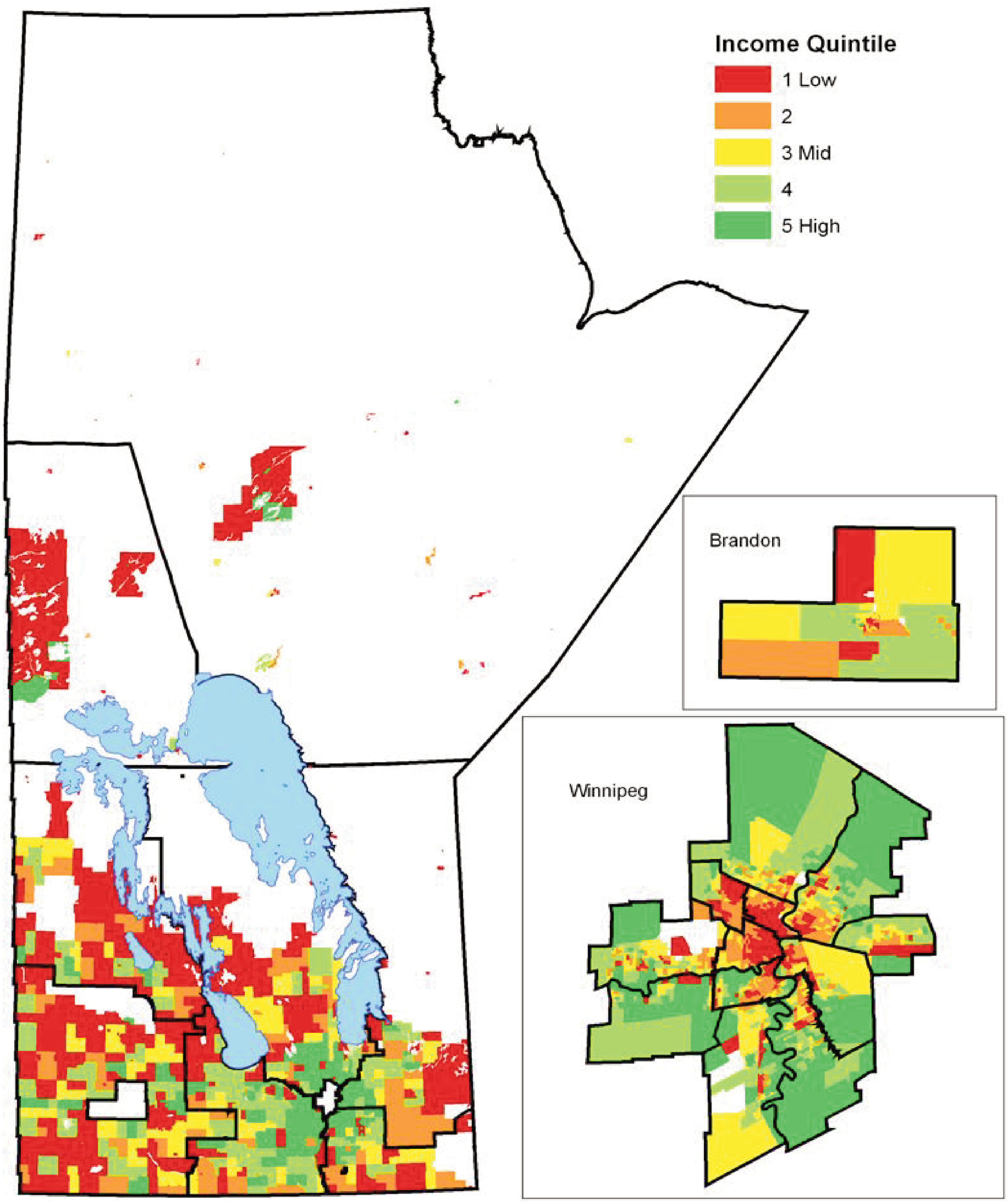


Figure 1.5: Distribution of Urban (Winnipeg and Brandon) and Rural (the rest of Manitoba) 2001 Census Data Dissemination Areas



1.3 Ordering of Areas in Graphs

In this report, RHAs and Winnipeg CAs (as well as RHA Districts and Winnipeg NCs) are shown in a particular order, which is consistent throughout the report, and similar to other MCHP reports. This order is based on the overall health status of the population of each area as measured by the premature mortality rate over a ten–year period (1996 through 2005).[4] A death before the age of 75 years is considered premature, so the **premature mortality rate (PMR)** is the rate at which area residents die prematurely in a given period, per 1,000 area residents aged 0 to 74 years.

Given that this is a report on child health, the use of PMR to order graphs may not seem logical; after all, we are focusing on rates of health indicators for children from birth through 19 years. However, the PMR is considered the best single indicator of the overall health status of a region's population and need for health care (Carstairs and Morris, 1991; Eyles et al., 1991; Eyles and Birch, 1993). And PMR is strongly correlated with socioeconomic indicators (Martens et al., 2002), which have been shown to predict child health outcomes. Using PMR to order the graphs in this report also facilitates making comparisons across MCHP reports. PMR values for each of the regions and sub–regions can be found in the RHA Indicator Atlas 2008 (Fransoo et al., forthcoming).

In the RHA figures in this report, the RHAs with the lowest PMR (that is, the best overall health status and relatively high socioeconomic status) are shown at the top of each graph (South Eastman, Central, Assiniboine), and the other RHAs follow in order of increasing PMR, ending with Burntwood RHA which has the highest PMR and relatively low socioeconomic status. In the district–level graphs found in the Appendix, the same order of the RHAs is maintained, and the districts within each RHA are ordered according to PMR. In other words, within each RHA, the district with the lowest PMR (the best overall health status) is listed first with the others listed below it in order of increasing PMR. For the Winnipeg areas, a similar process was used: first the 12 CAs were ordered by PMR, and then the 25 NCs within them were ranked by PMR within their CAs.

1.4 The Indicators—Key Concepts

Most indicators in this report were calculated using a population–based approach. This means that the rates or the prevalence shown are based upon virtually every child from 0 to 19 years of age living in Manitoba.[5] The exceptions are the chapters on "Nutrition and Physical Activity" and "Adolescent Health and Reproductive Health" which both use data from the **Canadian Community Health Survey (CCHS)** conducted by Statistics Canada. This survey comprises a sample of Manitobans selected to be representative of the provincial population, but did not include residents living in **First Nations communities**.

Furthermore, the indicators in this report reflect where children live, not where they received services. For example, a child living in a remote area in northern Manitoba may be hospitalized in Winnipeg, but the hospitalization is attributed back to the rate for the remote area. Thus, the results

[4] Ten years of data were used because some districts have small populations, so multiple years are required to provide reliable estimates.

[5] Excluded are persons in Federal penitentiaries, and personnel of the Canadian Armed Forces and Royal Canadian Mounted Police

offer insight into the complete health and health care use patterns of the child population living in the area, no matter where they receive their care.

Residents of some areas also receive health services from nurses working in nursing stations operated by the Federal government (especially in Burntwood and Nor–Man RHAs). These services are not recorded in the provincial data files used in our analyses.[6] Therefore, service use rates that are shown in this report may under–estimate the total level of service provision to some residents. Similarly, about 20% of drug prescriptions dispensed from nursing stations were not coded in the pharmaceutical data system before November 2004, after which time virtually all prescriptions were recorded.

Because rates for many of the indicators in this report vary by the age and/or the sex of the child, the results for most of the indicators presented are **adjusted rates** estimated from statistical models that control for age and sex differences among areas (see section 1.6 "Adjusted Rates and Statistical Analyses" following). This allows fair comparisons of health status and health service use across areas that have different population compositions. In some cases, age and sex adjustment was not necessary (e.g., teen pregnancy rates), so crude rates are provided. Whether the rates are adjusted or crude is indicated in the titles of the graphs. And for all indicators, the actual number of events observed, along with corresponding crude rates (the number of events divided by the population), are provided in the Appendix.

1.5 Data Sources and Years of Data Used

The data used for this report come from the **Population Health Research Data Repository** ("the Repository"), housed at the Manitoba Centre for Health Policy (MCHP). Most of the data in the Repository are derived from administrative records: data which were collected in order to administer health and social services. Data are sent to MCHP from Manitoba Health and Healthy Living after identifying information (e.g. names, street addresses, and personal health information number) is removed or encrypted. Therefore, the Repository contains only anonymized information, which is linkable across files.

The following database files from the Repository were used for analyses in this report:

- Medical claims (records of visits to physicians)
- Physician registry files (to identify the type of provider)
- Hospital files (records of hospital admissions)
- Population Registry data (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 deaths)
- Pharmaceutical claims (records of pharmaceutical prescriptions dispensed)

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[6] The exception is immunizations which are captured even when they are performed by nurses in Federal Nursing Stations.

- Manitoba Immunization Monitoring System (MIMS) (records of childhood immunizations)
- Public use census files (for neighbourhood–level socioeconomic information)
- *Families First* screening form data (newborn and family risk factors, from Healthy Child Manitoba)
- Social Assistance Management Information Network (information on **income assistance** receipt from Manitoba Family Services and Housing)
- Child and Family Services Information System (information on children in care and families receiving protection and support services from Manitoba Family Services and Housing)
- Enrolment and assessment data from the Manitoba Department of Education, Citizenship and Youth

Additional information in this report came from the CCHS, a cross–sectional survey implemented by Statistics Canada to gather health–related information on Canadians within each province, and housed in the Repository. Cycles 1.1, 2.1 and 3.1 were conducted in 2001, 2003, and 2005 respectively. These cycles sampled Canadians ages 12 years and older. Cycle 2.2, an additional survey cycle focusing on nutrition, was implemented in 2004 and sampled Canadians of all ages. The survey cycles were combined in this report to produce rates at the RHA level, with no comparisons over time. As noted above, First Nations communities were not included in the CCHS survey, thus a sizeable portion of children from some RHAs, particularly those in northern Manitoba, are not included in the CCHS analyses. Sociodemographic information in this report was developed using the 2001 Canada Census.[7]

All indicators in this report using Repository data are provided for two time periods, in order to allow some assessment of change over time. Providing the most recent data available was the priority, with additional (prior) years being added as needed to provide statistically reliable results. For the majority of indicators, the first time period in this report is **fiscal year** 2000/01, plus up to four preceding years of data. The second time period in this report is 2005/06, again adding up to four preceding years as necessary. These time periods may be different for a small number of indicators where data availability was limited.

1.6 Adjusted Rates and Statistical Analyses

Most of the indicators are labeled as "age–and sex–adjusted" values because the rates have been adjusted to account for the different age and sex composition of different geographic areas. This adjustment allows for fair comparisons among areas with different population characteristics. Adjusted rates show what an area's rate would be if that area's population had the same age and sex composition as the overall Manitoba population.

[7] Because the graphs in this report were created for the purposes of this report, they all indicate that their "source" was Manitoba Centre for Health Policy. The actual source of the data could be any of the number of datasets held in the MCHP Repository. The subtitles in the graph indicate when data used for the graph have come from the CCHS or the Census.

For most of the analyses, these adjusted rates were derived using **Generalized Linear Models**, a statistical approach that looks at the relationship between variables. Variables were included in the model to "adjust" for such effects as age, sex, and area of residence. For the analyses of CCHS data, the statistical analyses involved direct standardization of rates.

All data management, programming and analyses were performed on MCHP's central UNIX server, using SAS® version 9 software.

Even though most of the analyses in this report include the entire Manitoba population, we use statistical significance to indicate how much confidence to put in the rates. If a difference is "statistically significant," then this difference is large enough that we are confident it is not simply due to chance.

It is important not to over–interpret the importance of small differences, especially those that are not statistically significant. When a difference is not statistically significant (whether the difference is small or large), the rate should be considered similar to the provincial average, since it could fluctuate 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.

In most figures, the results from both time periods are shown: the most recent period in black bars and the earlier period in grey bars. Each geographic area's name is followed by a set of parentheses that can include the following indicators: (1, 2, t, s)

- a '1' indicates, that in the first time period, the area's rate was statistically different from the Manitoba average at that time (grey dashed line)
- a '2' indicates, that in the second time period, the area's rate was statistically different from the Manitoba average at that time (black dashed line)
- a 't' indicates, that for that area, the change in rates from time 1 to time 2 was significant
- an 's' indicates that the results were suppressed to ensure confidentiality.[8]

Significant results for linear trend tests are presented at the bottom of the income quintile graphs, except for those indicators where small numbers precluded modeling These tests are used to determine if there is a significant income gradient in the outcome, that is, whether the indicator rates change progressively across income quintiles.

The reference group for geographical region or income quintile in all models was the Manitoba average.

More information on the statistical calculations of **modeling and estimation rates** can be found in the Glossary of this report.

[8] Rates were suppressed where the counts upon which the rates were based represented 1 to 5 events. This practice avoids breeches of confidentiality and is similar to the way in which Statistics Canada reports data.

1.7 What's in This Report?

There is a wealth of information in this report that we hope will prove useful to regional and provincial planners and policy–makers in Manitoba, as well as other planners and researchers across Canada and elsewhere.

The report is divided into the following Chapters and sub–sections (sub–sections refer to specific indicators):

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    - 10.1 Nutrition: Fruit and Vegetable Consumption
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    - 10.3 BMI and Obesity/Overweight
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11. Adolescent Health and Reproductive Health
    - 11.1 Adolescent Smoking
    - 11.2 Adolescent Drinking
    - 11.3 Adolescent Sexual Activity
    - 11.4 Condom Use
    - 11.5 Birth Control Pill Use

An electronic version of this report can be accessed via the MCHP website under "Publications/Deliverables." Excel spreadsheets for the graphs in this report can be found on the website by looking under the link called "Data Extras." The Appendix for this report is also available on the website or on disk upon request.

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

1.8 What's Not in This Report

Obviously no report can include every possible indicator of child health and development, so we have tried to focus on key indicators in this report. Some key indicators have been left out of this report because they are explored in other available or upcoming reports. These include:

- Childhood cancer rates which will be reported by CancerCare Manitoba.
- Sexually transmitted infections which will be reported by Manitoba Health and Healthy Living.

- Physical environment indicators, such as green spaces and housing conditions, are available in the on–line Child Health Atlas, and information has not been updated since its release in 2004. Please go to the MCHP website, then click on "Publications", then "Other Reports" to find the 2004 on–line Child Health Atlas website (see http://mchp–appserv.cpe.umanitoba.ca/reports/child_inequalities/indicators_communityresources.shtml).

Other important indicators of child health and development are not included in this report due to a lack of data. For example, one condition (or range of conditions) that has gained growing attention over the past several years and can have profound effects on child health and development is Fetal Alcohol Spectrum Disorder (FASD). During the analytic phase of this report the only data we could use to identify children with FASD were hospital birth records, where significant under–counting occurs. MCHP has since acquired a dataset from the Clinic for Alcohol and Drug Exposed Children (CADEC) which can be used in future MCHP research to examine health and social outcomes for children with FASD.

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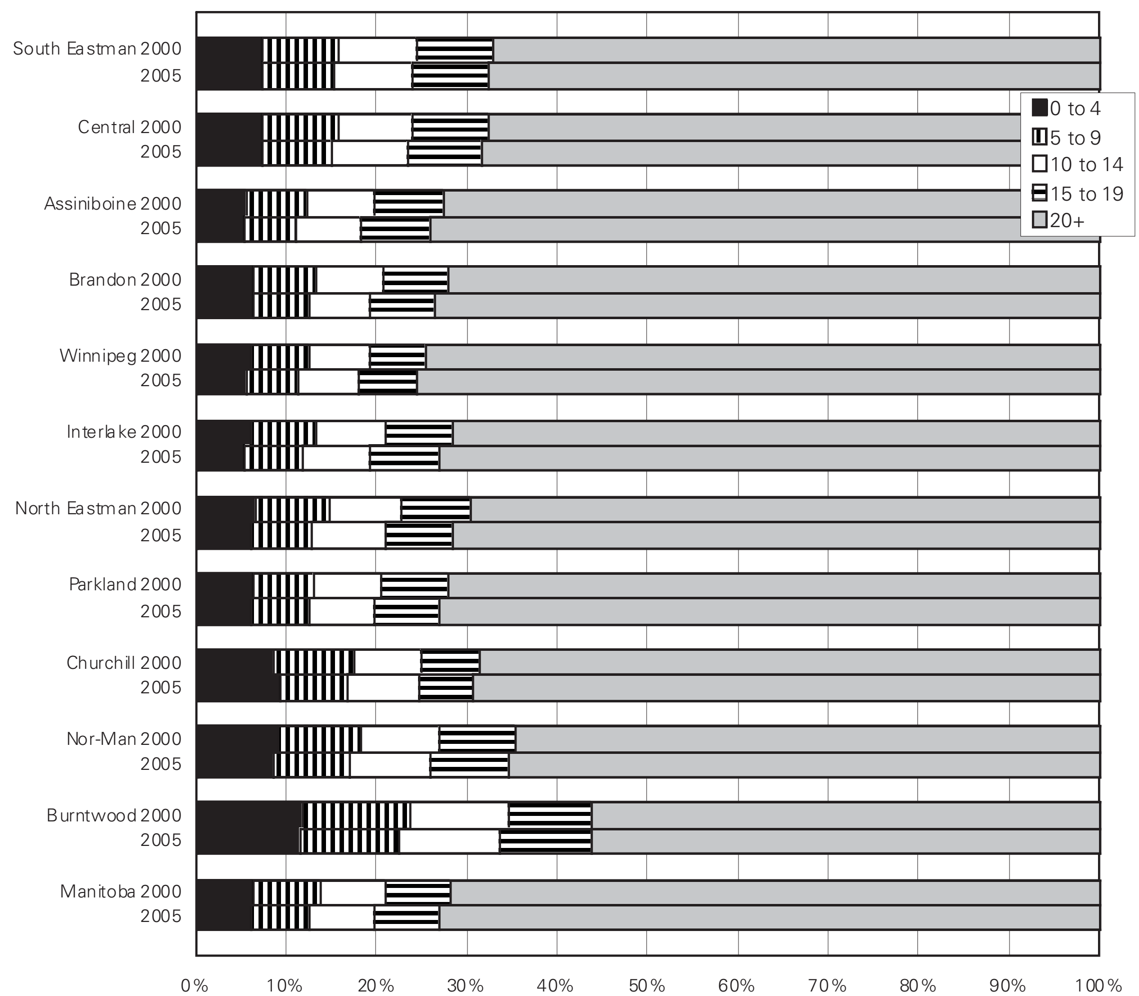
CHAPTER 2: THE MANITOBA CHILD POPULATION

Children 0 to 19 years of age comprised 28% of the Manitoba population in 2000 and 27% of the population in 2005. There is substantial variation in the percent of children in the population by RHA, ranging from comprising about a quarter of the population for Winnipeg (25.4%, 24.5%) to over 40% of the population of Burntwood (43.7% in both years). With the exception of Burntwood, all RHAs experienced a decrease in the percent of the population that was 0 to 19 between 2000 and 2005, with the largest decreases seen in North Eastman, Brandon, Interlake and Assiniboine. Burntwood, along with the other two northern RHAs also had the youngest child populations, with one quarter or more of the children in these regions being in the 0– to 4–year–old age group: Churchill (27.4%, 29.9%), Nor–Man (25.3%, 24.5%) and Burntwood (26.6%, 26.3%).

Figure 2.1: Population by Age, RHAs, 2000 and 2005

(Data source is Manitoba Health Registry)

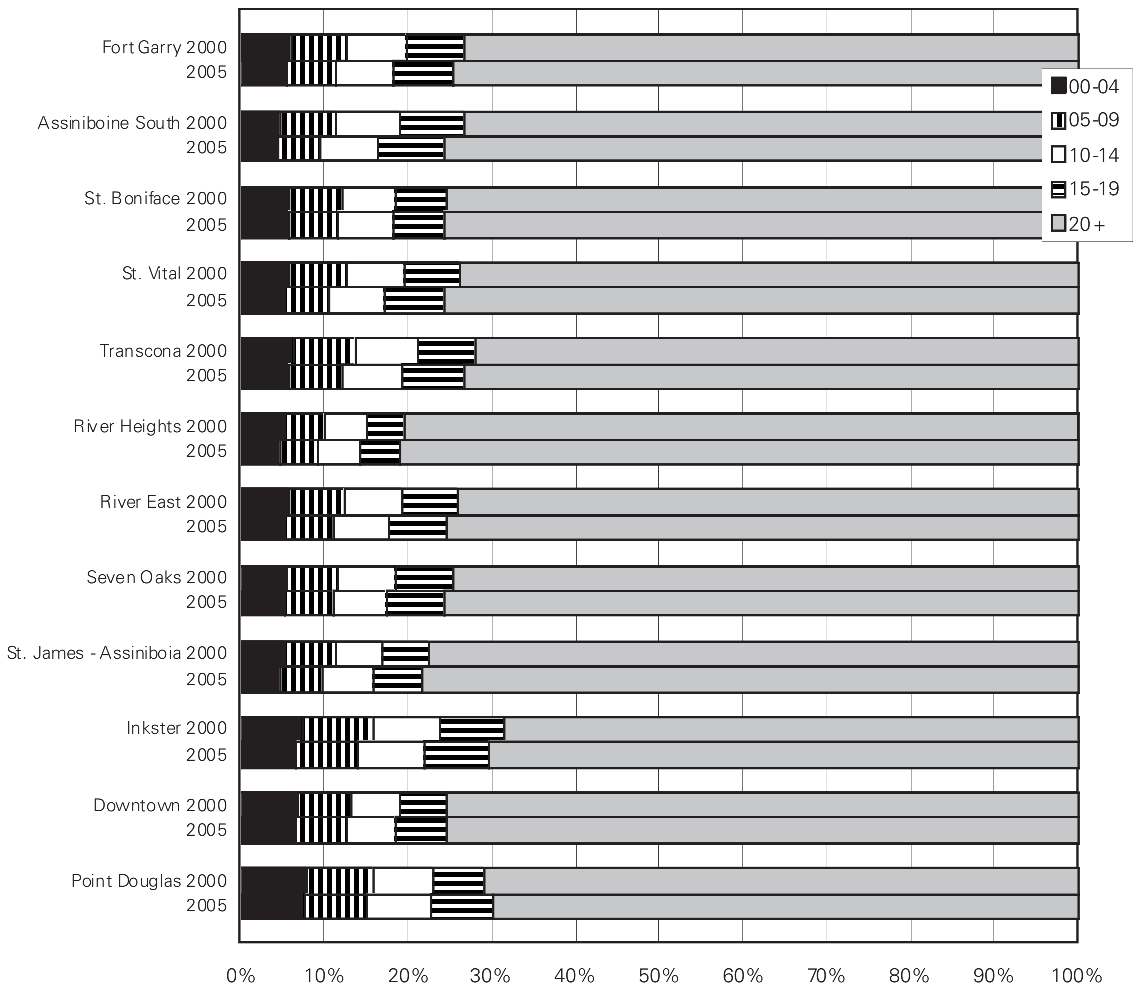


Source: Manitoba Centre for Health Policy, 2008

There was also variation across Winnipeg CAs in the proportion of the population that was 0 to 19 years, ranging from less than 20% for River Heights in both years (19.5%, 19.0%) to about 30% in Inkster (31.4%, 29.7%) and Point Douglas (29.1%, 30.1%). Point Douglas was the only CA to experience an increase over time in the proportion of the population that was 0 to 19 years; Assiniboine South, St. Vital and Inkster experienced the largest decreases in the percent of the population that was made up of children. The youngest child populations, those with the highest percent of children under the age of 20 who fell into the 0– to 4–year–old age group, were found in Downtown (27.8%, 26.3%), Point Douglas (26.5%, 24.8%) and River Heights (25.9%, 24.4%).

Figure 2.2: Population by Age, Winnipeg, 2000 and 2005

(Data source is Manitoba Health Registry)



Source: Manitoba Centre for Health Policy, 2008

Tables showing the age and sex breakdowns for each of the RHAs and CAs as well as this information at the RHA district and Winnipeg NC level can be found in the Appendix.

Statistics Canada projects that Manitoba's population will increase anywhere from 7% to 23% over the next 25 years, depending on rates of growth and migration (Statistics Canada, 2005). These same projections predict anywhere from a 16% decrease to a 12% increase in the population of Manitoba children 0 to 19 years over the same time period (Statistics Canada, 2005).

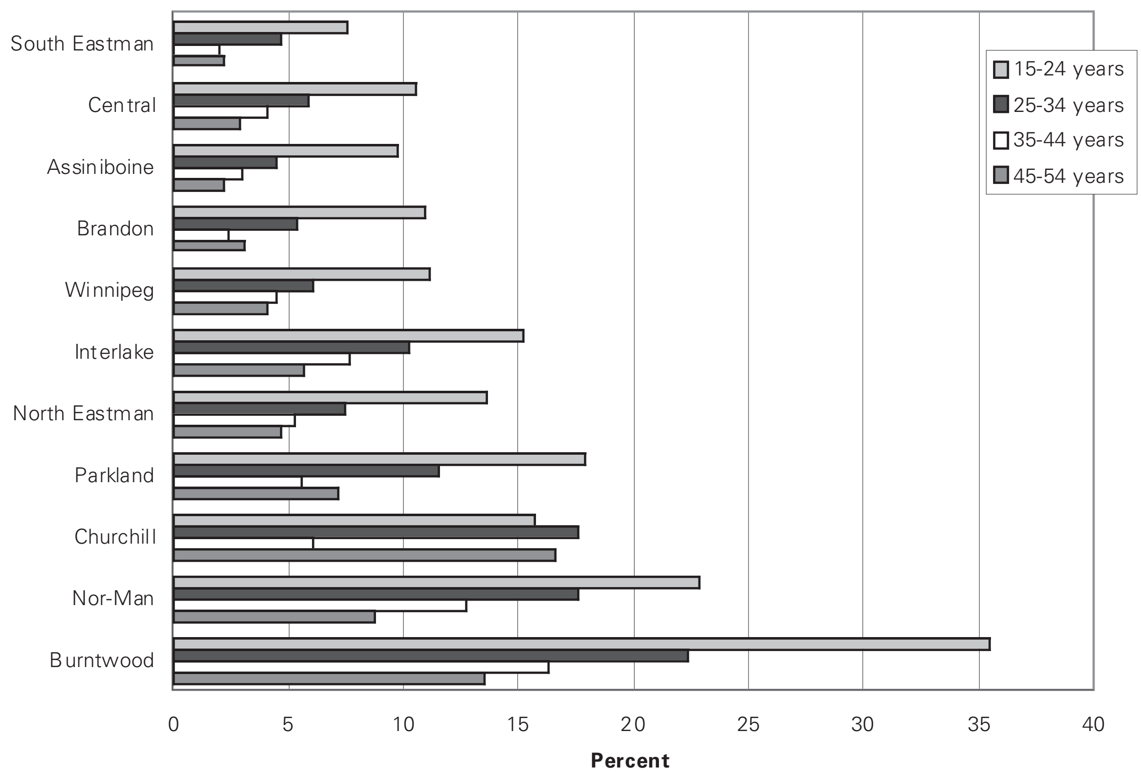
2.1 Sociodemographic Factors

Besides age and sex differences in the child populations within the geographic regions of Manitoba, there are sociodemographic differences across regions that can have an impact on child health and developmental outcomes. The figures in this chapter show unemployment and high school graduation rates for four adult age groupings of the population, as well as the percent of lone–parent households and female–headed lone–parent households. These area–level sociodemographic indicators are taken from the 2001 Census and have all been found to be related to child outcomes. Higher unemployment and lone–parent family rates and lower rates of high school graduation are associated with poorer health and social outcomes for children (Case et al., 2002; Chen et al., 2002; Currie and Lin, 2007; Feinstein, 2003; Jefferis et al., 2002; Lipman et al., 2002; Noble et al., 2005; Roberts and Power, 1996; Spencer, 2005a, 2005b; Thomas, 2006; To et al., 2004). Area–level measures of socioeconomic status from the Canada Census have been found to be highly correlated with individual–level measures (Mustard et al., 1999). Correlations between sociodemographic variables available through the Repository and variables in the CCHS can be found in the Appendix (Chapter 2).

Unemployment rates vary considerably across RHAs and by age group. The youngest age group (15 to 24 years) has the highest unemployment rates, ranging from less than 8% in South Eastman to over 35% in Burntwood. The oldest age group (45 to 54 years) had the lowest unemployment rates, ranging from 2.1% in both South Eastman and Assiniboine to 13.5% in Burntwood.

Figure 2.3: Rate of Unemployment by Age Group by RHA

Percent of population aged 15-54 years, Census 2001

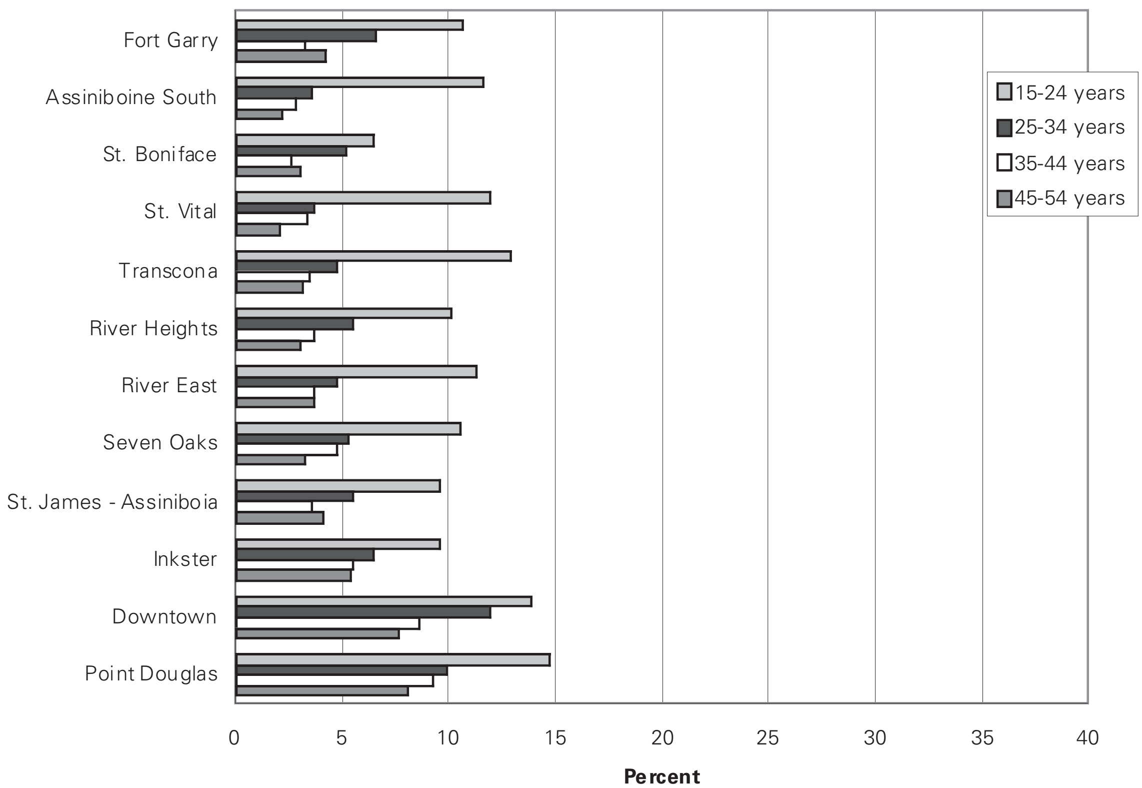


Source: Manitoba Centre for Health Policy, 2008

In the **Winnipeg Community Areas**, unemployment rates for 15– to 24–year–olds ranged from a low of 2.2% in Assiniboine South to a high of 8.1% in Point Douglas; the range for 45– to 54–year–olds was 6.5% for St. Boniface to 14.7% for Point Douglas.

Figure 2.4: Rate of Unemployment by Age Group by Winnipeg Community Area

Percent of population aged 15-54 years, Census 2001

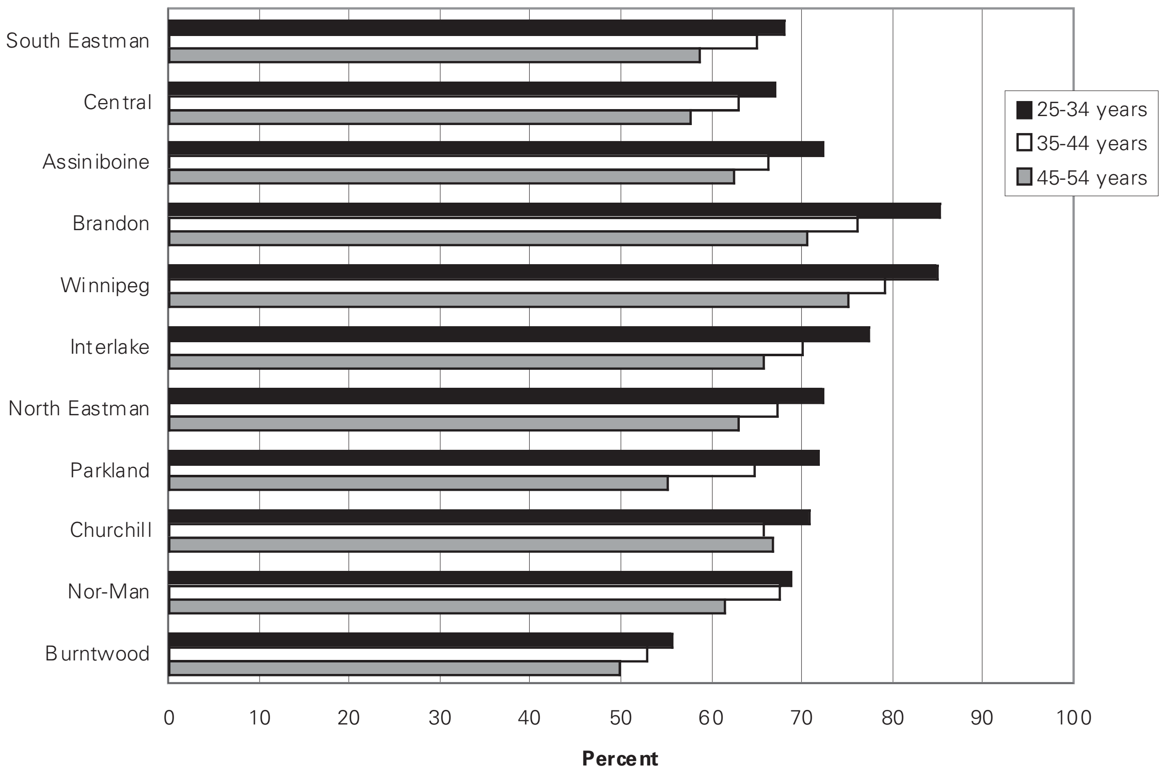


Source: Manitoba Centre for Health Policy, 2008

Rates of high school diplomas also varied considerably by age and by RHA. The percent of the adult population with a high school diploma was highest for the youngest age category (25 to 34 years) and lowest for the oldest age group (45 to 54 years). The highest rates of adults who have completed high school, according to the 2001 Census, were found in the two urban areas—Winnipeg and Brandon (e.g., 84.9% and 85.1% respectively for 25– to 34–year–olds). The lowest rates were found in Burntwood (e.g., 55.4% for 25– to 34–year–olds).

Figure 2.5: Percent of Population with a High School Diploma by Age Group, by RHA

Population aged 25-54 years, Census 2001

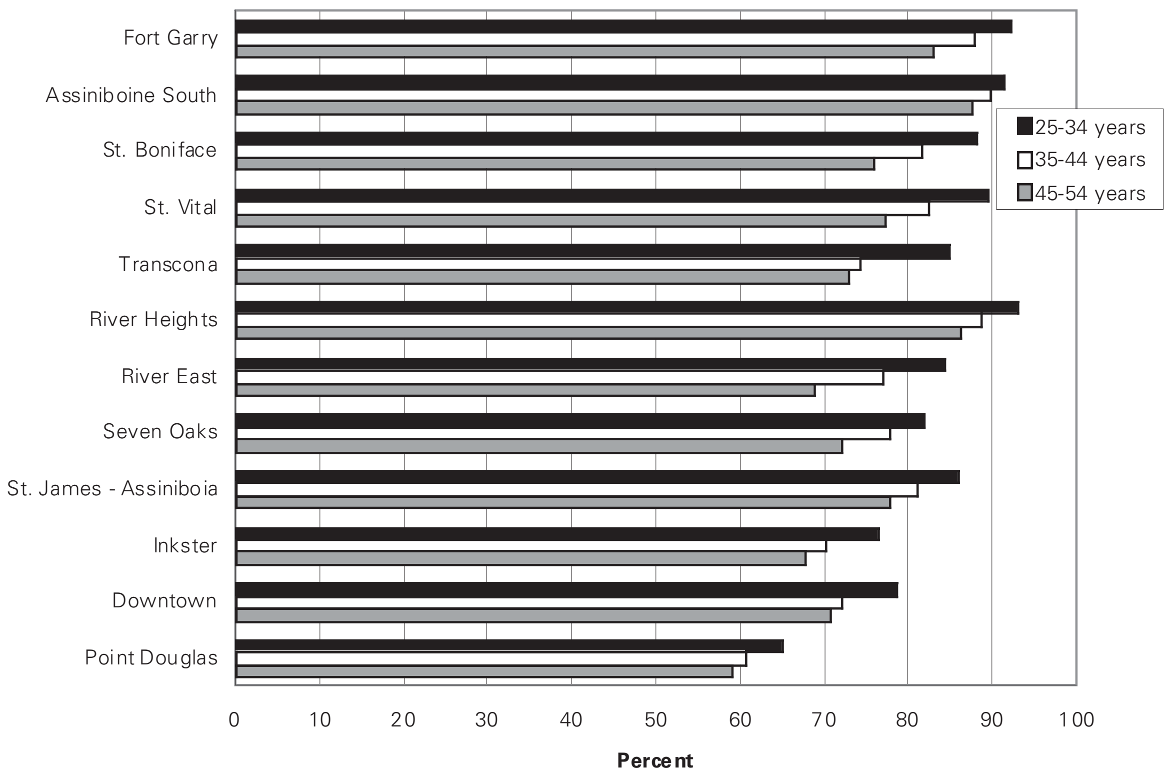


Source: Manitoba Centre for Health Policy, 2008

In the Winnipeg CAs, the percent of adults 25 to 34 years of age with a high school diploma ranged from 64.9% in Point Douglas to 92.9% in River Heights; for adults 45 to 54 years, the range went from 58.9% for Point Douglas to 87.6% for Assiniboine South.

Figure 2.6: Percent of Population with a High School Diploma by Age Group, by Winnipeg Community Area

Population aged 25-54 years, Census 2001

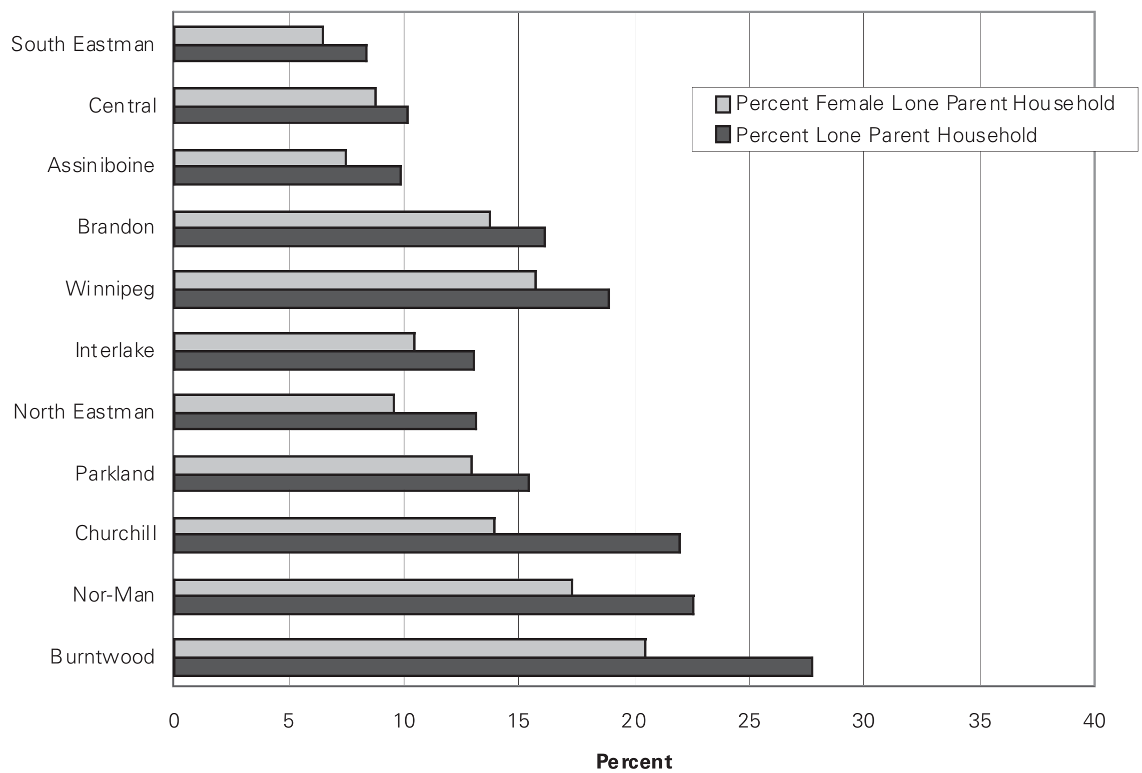


Source: Manitoba Centre for Health Policy, 2008

The percent of families in an area that are headed by a lone parent, as well as those headed by a mother who is a lone parent, also varied considerably across RHAs, with the percent of lone–parent households ranging from a low of 8.3% in South Eastman to a high of 27.7% in Burntwood. It is clear from the graph that the majority of lone–parent families are headed by females.

Figure 2.7: Percent of Lone Parent Households by RHA

Census 2001

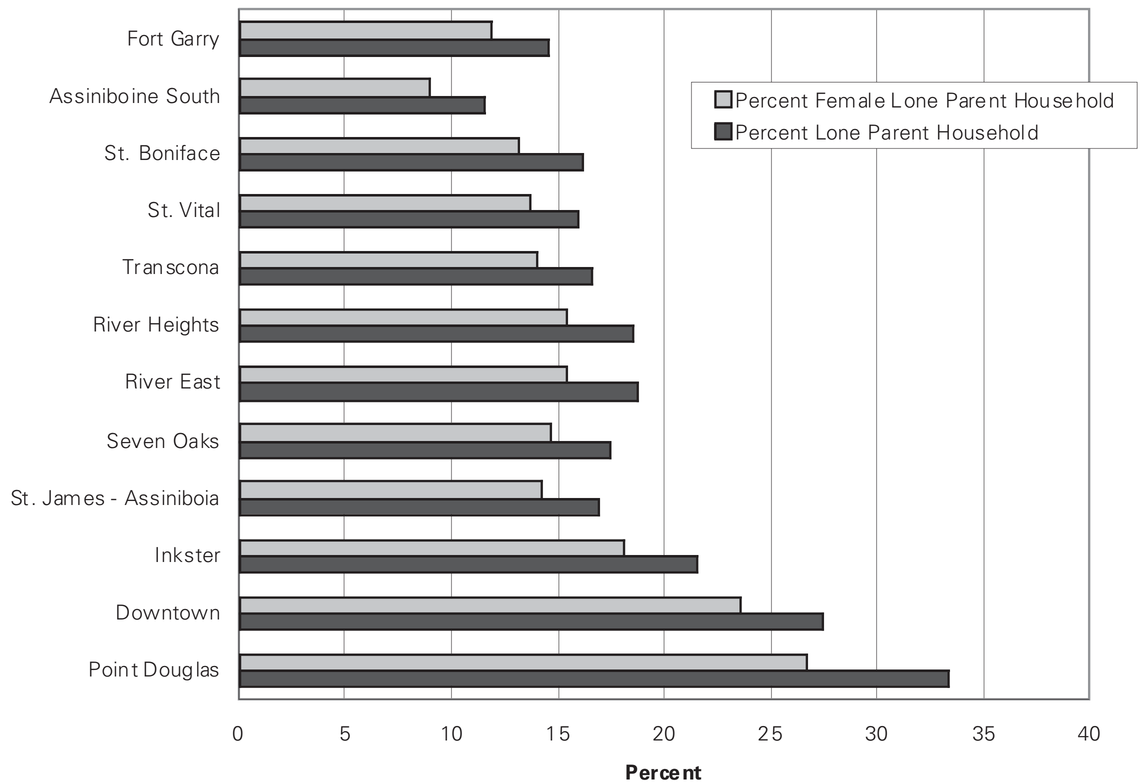


Source: Manitoba Centre for Health Policy, 2008

In the Winnipeg CAs, lone–parent status also varied considerably, ranging from 11.5% for Assiniboine South to 33.3% for Point Douglas.

Figure 2.8: Percent of Lone Parent Households by Winnipeg Community Area

Census 2001



Source: Manitoba Centre for Health Policy, 2008

As shall be demonstrated in subsequent chapters in this report, area–level income is strongly related to several indicators of child health and development. Because these associations between area–level income and child health indicators are displayed using urban and rural income quintiles, the table below shows the mean household incomes and ranges of incomes for each of these quintiles.

Table 2.1: Household Income by Rural/Urban Area, Census 2001

Area	Quintile	Minimum	Maximum	Average
Rural	1	16843	34086	31070
	2	34150	40201	36915
	3	40245	45208	42994
	4	45260	54175	48964
	5	54175	123478	68415
Urban	1	11129	36563	28737
	2	36563	46712	41775
	3	46768	58639	52275
	4	58647	73777	65564
	5	73793	279150	96571

Source: Manitoba Centre for Health Policy, 2008

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Chapter 3: Perinatal Health

3.1 Teen Pregnancy

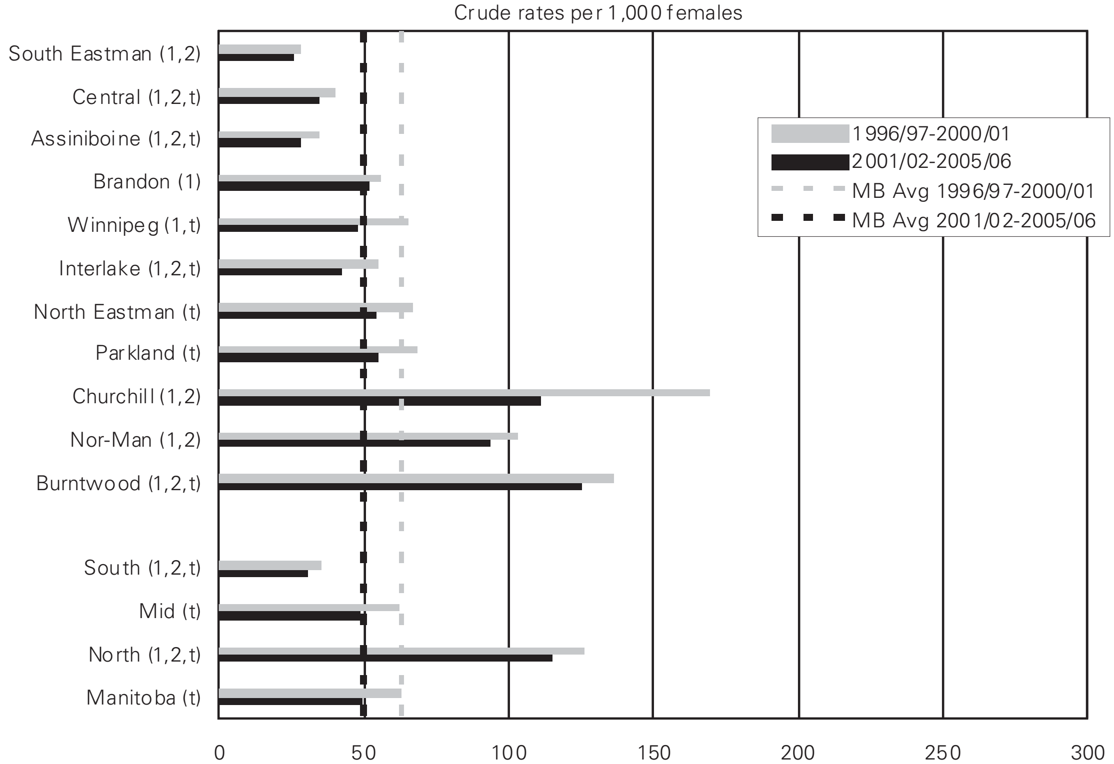
The teen pregnancy rate was calculated using data from hospital records by taking the ratio of all live and still births, abortions[9] and ectopic pregnancies for females aged 15 to 19 years to the total female population of the same age. No adjustment for age or sex was necessary, so only crude rates are provided. Teen pregnancy rates were also calculated for 12– to 19–year–old females, however the rate of teen pregnancy for females under 15 was very low; the patterns were similar to the 15– to 19–year–old female rates and so only the latter are reported here. Crude rates for 15– to 17– and 18– to 19–year–old females can be found in the Appendix (section 3.1).

The teen pregnancy rate dropped significantly in Manitoba over the two time periods: in 1996/97–2000/01, the rate was 62.7/1,000 and in 2001/02–2005/06, it dropped to 49.8/1,000 (Figure 3.1). The Manitoba rate of teen pregnancy is higher than the Canadian rate, which was 45.6/1,000 in 1996 and dropped to 36.1/1,000 in 2001 (adapted from the Statistics Canada CANSIM database 106–9002, http://cansim2.statcan.ca, May 31, 2007). In most RHAs, teen pregnancy rates decreased significantly over the time period; the exceptions were South Eastman (which had the lowest teen pregnancy rate in both time periods), Brandon, and two of the three northern RHAs (Churchill and Nor–Man). RHAs with significantly lower rates than the Manitoba average in both time periods included South Eastman (28.2/1,000, 26.1/1,000), Central (40.4/1,000, 34.7/1,000), Assiniboine (34.3/1,000, 27.9/1,000) and Interlake (54.9/1,000, 42.8/1,000); whereas RHAs with significantly higher rates included Churchill (169.7/1,000, 111.1/1,000), Nor–Man (103.2/1,000, 93.7/1,000) and Burntwood (136.4/1,000, 125.0/1,000). For further information on trends in teen pregnancy rates as well as a discussion of programs and policies that contribute to declining rates, see Martens et al., 2008.

[9] Therapeutic abortions performed in hospital were captured here. However, therapeutic abortions performed at private clinics were not captured in the Repository data during the study period. For teens with greater access to private clinics (e.g., teens living in Winnipeg or perhaps higher income teens since private clinics charge a fee), the teen pregnancy rate may be underestimated in this report.

Figure 3.1: Teen Pregnancy Rate of Women Aged 15-19 by RHA

Crude rates per 1,000 females



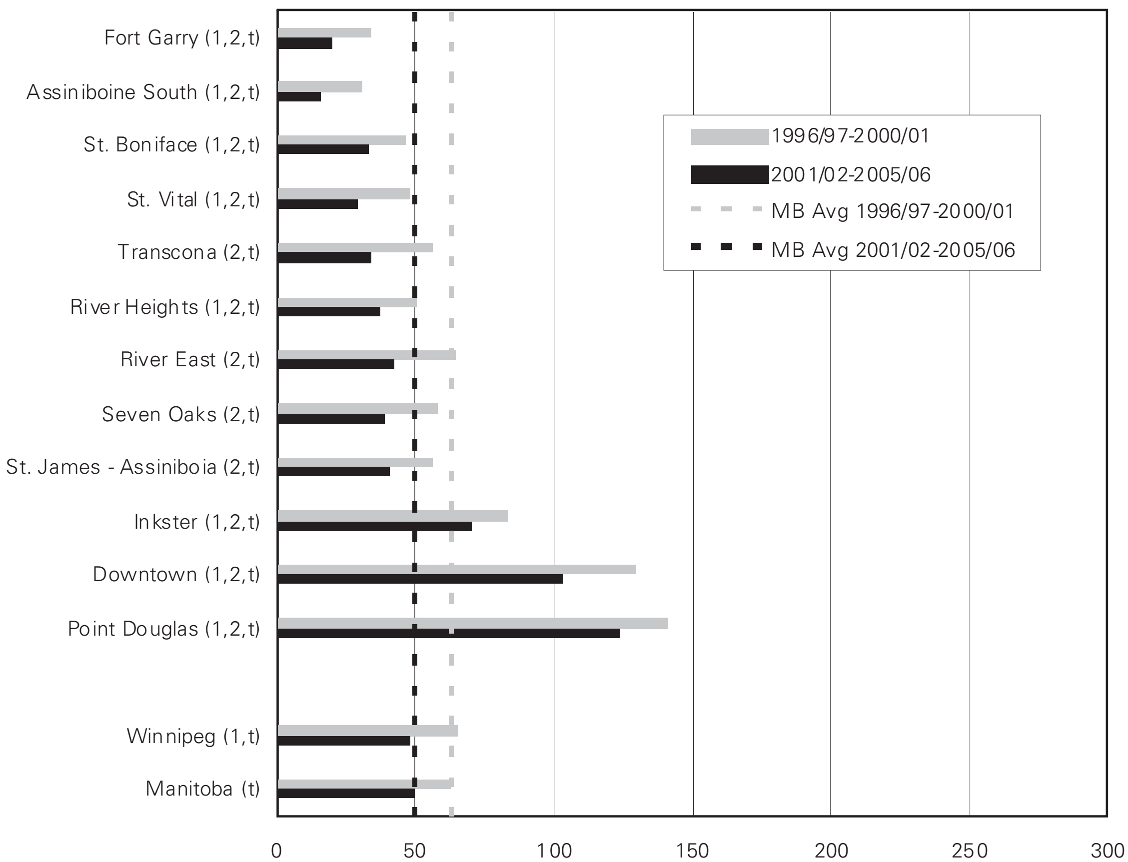
'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

In the Winnipeg Community Areas, Inkster (83.3/1,000, 69.8/1,000), Downtown (129.9/1,000, 103.3/1,000) and Point Douglas (141.5/1,000, 124.1/1,000) had rates that were significantly higher in both time periods than the average for Manitoba. Teen pregnancy rates decreased significantly in all Winnipeg CAs over the two time periods.

Figure 3.2: Teen Pregnancy Rate of Women Aged 15-19 by Winnipeg Community Area

Crude rates per 1,000 females



'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

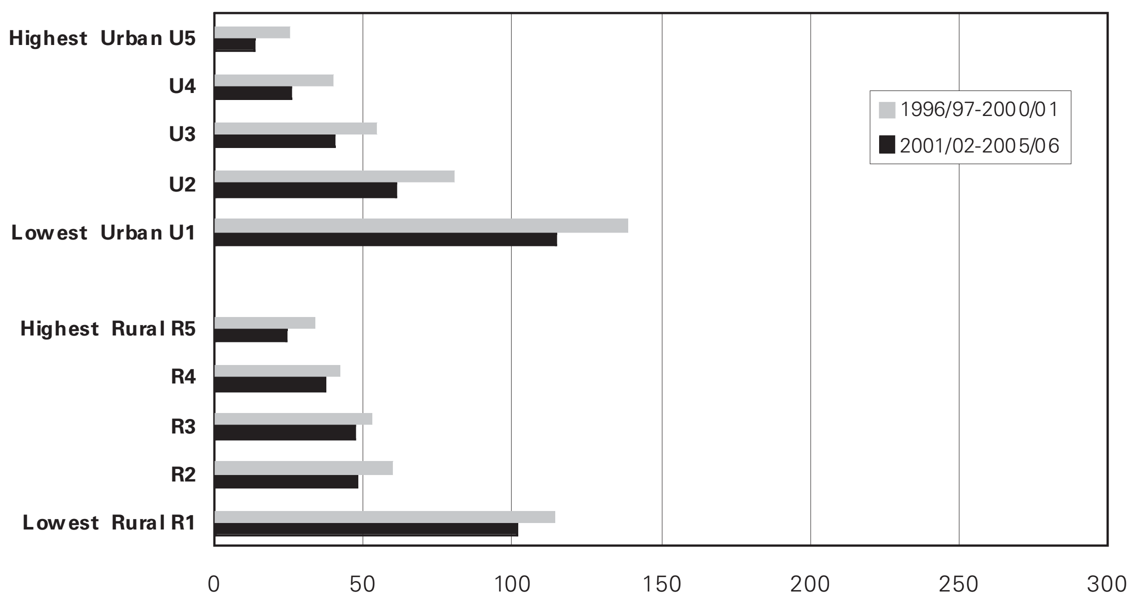
There was a significant relationship between teen pregnancy rates and area–level income in both urban and rural regions of Manitoba in both time periods[10] (Figure 3.3). Steep income quintile gradients indicated that, with each successive decrease in area–level income, there was an increase in teen pregnancy rates. There was a significant time change in the urban income quintile neighbourhoods indicating that the gradient changed significantly over time. This change is difficult to interpret. When we look at absolute changes in rates, it would appear that the gap in teen pregnancy rates between the highest and lowest income areas has narrowed: in the first time period,

[10] For the analysis by area–level income, we have produced age–adjusted rates, rather than crude rates, in order to conduct the trend analysis.

the gap between the lowest and highest income areas was 113.3 (138.9–25.6) whereas this gap dropped to 101.3 (114.5–13.2) in the second time period. When we look at the relative decreases, however, the gap appears to be widening: in the first time period the ratio of teen pregnancy rates between the lowest and highest urban income areas was 5.4 to 1 (138.9/25.6), whereas the ratio increased to 8.7 to 1 (114.5/13.2) in the second time period. In other words in 2001/02–2005/06, for every teen pregnancy in the highest income area, there were almost nine teen pregnancies in the lowest income areas, an increase from over five pregnancies in time 1. Looked at another way, the teen pregnancy rate in the lowest urban income areas decreased by 17.6% between time 1 and time 2 (1–[114.5/138.9]), but the rate decreased by 48.4% (1–[13.2/25.6]) in the highest urban income areas during the same time period. These seemingly contradictory interpretations are largely due to the fact that the rates were so low in the high urban income quintile to begin with. Relying on only the relative difference between the highest and lowest urban income quintiles would overlook the striking drop in teen pregnancies in the lowest urban income quintile.

Figure 3.3: Teen Pregnancy Rate of Women Aged 15-19 by Income Quintile

Age-adjusted rates per 1,000 females



Linear Trend Test Results
Time 1: Rural: Significant (p<.001) Urban: Significant (p<.001)
Time 2: Rural: Significant (p<.001) Urban: Significant (p<.001)
Urban time change: Significant (p<.001)

Source: Manitoba Centre for Health Policy, 2008

References

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Statistics Canada. *CANSIM database 106–9002.* Available from URL: http://cansim2.statcan.ca. Accessed on: May 31, 2007.

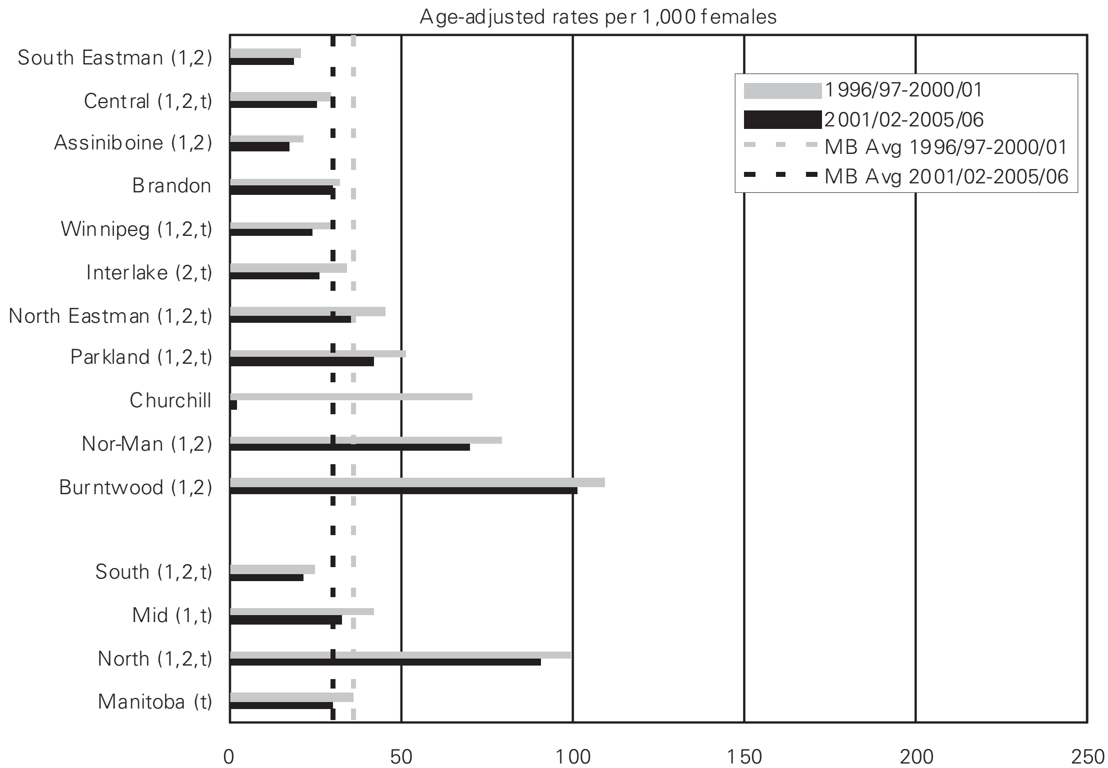
3.2 Teen Birth

The teen birth rate was calculated using hospital data by taking the ratio of live births to females aged 15 to 19 years to the total female population of the same age. As with teen pregnancy, teen birth rates were also calculated for 12– to 19–year–old females. Since the rates for females under 15 years were very low and the pattern of results similar to that found for the 15– to 19–year–olds, only the rates for 15– to 19–year–olds are reported here. Rates broken down into 15– to 17–year–old and 18– to 19–year–old females can be found in the Appendix (section 3.2).

There is a large body of research that demonstrates that teen mothers have reduced educational (Bradley et al., 2002; Chase–Lansdale and Brooks–Gunn, 1994; Nanchahal et al., 2005) and employment (Attico and Hartner, 1993; Chase–Landsdale and Brooks–Gunn, 1994; Hardy et al., 1997; Luster and Mittelstaedt, 1993) opportunities. These outcomes have an influence on the children of teen mothers, who have been found to be at greater risk of poor health (Wolf and Perozek, 1997) and educational outcomes (Moffitt, 2002; Moore et al., 1997) compared to children of mothers who delayed childbirth. For these reasons, a reduction in teen birth rates is seen as a positive outcome.

The teen birth rate in Manitoba is substantially higher than the national average: in 1996/97–2000/01, the Manitoba rate of births to teen females 15 to 19 years of age was 36.2 per 1,000 (see Figure 3.4) whereas the Canadian rate in 1998 was 19.8 (adapted from the Statistics Canada CANSIM database 106–9002, http://cansim2.statcan.ca, May 31 2007). And a report by the Children in North America Project (2007) found that the Canadian teen birth rate was 13.6 in 2004, less than half of the Manitoba rate of 30.1 per 1,000 in 2001/02–2005/06. Thus, although Figure 3.4 shows a significant decrease over the two time periods in teen birth rates in the province (36.2/1,000 to 30.1/1,000), the gap in rates between Manitoba and the rest of the country appears to be growing, indicating that Manitoba's teen birth rate is not decreasing as rapidly as the rates in other provinces. In five of the 11 RHAs, teen birth rates decreased significantly over the study period: Central (29.4/1,000 to 25.2/1,000), Winnipeg (30.0/1,000 to 24.0/1,000), Interlake (34.4/1,000 to 26.0/1,000), North Eastman (45.7/1,000 to 36.0/1,000) and Parkland (51.3/1,000 to 41.9/1,000). As well, although none of the three northern RHAs showed significant decreases over time in teen birth rates, together the rates in the North decreased significantly (99.1/1,000 to 90.5/1,000). The rates in South Eastman (20.7/1,000, 19.0/1,000), Central, Assiniboine (21.1/1,000, 17.7/1,000) and Winnipeg were all significantly lower compared to the provincial average in both time periods, whereas rate of teen births were significantly higher in both time periods in North Eastman, Parkland, Nor–Man (79.3/1,000, 70.0/1,000) and Burntwood (109.3/1,000, 101.1/1,000).

Figure 3.4: Teen Birth Rate of Women Aged 15-19 by RHA



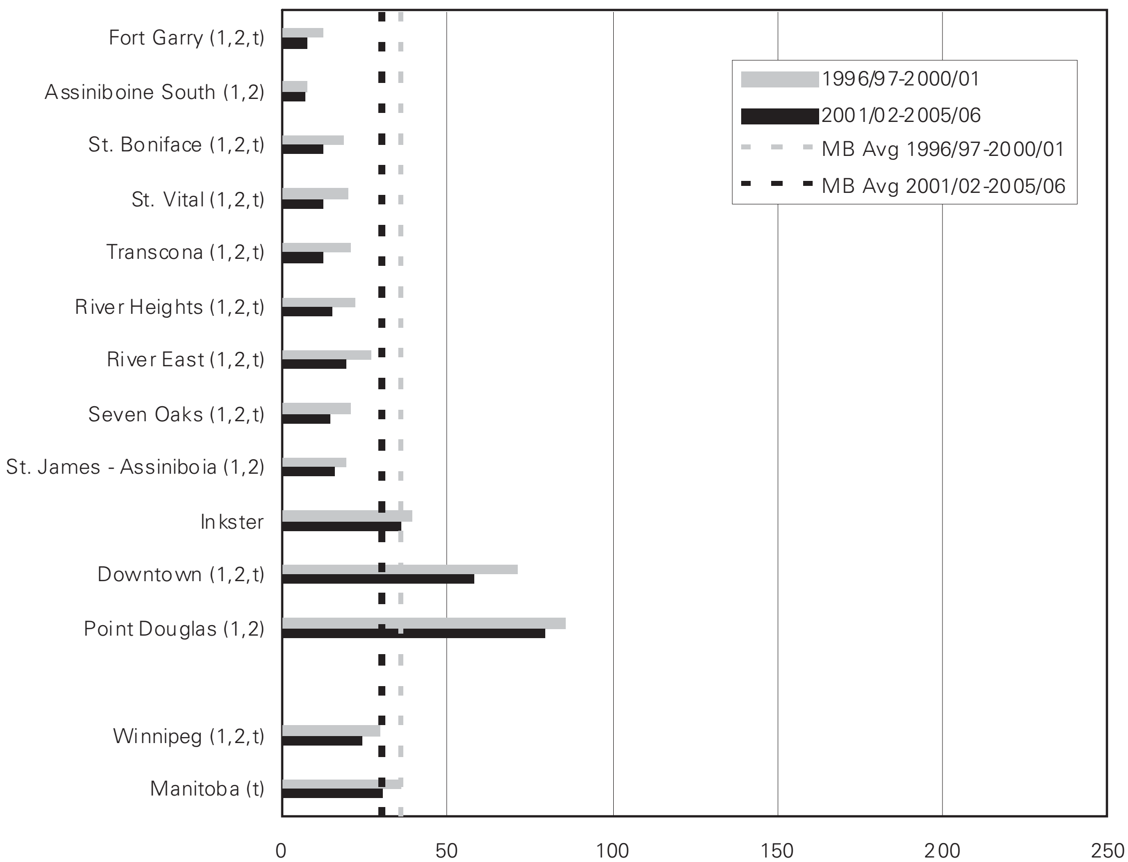
'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

The teen birth rate in Winnipeg was lower than the provincial rate, and the majority of Community Areas in Winnipeg showed a decrease in rates over the two time periods. Most of the Winnipeg CAs had teen birth rates that were significantly lower than the provincial rates in both time periods. The exceptions were Inkster, where rates were similar to the provincial average in both time periods, and both Downtown (71.2/1,000, 58.1/1,000) and Point Douglas (85.5/1,000, 79.8/1,000) where rates were significantly higher than the provincial average in both time periods. It is noteworthy that Point Douglas, the area with the highest teen birth rate in Winnipeg, did not show a significant change in rates over the two time periods.

Figure 3.5: Teen Birth Rate of Women Aged 15-19 by Winnipeg Community Area

Age-adjusted rates per 1,000 females



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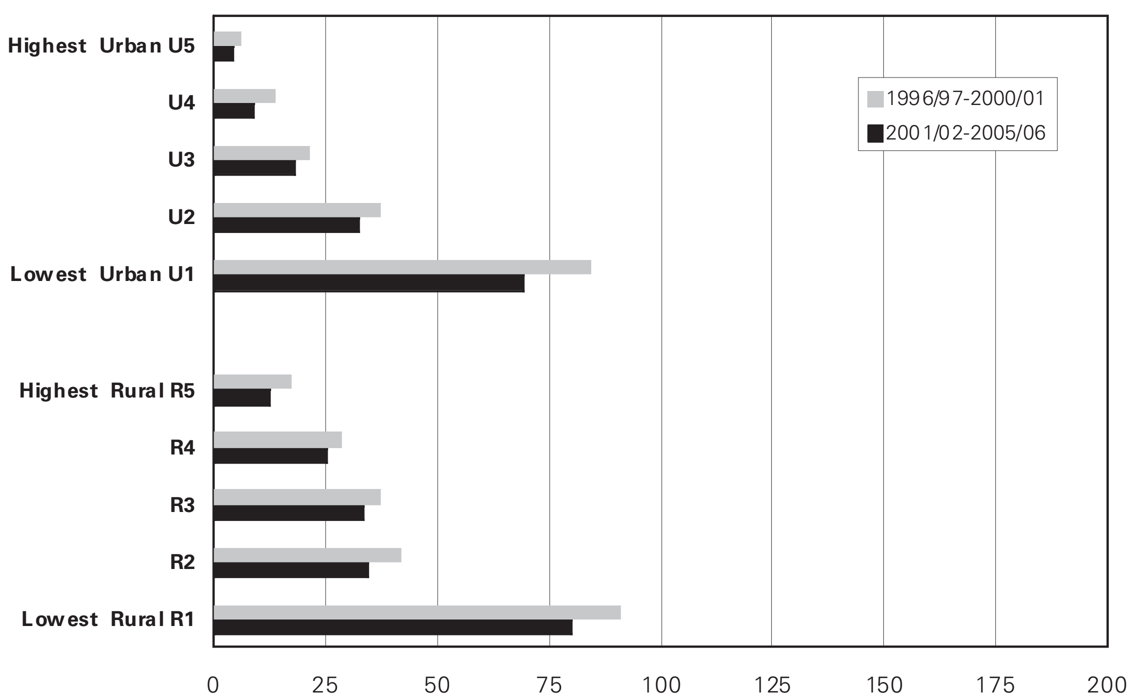
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

Teen birth rates varied significantly across area–level income in both urban and rural regions of Manitoba, in both time periods, with higher rates of teen birth in the areas with lower income. There was also a significant change in the urban income gradient over time. As was the case with teen pregnancy rates, this significant change in gradient is difficult to interpret. In absolute terms, the teen birth rate has decreased more in the lowest urban income area (from 84.5/1,000 in time 1 to 69.0/1,000 in time 2) compared to the highest income areas (from 6.2/1,000 to 4.1/1,000). In relative terms, however, the gap in rates between the lowest and highest income quintiles grew larger over the time period: in the first time period the teen birth rate was 13.6 times higher in the lowest compared to the highest income area whereas in the second time period the rate was 16.8 times higher in the lowest compared to the highest income quintile. As was the case with the teen pregnancy rates, these seemingly contradictory interpretations are largely due to the very low rate of teen births in both time periods in the highest urban income quintile neighbourhoods. Focusing only on the relative difference in teen birth rates between the lowest and highest urban income quintiles would overlook the striking drop in teen births in the lowest urban income areas.

Figure 3.6: Teen Birth Rate of Women Aged 15-19 by Income Quintile

Age-adjusted rate per 1,000 females



Linear Trend Test Results

Time 1: Rural: Significant (p<.001) Urban: Significant (p<.001)

Time 2: Rural: Significant (p<.001) Urban: Significant (p<.001)

Urban time change: Significant (p<.01)

Source: Manitoba Centre for Health Policy, 2008

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3.3 Caesarean Sections

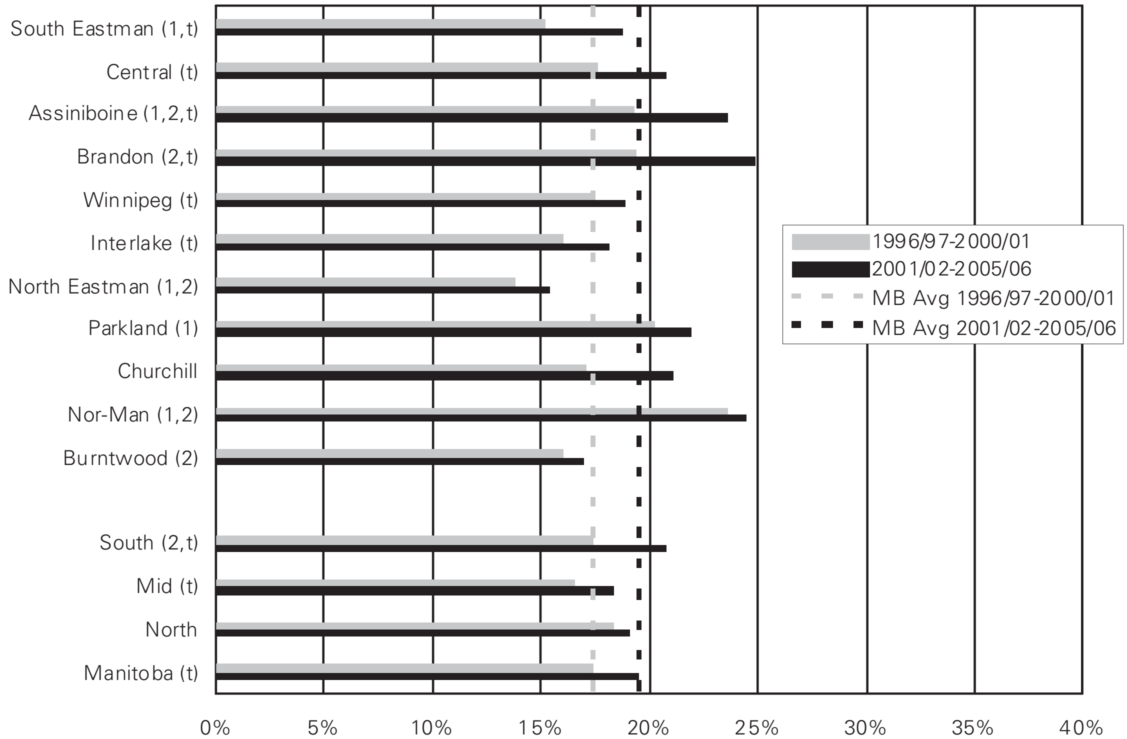
The type of delivery can have an impact on the newborn's health. Babies delivered via Caesarean Section (**C–Section**) are at increased risk of a number of complications including respiratory problems and difficulties breastfeeding (Canadian Institute for Health Information, 2004). C–Sections are also more costly than vaginal births (CIHI, 2006) and increase the risk of complications to the mother (Belizan et al., 2007; Martens et al., 2008). In this section of the report, we look at C–Section rates for women of child–bearing age (in this case 12 to 51 years) by taking the ratio of the number of women giving birth by C–Section to the total number of women giving birth.[11] Data come from the hospital records. The rate of C–Sections has been climbing steadily in Canada for the last several years. The Manitoba C–Section rate has historically been lower than the Canadian rate (Mustard et al., 1995; Martens et al., 2003).

Figure 3.7 indicates that the Manitoba rate of C–Sections increased significantly over the two time periods from 17.4% in 1996/97–2000/01 to 19.5% in 2001/02–2005/06, but was still below the Canadian average of 23.7% in 2002/03 (Canadian Institute for Health Information, 2006). Rates of C–Sections increased significantly over the study period in South Eastman (15.2% to 18.7%), Central (17.6% to 20.8%), Assiniboine (19.3% to 23.6%), Brandon (19.4% to 24.9%), Winnipeg (17.3% to 18.9%) and Interlake (16.0% to 18.2%). The rates in Assiniboine and Nor–Man (23.6%, 24.5%) were significantly higher than the provincial average in both time periods, whereas the rates for North Eastman (13.8%, 15.4%) were significantly lower. In the second time period, C–Section rates for Brandon were significantly higher and rates for Burntwood (16.9%) were significantly lower than the provincial average.

[11] Only Manitoba women giving birth in Manitoba hospitals are included in the rates.

Figure 3.7: Caesarean Section Rates by RHA

Age-adjusted percent of deliveries



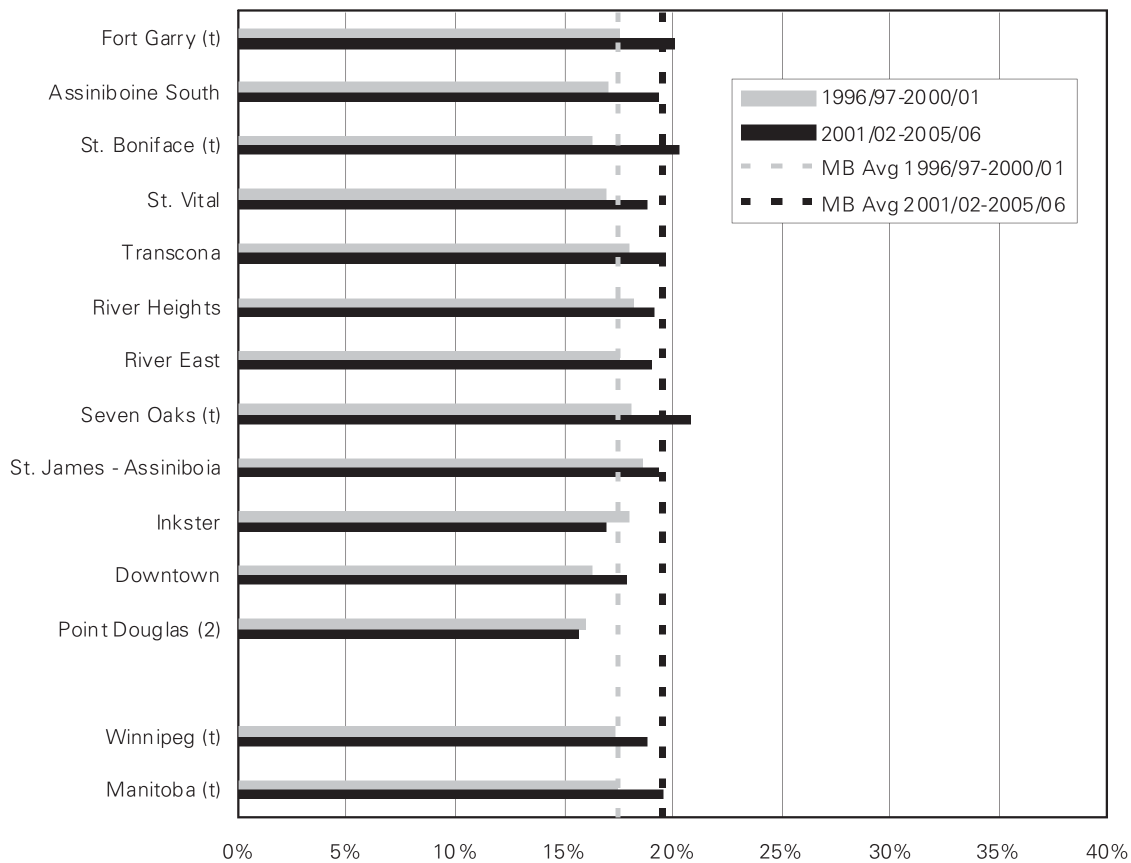
'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

There was little variation in C–Section rates across Winnipeg Community Areas, with the exception of significant increases over the study period in Fort Garry (17.6% to 20.0%), St. Boniface (16.3% to 20.3%) and Seven Oaks (18.1% to 20.8%), and significantly lower rates in Point Douglas (15.7%) in the second time period compared to the Manitoba average.

Figure 3.8: Caesarean Section Rates by Winnipeg Community Area

Age-adjusted percent of deliveries



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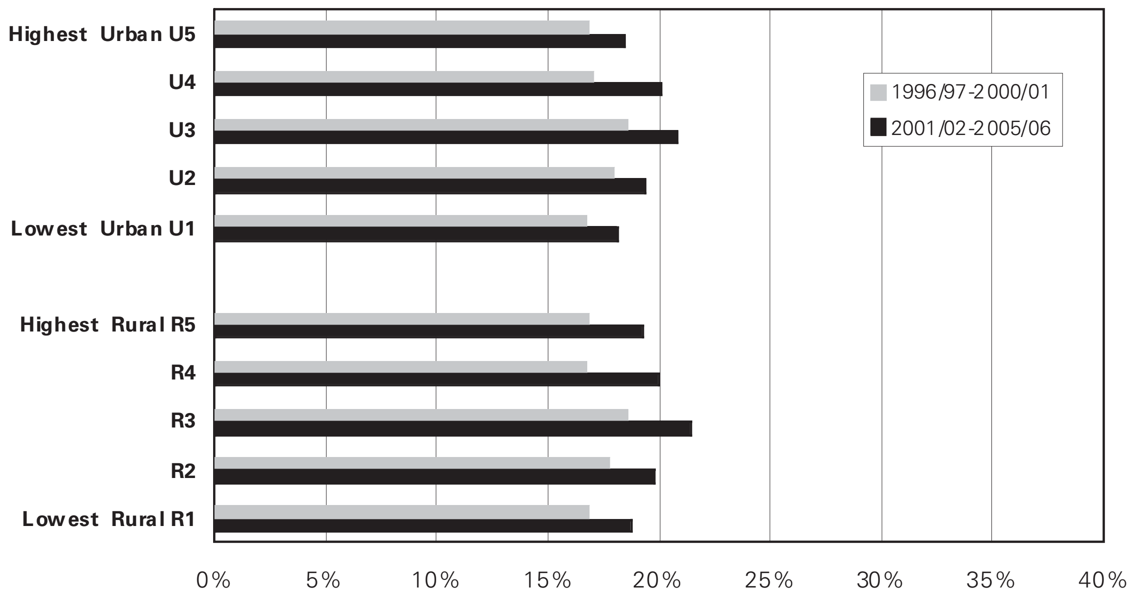
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

There were no significant trends of C–Section rates by area–level income quintiles, and increases over time were observed for all urban and rural income areas.

Figure 3.9: Caesarean Section Rate by Income Quintile

Age-adjusted percent of deliveries



Linear Trend Test Results

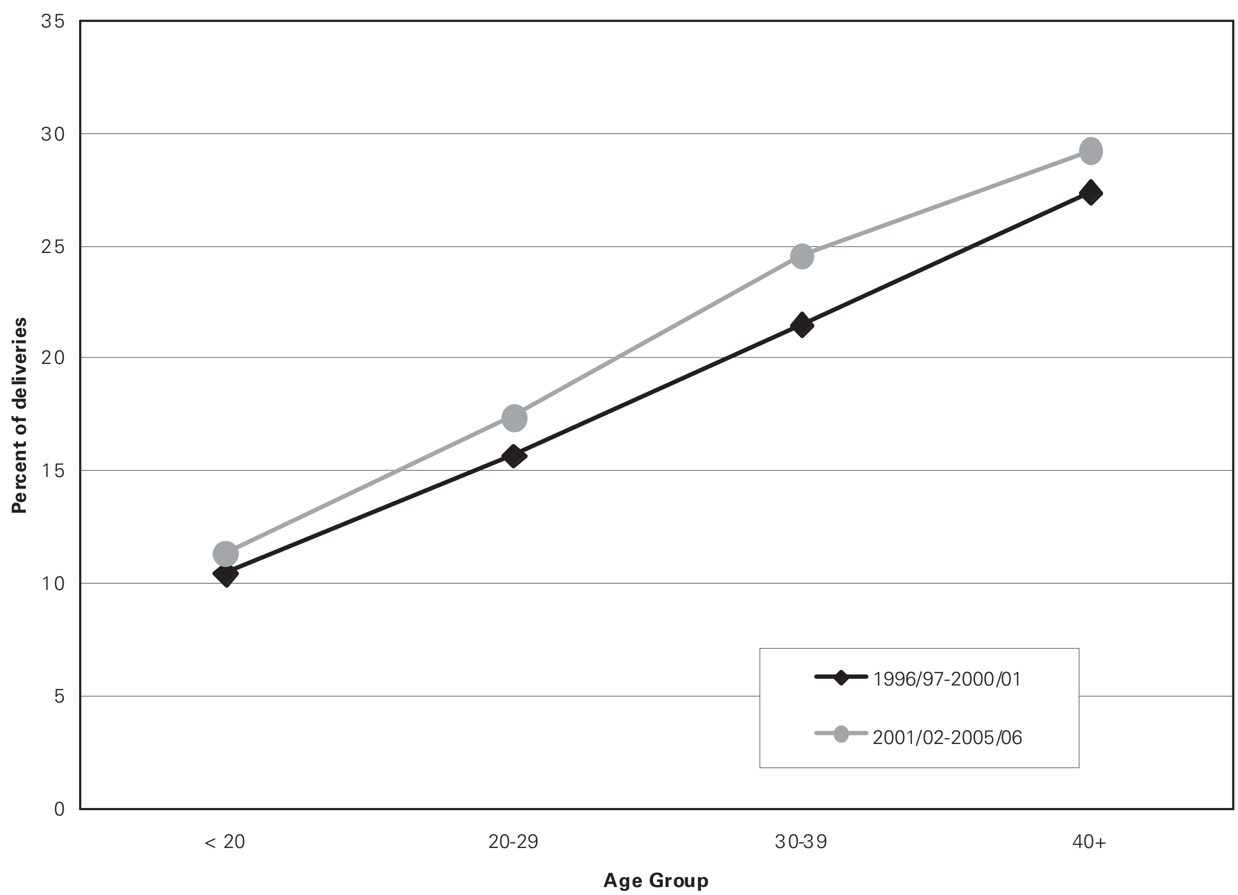
No significant results

Source: Manitoba Centre for Health Policy, 2008

The rate of C–Sections is strongly related to the age of the mother: as the age of the women giving birth increases, so does the C–Section rate. Women giving birth who were 40 years of age or older had over two–and–a–half times the rate of C–Sections compared to the youngest age group of women giving birth, and this pattern was evident in both time periods.

Figure 3.10: Caesarean Section Rates by Age

Crude percent of deliveries



Source: Manitoba Centre for Health Policy, 2008

Further information on C–Section rates in Manitoba, including information on policies and programs within RHAs that may reduce the C–Section rate, can be found in the MCHP report "What Works? A First Look at Evaluating Manitoba's Regional Health Programs and Policies at the Population Level" (Martens et al., 2008).

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3.4 Vaginal Birth After Caesarean Section (VBAC)

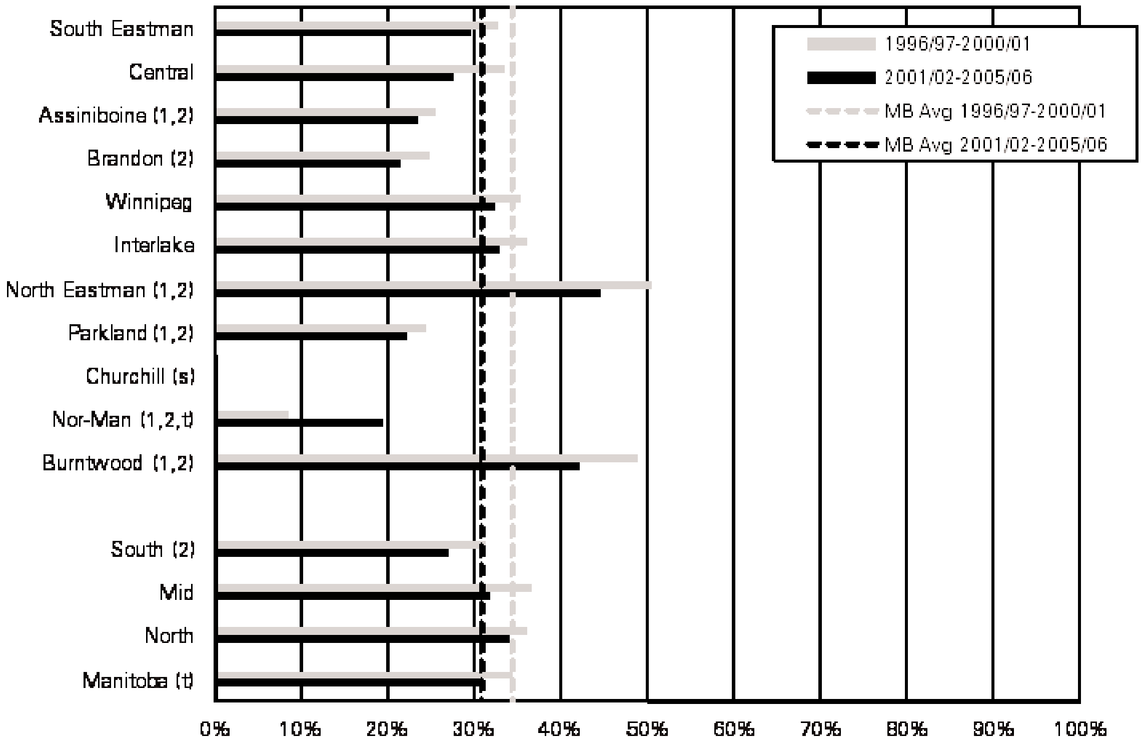
This indicator is limited to women who have previously given birth by C–Section. It is the percent of women giving birth vaginally who had previously had at least one delivery by C–Section; the data come from the hospital records. **VBAC** is an important indicator of the effort to reduce unnecessary C–Sections when there is no indication for a C–Section and evidence that C–Sections may increase complications for the newborns (Canadian Institute for Health Information, 2004). VBACs also tend to carry lower health risks to the mother and require shorter hospital stays than C–Sections (Canadian Institute for Health Information, 2004). As was discussed in the previous section, Manitoba's C–Section rate is lower than the Canadian average, and the VBAC rate is higher in Manitoba than in the rest of the country (Canadian Institute for Health Information, 2004). The Canadian rate of VBAC dropped from 35% in 1997–98 to 27% in 2001–02 (Canadian Institute for Health Information, 2004). The Manitoba rate in 2001/02–2005/06 was 30.8%; however, the VBAC rates in Manitoba decreased significantly between the two time periods, dropping from 34.4% in 1996/97–2000/01 (see Figure 3.11). Not surprisingly, in light of the higher C–Section rate in older mothers, VBAC rates drop with increasing age of the mother (see Appendix, section 3.4).

Most RHAs showed decreases in rates over the study period, none were significant. North Eastman (50.6%, 44.6%) and Burntwood (48.9%, 42.2%) had significantly higher rates of VBAC in both time periods compared to the Manitoba average. Nor–Man's VBAC rate was significantly lower than the provincial average in both periods; however this RHA showed a significant increase in VBAC rates over the study period (8.5% to 19.4%).

This page edited June 21, 2011.

Figure 3.11: Vaginal Birth after Caesarean Section by RHA

Age-adjusted percent for females ages 15+ with a previous C-section



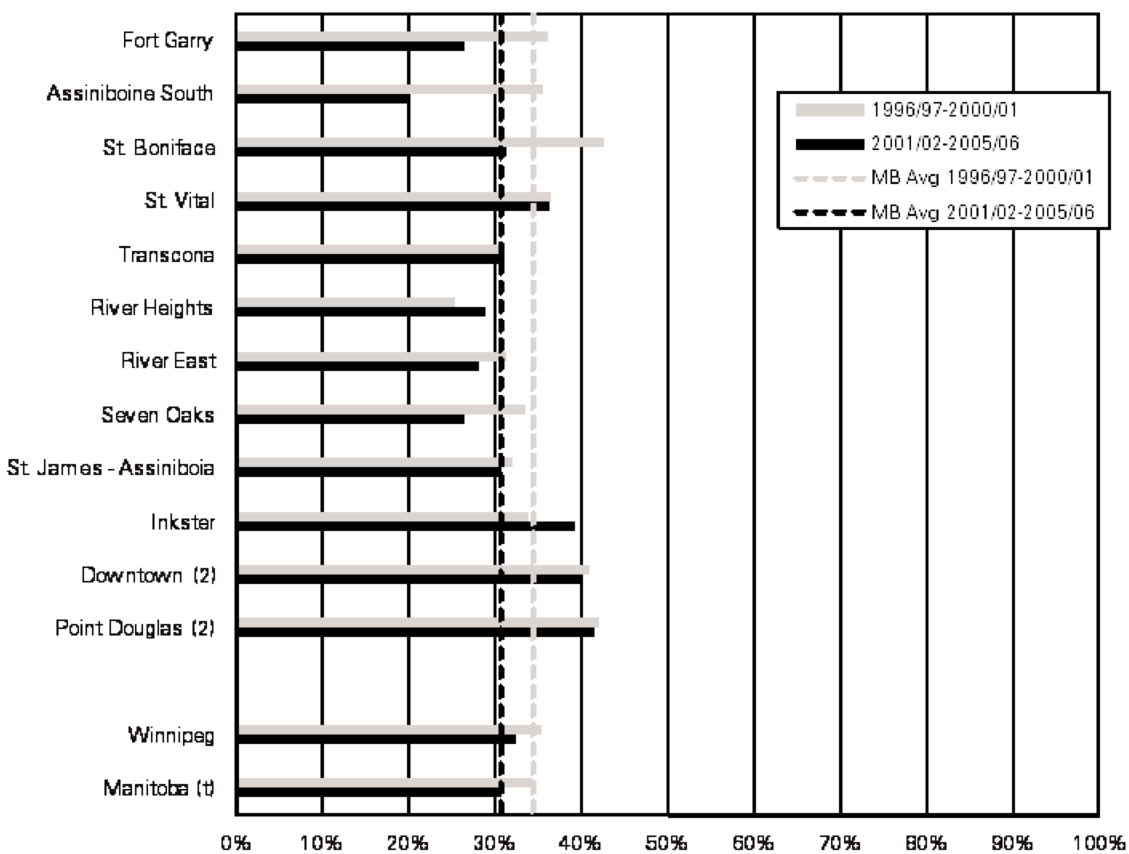
'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

In the Winnipeg Community Areas, VBAC rates remained stable over time in all areas. The only differences across areas evident were higher rates of VBAC in the Downtown (39.9%) and Point Douglas (41.6%) areas in the second time period of the study. It is interesting that, for this indicator, higher rates (which may be an indicator of better care) were found in areas that generally have poorer health status and lower socioeconomic status (e.g., Burntwood, North Eastman, Downtown and Point Douglas). It should be noted that although in these areas women tend to give birth at younger ages, and younger women are more likely to have higher VBAC rates than older women, the graphs in this section have been adjusted for age of mother. The Appendix includes not only graphs for VBAC rates by RHA districts and Winnipeg neighbourhood clusters, but also a graph of VBAC rates by age of mother for each time period.

Figure 3.12: Vaginal Birth after Caesarean Section by Winnipeg Community Area

Age-adjusted percent for females ages 15+ with a previous C-section



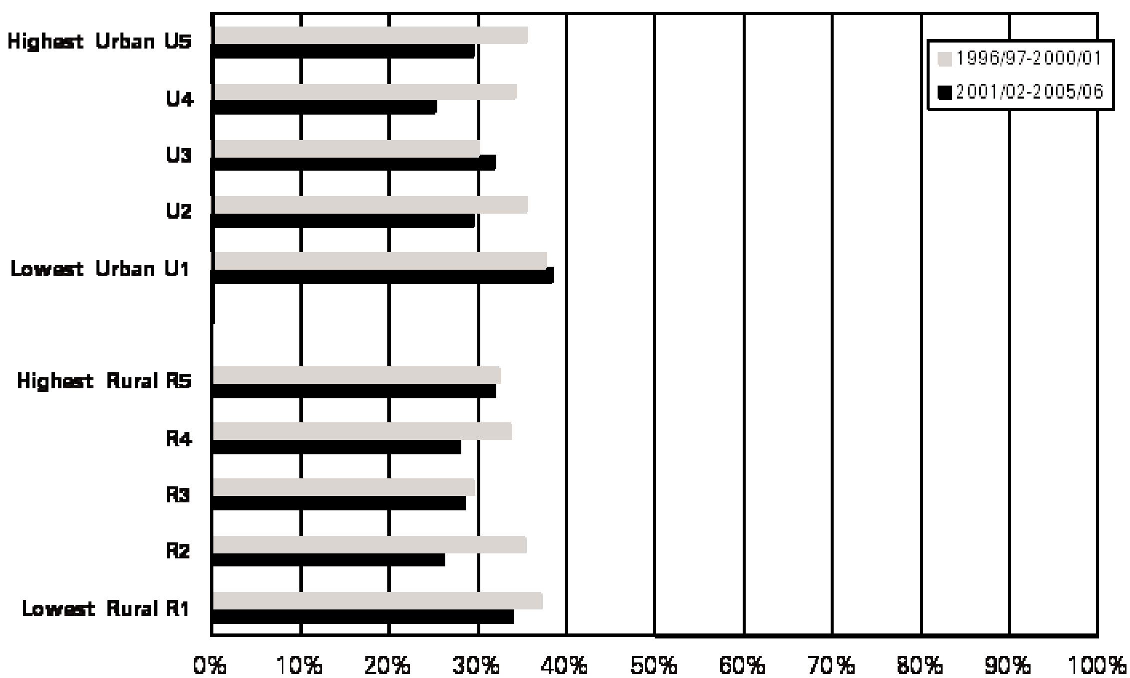
'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

Although the graph of VBAC rates by area–level income appears to show that rates are higher in lower income areas, significant differences across income quintile neighbourhoods were found only for the urban areas during the second time period, with higher rates of VBAC as area level income decreased. For example, the VBAC rate in the highest urban income quintile neighbourhoods was 29.5%, compared to 38.4% in the lowest income neighbourhoods.

Figure 3.13: Vaginal Birth after Caesarean Section by Income Quintile

Age-adjusted percent for females ages 15+ with a previous C-section



Linear Trend Test Results
Time 2 Urban: Significant (p<.001)

Source: Manitoba Centre for Health Policy, 2008

References

Canadian Institute for Health Information. *Giving Birth in Canada: Providers of Maternity and Infant Care*. Available from URL: http://secure.cihi.ca/cihiweb/dispPage.jsp?cw_page=PG_262_Eandcw_topic=262andcw_rel=AR_1106_E. Accessed on: December 20, 2007.

3.5 Preterm Birth and Size for Gestational Age

Preterm birth is a birth which occurs prior to 37 weeks gestation and is the most important determinant of fetal and **infant mortality** (Health Canada, 2000, 2003). Size for gestational age is a measure of fetal growth, where **small–for–gestational–age (SGA)** is considered an indicator of fetal growth restriction and a marker for increased fetal and infant mortality and morbidity risk, and **large–for–gestational–age (LGA)** is considered an indicator of accelerated fetal growth and a marker for increased risk of birth complications and infant morbidity (Health Canada, 2000, 2003). The rates of preterm birth, and small– and large–for–gestational–age are included in this section.[12]

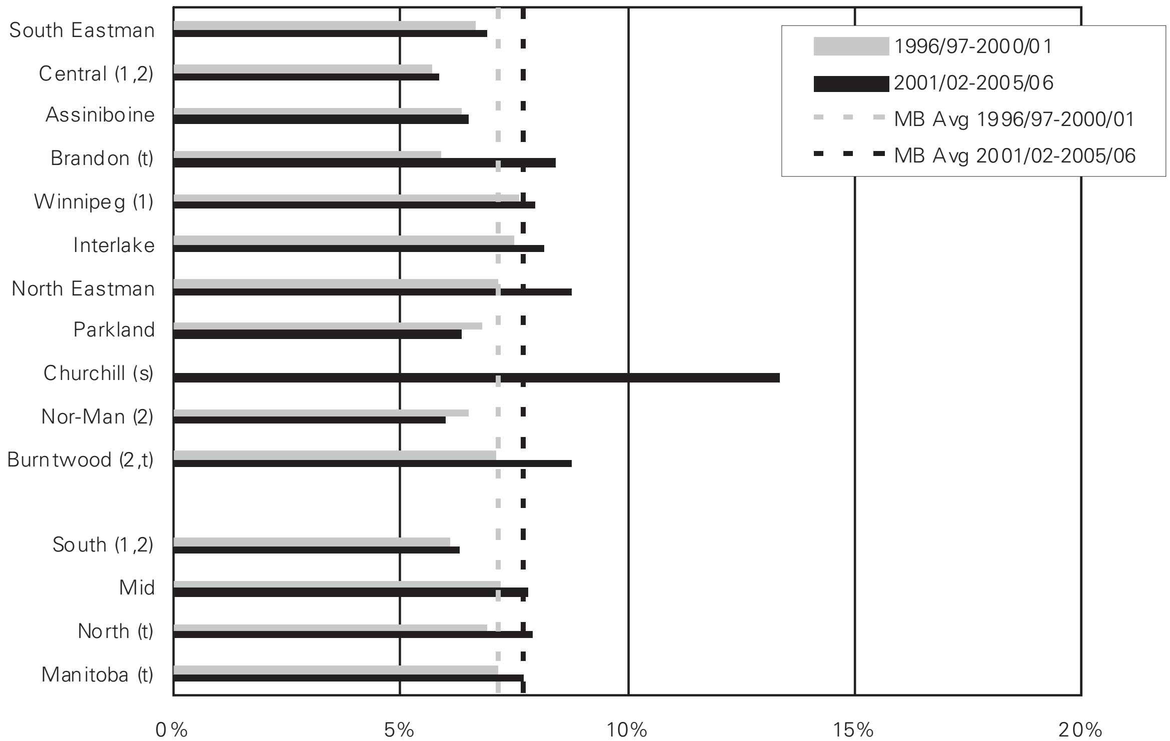
3.5.1 Preterm birth

Preterm birth was defined as any live birth where the gestational age was less than 37 weeks, divided by the total number of live births. Preterm births were examined for two five–year time periods: 1996/97–2000/01 and 2001/02–2005/06. The Manitoba preterm birth rate increased significantly over the study period, changing from 7.2% of births in time 1 to 7.7% of births in time 2 (Figure 3.14). National rates of preterm birth have also increased with rates for Canada increasing from 6.6% in 1991 to 7.6% in 2000 (Health Canada, 2003). In both Brandon (5.9% to 8.4%) and Burntwood (7.1% to 8.8%), the rates of preterm birth increased significantly over the study period. Central (5.7%, 5.9%) had significantly lower rates of preterm birth in both time periods compared to the provincial average. Nor–Man (6.0%) had significantly lower rates of preterm birth in time 2 and Burntwood had significantly higher rates in time 2 compared to the Manitoba average.

[12] Information for these indicators is taken from the hospital birth records. Babies without gestational age on their hospital birth record were excluded from the analyses. Only 1.1% of babies in each of the time periods were missing gestational age information.

Figure 3.14: Preterm Birth Rates by RHA

Sex-adjusted percent of liveborn infants, less than 37 weeks gestation



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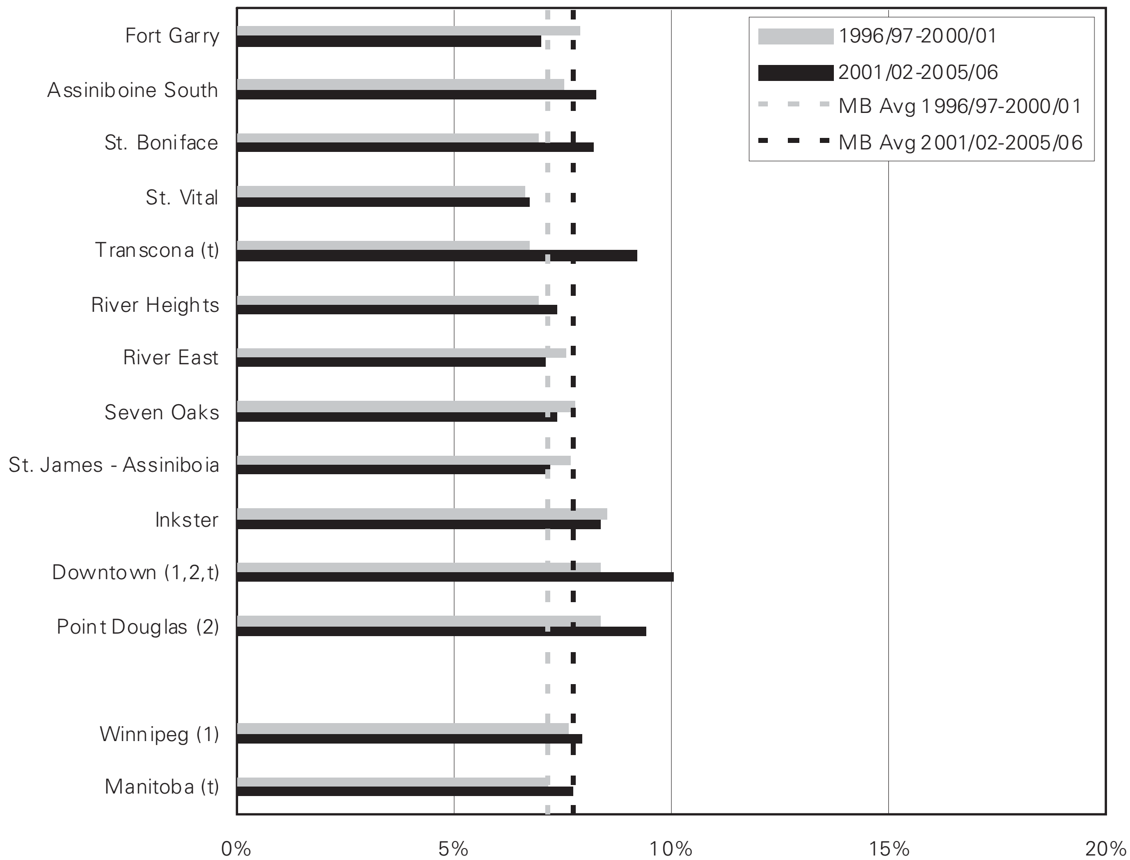
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

Preterm birth rates increased significantly over the study period in the Winnipeg Community Areas of Transcona (6.8% to 9.2%) and Downtown (8.3% to 10.0%). Downtown also had significantly higher rates of preterm birth in both time periods compared to the provincial average, and Point Douglas (9.4%) had significantly higher rates in the second time period.

Figure 3.15: Preterm Birth Rates by Winnipeg Community Area

Sex-adjusted percent of liveborn infants, less than 37 weeks gestation



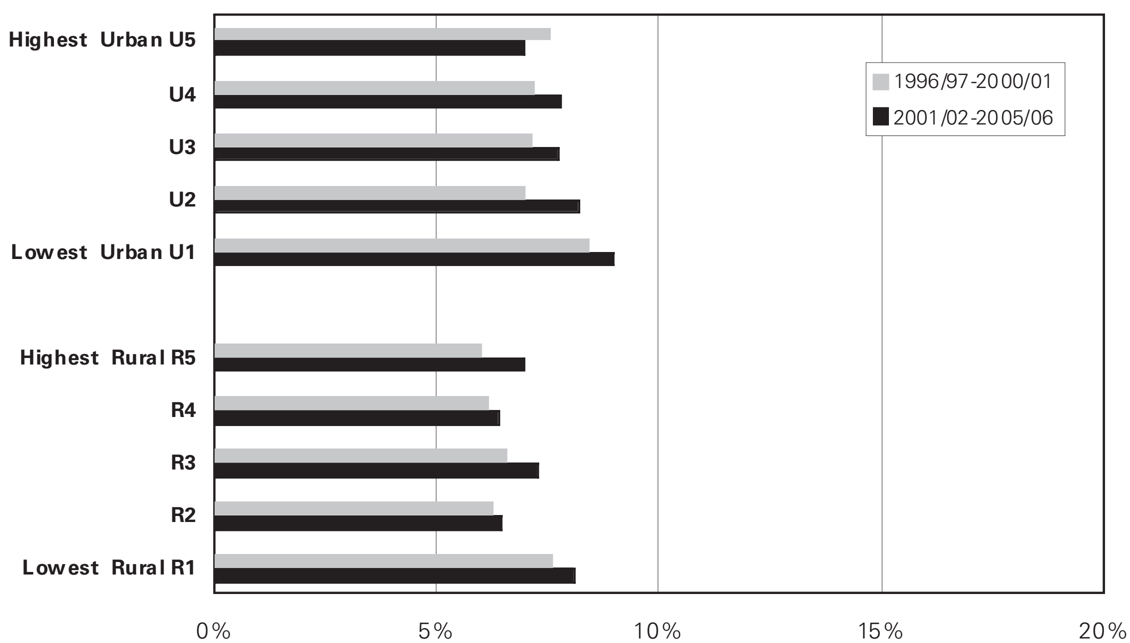
'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

In rural areas, the relationship between area–level income and preterm birth rates was significant in the first time period with rates increasing as area–level income decreased. For example, in time 1, the rate of preterm birth was 6.0% in the highest rural income quintile areas compared to 7.6% in the lowest income quintile areas. This relationship was not present in the second time period. In urban areas, the relationship between area–level income and preterm birth rates was not significant in the first time period, but was significant in the second time period with higher rates associated with lower income areas. For instance, the preterm birth rate was 7.0% in the highest urban income quintile neighbourhoods compared to 8.9% in the lowest.

Figure 3.16: Preterm Birth Rates by Income Quintile

Sex-adjusted percent of liveborn infants, less than 37 weeks gestation



Linear Trend Test Results
Time 1: Rural: Significant (p<.01)
Time 2: Urban: Significant (p<.001)

Source: Manitoba Centre for Health Policy, 2008

3.5.2 Size for gestational age

Size for gestational age can be divided into nine different categories based on gestational age (preterm, term and postterm) and birth weight (small, appropriate and large). The indicators most commonly reported are small–for–gestational–age (SGA) and large–for–gestational–age (LGA). Size for gestational age categories were defined as in Kramer et al. (2001). Rates for SGA were calculated by taking all live–born small for preterm, small for term and small for postterm births and dividing by the total number of live–born deliveries. Rates for LGA used large for preterm, large for term and large for postterm births in the numerator and total liveborn deliveries in the denominator.[13] Rates were produced for two five–year time periods: 1996/97–2000/01 and 2001/02–2005/06. A table of

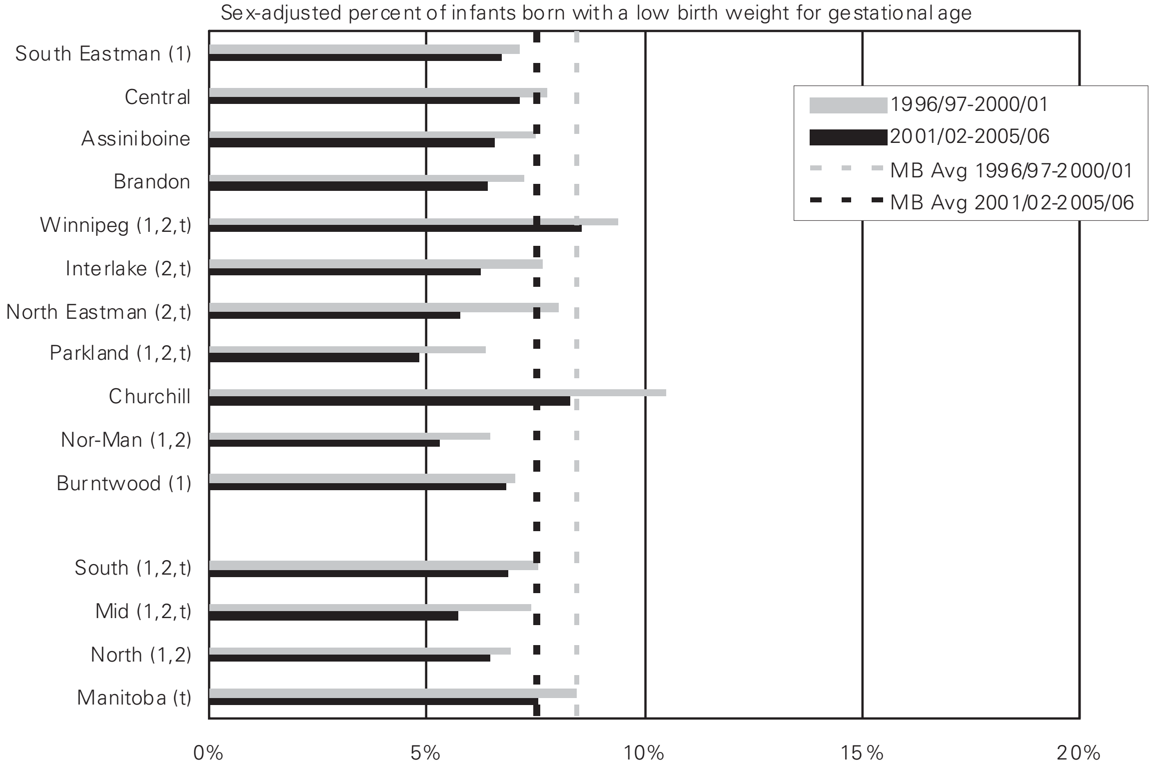
[13] To provide an indication of the size of these babies, the average birth weight for Manitoba newborns in 2001/02–2005/06 was 3466.1 grams (7.6 pounds), the average birth weight for Manitoba newborns categorized as SGA was 2617.4 grams (5.8 pounds) and the average birth weight for those categorized as LGA was 4235.8 grams (9.3 pounds).

crude rates for each of the nine categories of size for gestational age by region can be found in the Appendix (section 3.5).

The average newborn birth weight remained stable over the study period.[14] Rates of SGA decreased significantly in Manitoba over the study period from 8.4% in 1996/97–2000/01 to 7.5% in 2001/02–2005/06. National rates also decreased between 1991 and 2000 from 10.7% to 7.9% (Health Canada, 2003). Significant decreases over the study period were also found for Winnipeg (9.4% to 8.6%), Interlake (7.6% to 6.2%), North Eastman (8.0% to 5.8%) and Parkland (6.4% to 4.8%). Although none of the southern RHAs showed a significant decrease in this indicator, collectively rates of SGA for RHAs in the South decreased significantly (7.6% to 6.9%). Winnipeg had significantly higher rates of SGA in both time periods compared to the provincial average, whereas Parkland and Nor–Man (6.5%, 5.3%) had significantly lower rates. Significantly lower rates than the provincial average were also found in time 2 for Interlake and North Eastman.

Figure 3.17: Small-for-Gestational Age Rates by RHA

Sex-adjusted percent of infants born with a low birth weight for gestational age



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'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

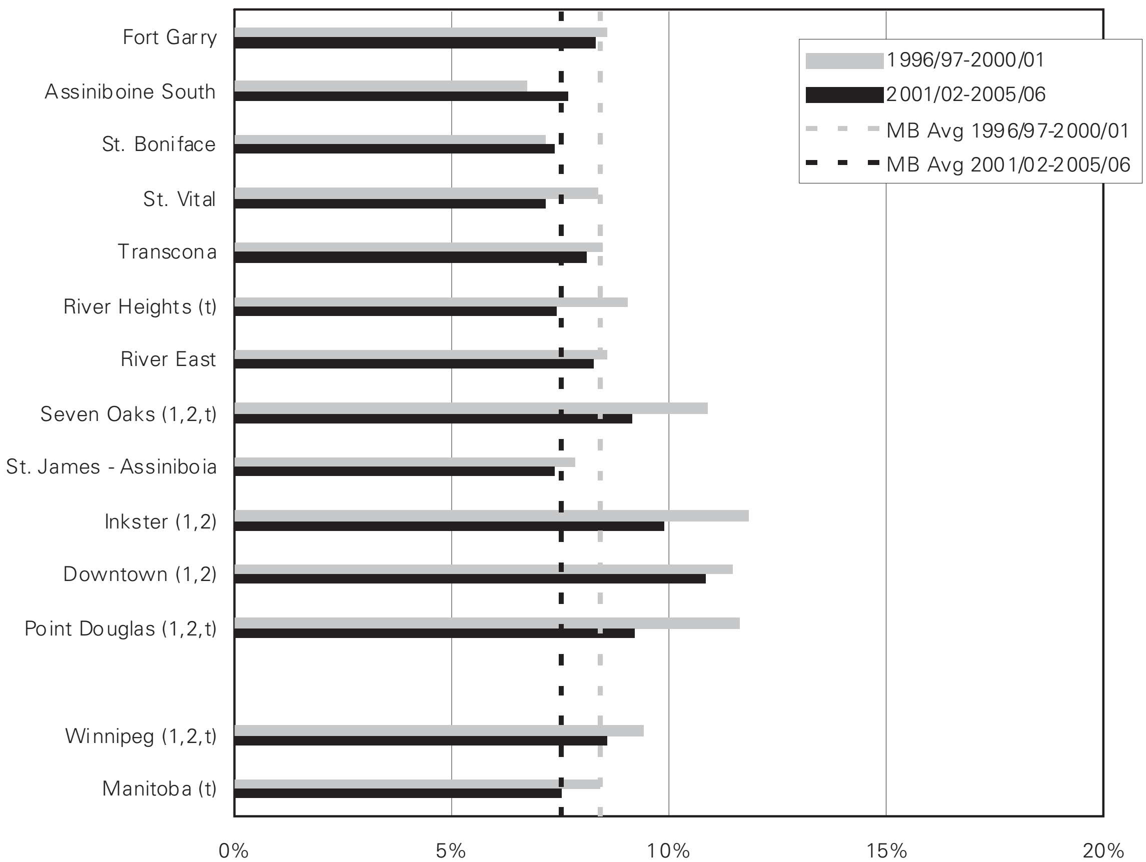
Source: Manitoba Centre for Health Policy, 2008

[14] In 1996/97–2000/01 the average newborn birth weight in Manitoba was 3453.1 grams (7.6 pounds) and in 2001/02–2005/06 the average newborn birth weight was 3466.1 grams (7.6 pounds).

In the Winnipeg Community Areas, significant decreases in SGA over the study period were found in River Heights (9.1% to 7.4%), Seven Oaks (10.9% to 9.1%) and Point Douglas (11.6% to 9.2%). In Seven Oaks, Inkster (11.8%, 9.9%), Downtown (11.4%, 10.8%) and Point Douglas the rates of SGA were all significantly higher in both time periods compared to the Manitoba average.

Figure 3.18: Small-for-Gestational Age Rates by Winnipeg Community Area

Sex-adjusted percent of infants born with a low birth weight for gestational age



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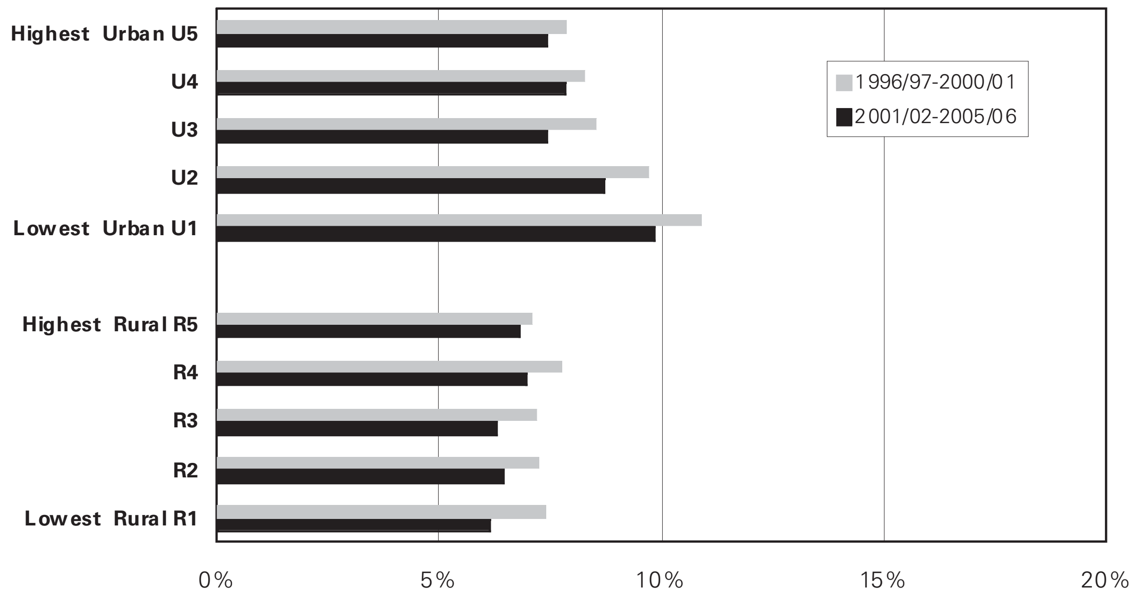
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

There was no significant association between area–level income and SGA rates in rural areas; but in urban areas, the association was significant in both time periods, with increasing rates of SGA births as area–level income decreased. For example, in time 2, the rate of SGA births was 7.4% in the highest urban income quintile neighbourhoods compared to 9.8% in the lowest income quintile.

Figure 3.19: Small-for-Gestational Age Rates by Income Quintile

Sex-adjusted percent of infants born with a low birth weight for gestational age



Linear Trend Test Results

Time 1: Urban: Significant (p<.001)

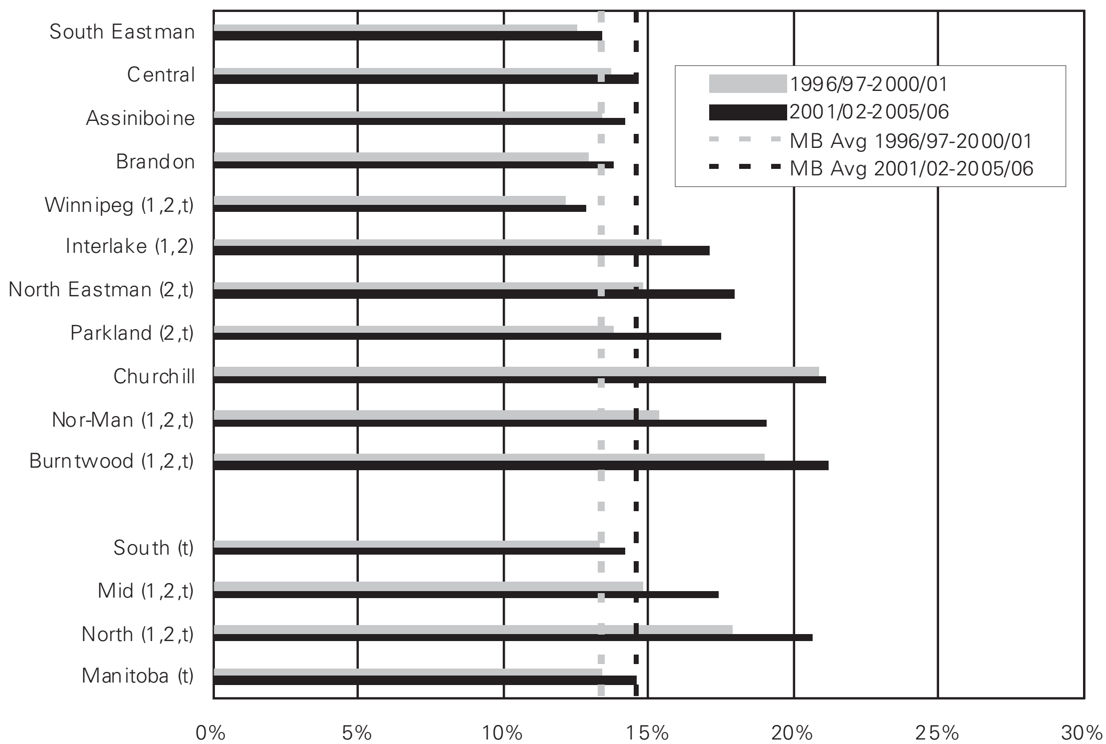
Time 2: Urban: Significant (p<.001)

Source: Manitoba Centre for Health Policy, 2008

The rates of LGA births increased significantly in Manitoba over the study period from 13.4% in 1996/97–2000/01 to 14.6% in 2001/02–2005/06. The Canadian rate of LGA births also increased from 9.5% in 1991 to 12.0% in 2000 (Health Canada, 2003). In five of the 12 RHAs, rates of LGA also increased significantly over the study period: Winnipeg (12.2% to 12.9%), North Eastman (14.8% to 18.0%), Parkland (13.8% to 17.5%), Nor–Man (15.4% to 19.1%) and Burntwood (19.0% to 21.2%). And although none of the RHAs in the South showed a significant increase in rates, collectively the LGA rates increased significantly for these RHAs (13.3% to 14.2%). LGA rates in Winnipeg were significantly lower than the provincial average in both time periods, whereas rates in Interlake (15.5%, 17.1%), Nor–Man and Burntwood were significantly higher in both time periods. LGA rates in North Eastman and Parkland were significantly higher than the provincial average only in the second time period.

Figure 3.20: Large-for-Gestational Age Rates by RHA

Sex-adjusted percent of infants born with a high birth weight for gestational age



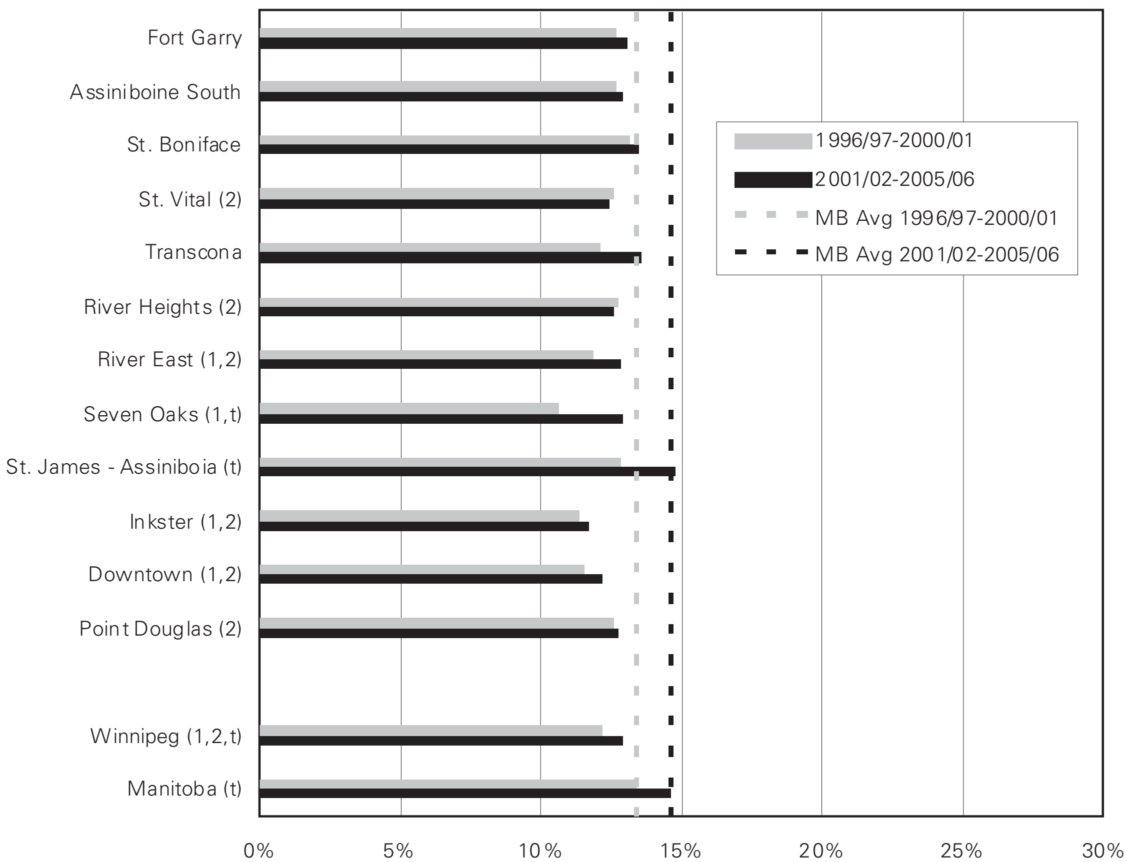
'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

Seven Oaks (10.7% to 12.9%) and St. James Assiniboia (12.8% to 14.8%) were the only Winnipeg Community Areas with significant increases in rates of LGA over the study period. Rates of LGA births in the Winnipeg CAs were generally lower than those found in the non–Winnipeg RHAs. LGA rates were significantly lower in both time periods compared to the provincial average in River East (11.8%, 12.9%), Inkster (11.4%, 11.7%) and Downtown (11.5%, 12.2%). LGA rates were significantly lower than the provincial average in time 2 in St. Vital (12.4%), River Heights (12.6%) and Point Douglas (12.7%).

Figure 3.21: Large-for-Gestational Age Rates by Winnipeg Community Area

Sex-adjusted percent of infants born with a high birth weight for gestational age



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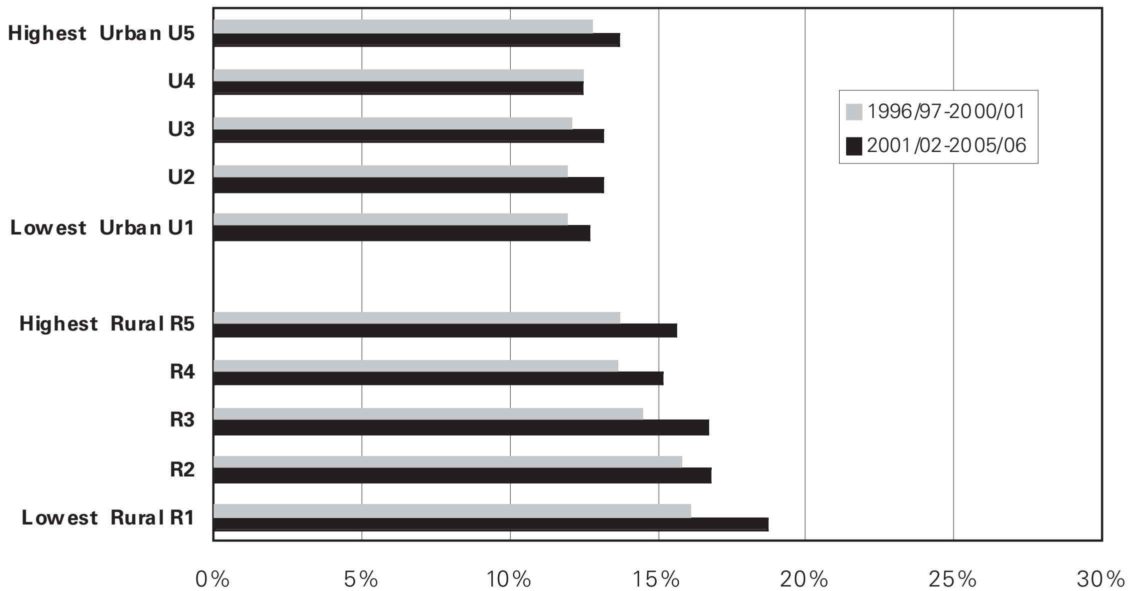
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

There was a significant relationship between area–level income and LGA births in rural areas in both time periods with rates of LGA births increasing as area–level income decreased. For example, in 2001/02–2005/06, the LGA rate was 15.5% in the highest rural income quintile areas compared to 18.7% in the lowest income quintile areas. There were no significant relationships between area–level income and LGA rates in urban areas although it is interesting to note that LGA births appear to be somewhat higher in higher income neighbourhoods—a pattern that is opposite to that found in rural areas.

Figure 3.22: Large-for-Gestational Age Rates by Income Quintile

Sex-adjusted percent of infants born with a high birth weight for gestational age



Linear Trend Test Results
Time 1: Rural: Significant (p<.001)
Time 2: Rural: Significant (p<.001)

Source: Manitoba Centre for Health Policy, 2008

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3.6 Breastfeeding Initiation

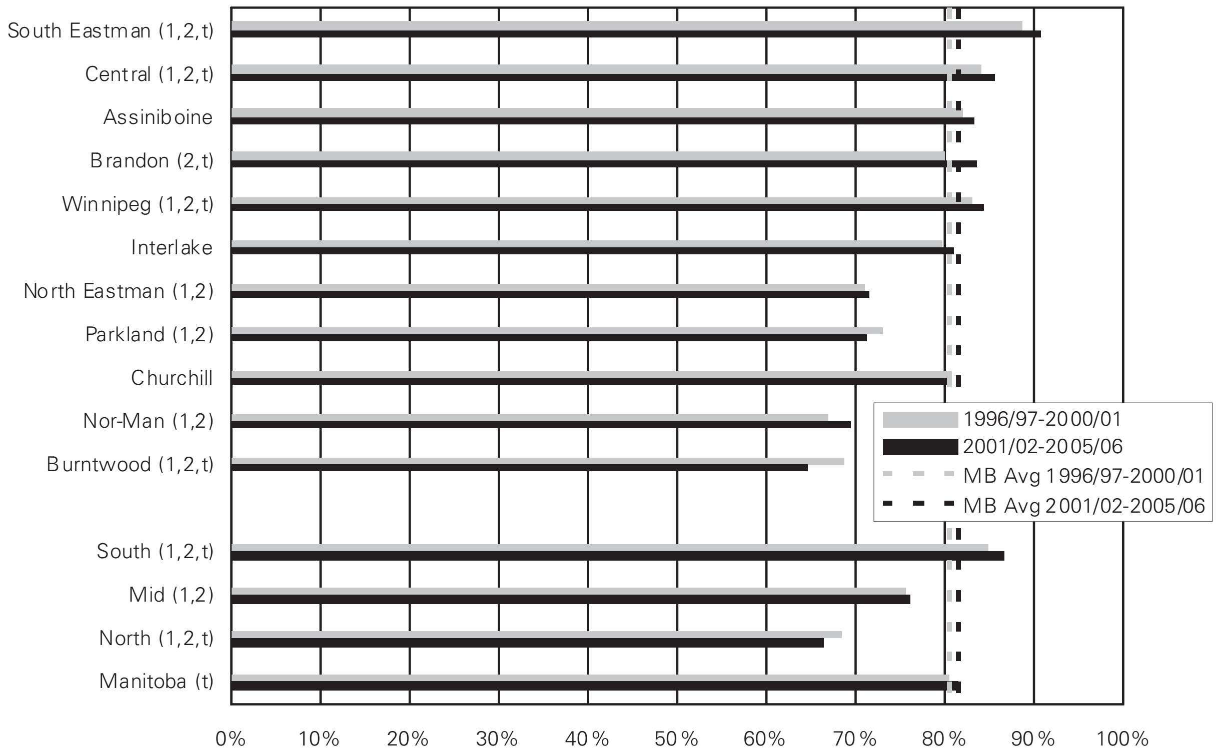
Newborn feeding type is recorded on the hospital discharge abstract as "breast", "artificial" or "both breast and artificial." The **breastfeeding initiation rate** was calculated by taking the ratio of live born babies who were exclusively or partially breast fed, to the total number of live born babies in Manitoba. Previous research found that almost 2% of newborn records were missing data for this indicator in 1994–1998 (Martens et al., 2002); our analysis suggests that the percent of newborn records with missing information on feeding type dropped from 1.44% in 1996/97–2000/01 to 0.46% in 2001/02–2005/06 for Manitoba. Efforts in individual RHAs to improve their collection of this information appear to have paid off: Interlake dropped from 15% missing in 1994–98 (Martens et al, 2002) to 8.3% in 1996/97–2000/01, with a further drop to 0.33% in 2001/02–2005/06; North Eastman dropped from 6.5% to 4.3% to 0.36% over the same time periods; and Assiniboine dropped from missing between 7.7–12.5% (in 1994–98 Assiniboine consisted of two separate regions) to 9.1% in 1996/97–2000/01 to 4.1% in 2001/02–2005/06. Information on missing data for all RHAs can be found in the Appendix.

There is overwhelming evidence supporting the positive impact of breastfeeding on infant and child health and development. Positive health outcomes associated with breastfeeding include reductions in ear infections, atopic dermatitis, gastrointestinal infections, **lower respiratory tract infections**, the development of asthma and leukemia (Ip et al., 2007), as well as, decreased infant hospitalizations independent of the effects of family income (Coulibaly et al., 2006).

Rates of breastfeeding initiation increased significantly in Manitoba over the study period, from 80.6% to 81.6% (Figure 3.23). Significant increases in rates of breastfeeding initiative were also found in South Eastman (88.8% to 90.8%), Central (84.1% to 85.6%), Brandon (80.1% to 83.6%) and Winnipeg (83.0% to 84.4%). A significant decrease in rates of breastfeeding initiation over the study period was observed in Burntwood (68.6% to 64.5%). Burntwood, along with Nor–Man (67.0%, 69.6%), Parkland (73.1%, 71.2%) and North Eastman (70.9%, 71.5%), had significantly lower rates of breastfeeding initiation in both time periods compared to the provincial average, whereas South Eastman, Central and Winnipeg all had significantly higher rates in both time periods.

Figure 3.23: Breastfeeding Initiation Rates by RHA

Age-adjusted percent of mothers, all ages



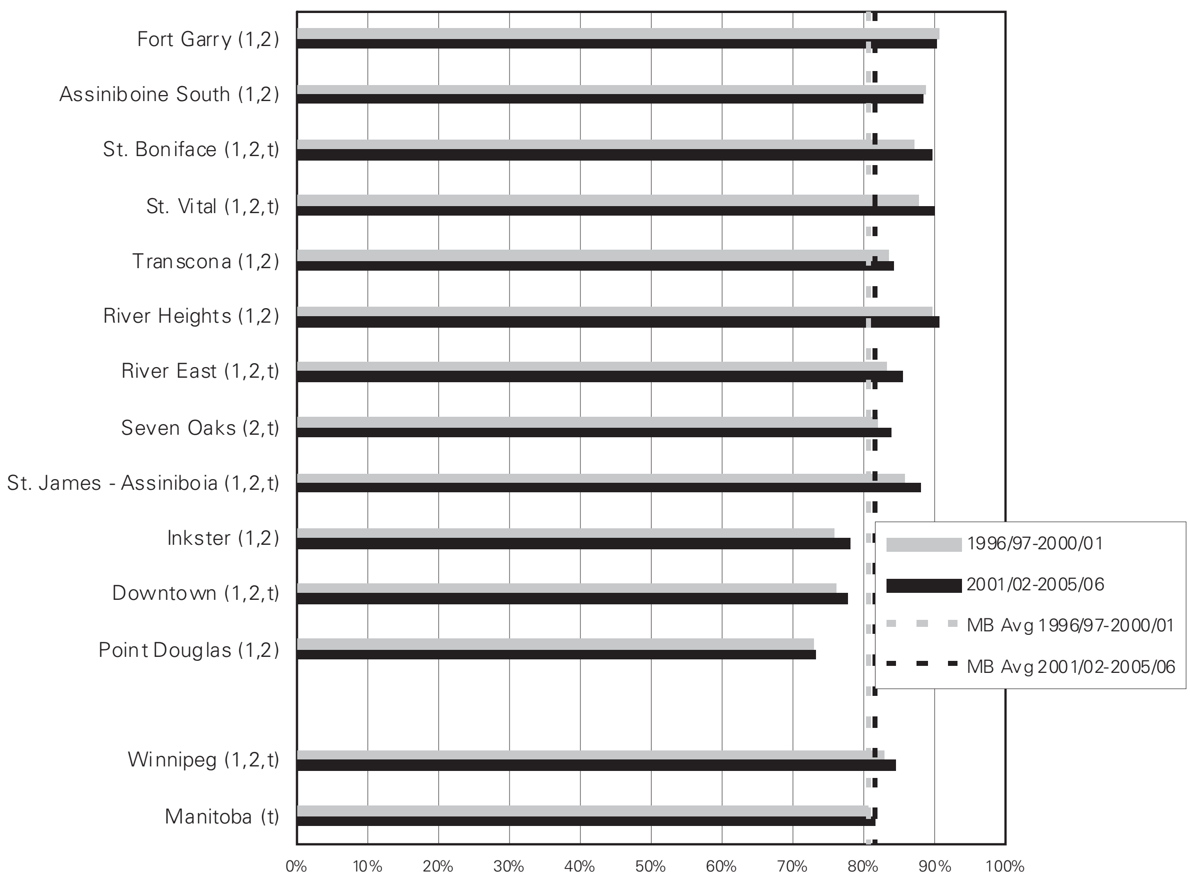
'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

In the Winnipeg Community Areas, significant increases in breastfeeding initiation rates over the study period were found in St. Boniface (87.2% to 89.5%), St. Vital (87.7% to 90.0%), River East (83.2% to 85.3%), Seven Oaks (81.9% to 84.0%), St. James–Assiniboia (85.7% to 88.2%) and Downtown (75.9% to 77.8%). Eight of the 12 CAs had breastfeeding initiation rates that were significantly higher than the Manitoba average in both time periods, and a ninth CA had a higher rate in the second time period. The remaining three CAs had breastfeeding initiation rates that were significantly lower than the provincial rates in both time periods: Inkster (75.8%, 78.1%), Downtown (75.9%, 77.8%) and Point Douglas (72.9%, 73.1%).

Figure 3.24: Breastfeeding Initiation Rates by Winnipeg Community Area

Age-adjusted percent of mothers, all ages

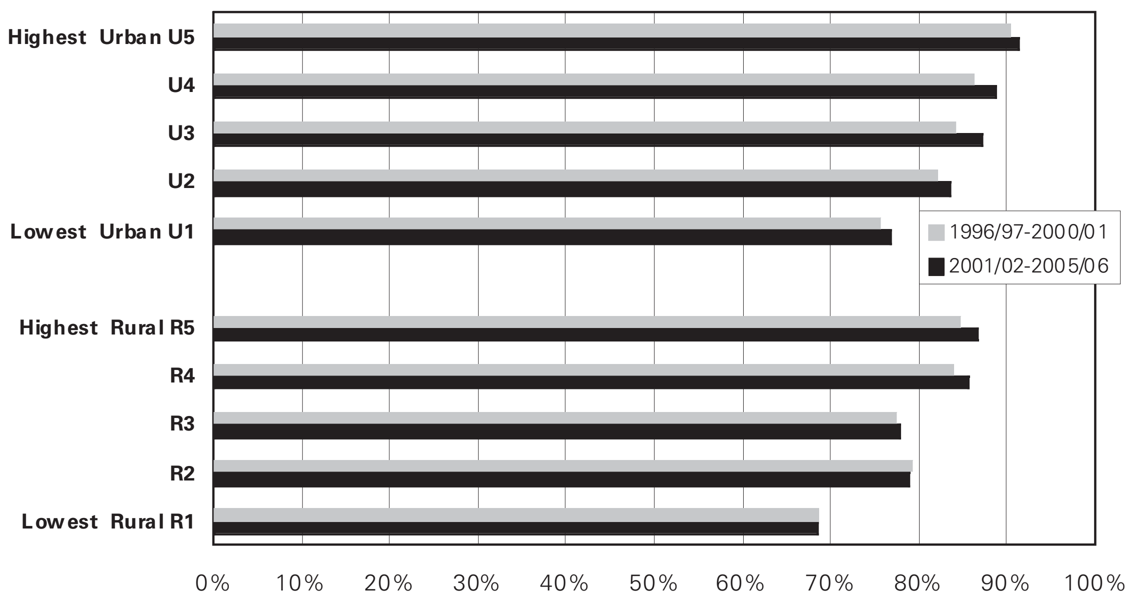


'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, There was a significant relationship between area–level income and breastfeeding initiation rates for both rural and urban areas in both time periods. For example, in urban areas in the second time period, the breastfeeding initiation rate for the highest income quintile neighbourhoods was 91.2% compared to 76.6% for the lowest income quintile. Similar discrepancies across income areas were observed in rural areas. As well, the gradient in rural areas changed significantly over time which appears to be due to the gap between the highest and lowest income quintiles growing larger (creating a steeper gradient). In the highest rural income quintile areas, the breastfeeding initiation rates increased over time from 84.6% to 86.5%, whereas in the lowest rural income quintile areas there was very little change over time (68.7% to 68.2%).

Figure 3.25: Breastfeeding Initiation Rates by Income Quintile

Age-adjusted percent of mothers, all ages



Linear Trend Test Results

Time 1: Rural: Significant (p<.001) Urban: Significant (p<.001)

Time 2: Rural: Significant (p<.001) Urban: Significant (p<.001)

Rural time change: Significant (p<.01)

Source: Manitoba Centre for Health Policy, 2008

Breastfeeding varies considerably by mother's age at the birth of the child, with younger mothers being less likely and older mothers being more likely to breastfeed their babies (figures of breastfeeding initiation by age of mother can be found in the Appendix).

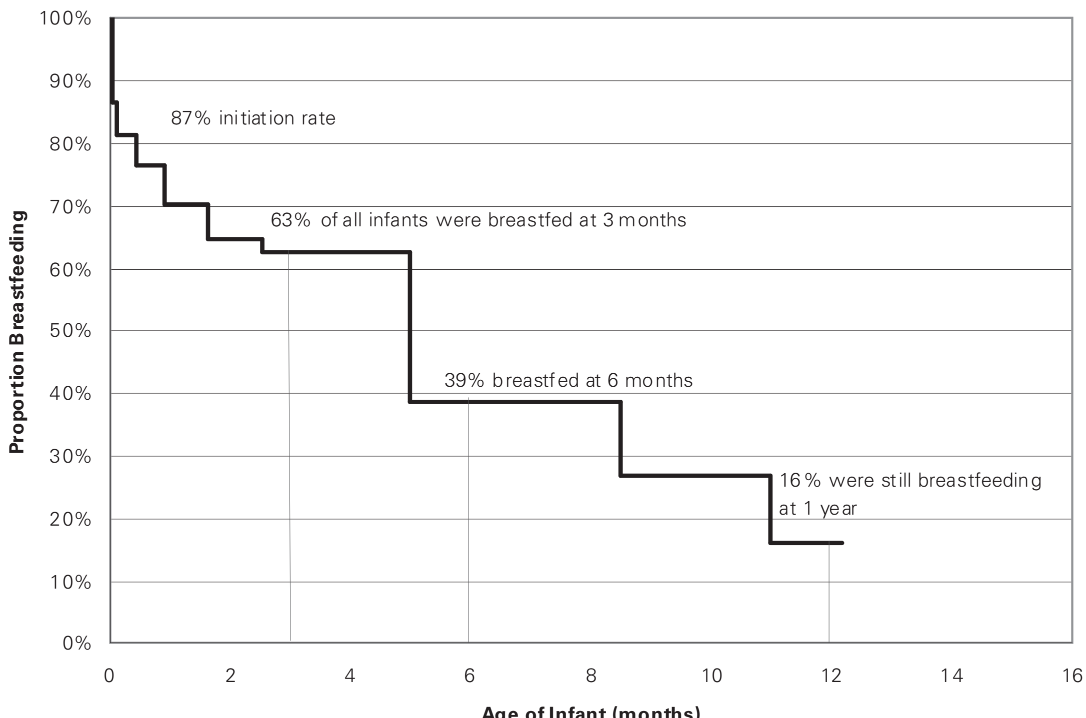
The information on the hospital record tells us only if breastfeeding had been initiated at time of hospital discharge; it tells us nothing about how long the baby was breastfed. Duration of breastfeeding has important implications for child development—a recently released, very large, randomized controlled trial on breastfeeding that followed children up to 6.5 years of age found that longer duration of breastfeeding significantly predicted increases in verbal, performance and full–scale IQ (Kramer et al, 2008). Although the Manitoba hospital record cannot provide information on breastfeeding duration, there is some information on duration of breastfeeding in the Canadian Community Health Survey (CCHS). Using information from three cycles of the CCHS (1.1, 2.1

and 3.1), we were able to calculate breastfeeding duration. In the survey, women were asked about whether they had given birth in the past five years, and for those who did, whether they breastfed their baby, whether they were still breastfeeding their baby, and if not, how long they breastfed their baby. We have created two graphs—one providing the population–based proportion of infants being breastfed (based on all women giving birth) and the second looking only at those infants whose mothers initiated breastfeeding. The graphs for Manitoba are presented here and the graphs by aggregate regions can be found in the Appendix (section 3.6). It should be noted that the CCHS did not survey individuals living in First Nations communities, so results here will not represent that segment of the population.

Looking first at the population of women who gave birth (Figure 3.26), there was an 86.5% breastfeeding initiation rate among those surveyed and 62.8% of all infants were breastfed at three months of age. At six months of age, 38.5% of infants were breastfeeding; and at 12 months, the percent of infants being breastfed was 16.1%. Only 4.2% of infants were breastfed beyond one year. Looking at the second graph (Figure 3.27), which is based on only those women who initiated breastfeeding, 72.6% of these infants were still breastfeeding at 3 months, 44.5% at six months of age, and 18.6% at 12 months and only 4.8% of infants who had initiated breastfeeding were still being breastfed beyond one year.

Figure 3.26: Percent of All Manitoba Infants Being Breastfed at Various Time Points Postpartum

Crude percent of sample of all Manitoba women 15-55 giving birth from CCHS 1.1, 2.1, 3.1 cycles combined (2001, 2003, 2005) who had completed or were still breastfeeding

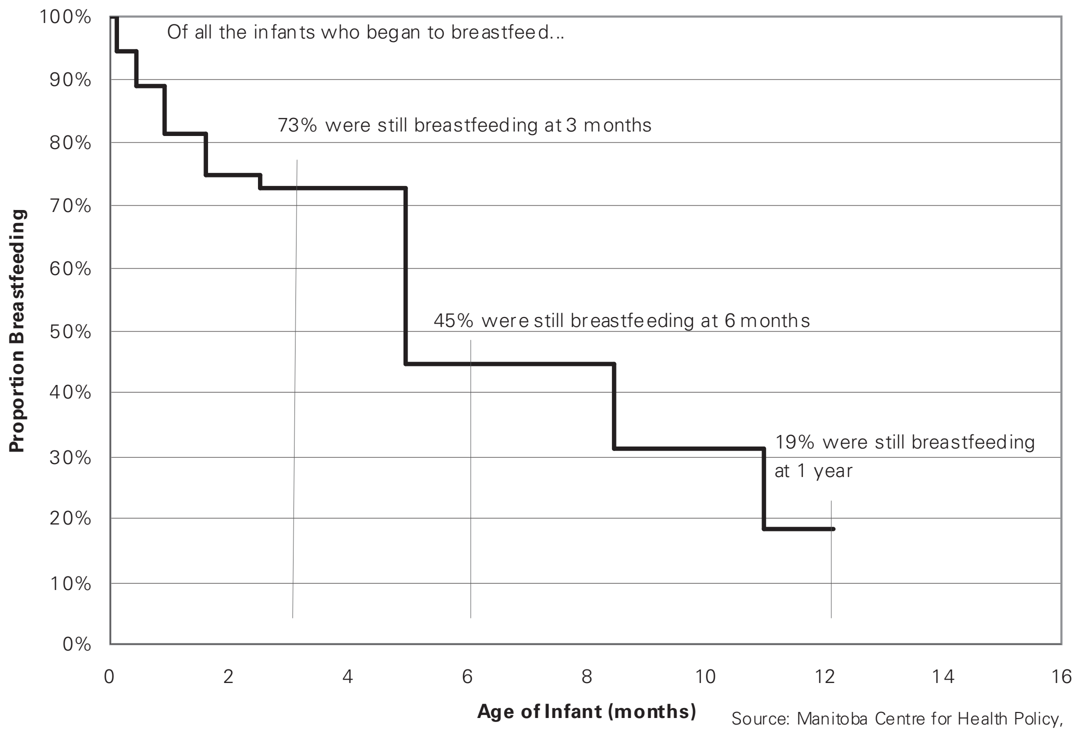


Source: Manitoba Centre for Health Policy,

For further information on breastfeeding initiation rates in Manitoba, including a discussion of factors that predict breastfeeding as well as policies and programs that may encourage breastfeeding, see Martens et al. (2008).

Figure 3.27: Percent of Manitoba Infants Who Had Initiated Breastfeeding, Being Breastfed at Various Time Points Postpartum

Crude percent of sample of all Manitoba women 15-55 years initiating breastfeeding from CCHS 1.1, 2.1, 3.1 cycles combined (2001, 2003, 2005) who had completed or were still breastfeeding



Source: Manitoba Centre for Health Policy,

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3.7 Prenatal and Family Risk Factors

Since 1999, the Healthy Child Manitoba Office has been funding and coordinating the province–wide **Families First**[16] program, a targeted, multiyear home visiting program for families with newborns living under conditions of risk. Eligibility for the program is determined through a two–stage screening process; the first stage involves a brief screen of all postpartum referrals in the province, performed by public health nurses. Crude rates of some of the key prenatal and family risk factors assessed on this screen are reported in this section. Screening data were available for three calendar years: 2000, 2001 and 2002. It should be noted that previous research has established that during this time period about a quarter of all births in Manitoba did not get screened, so rates shown in this section are not based on the entire population of newborns and their families (Brownell et al., 2007). Of particular note is the fact that infants not receiving the screen were more likely to be from vulnerable families (e.g., young mothers, low–income areas, higher rate of children taken into foster care), so results presented in this section will likely underestimate the rates of risk factors experienced by newborns and their families. Certain RHAs, particularly those in the north, had very low rates of screening with only 26% of families with newborns living in Burntwood screened in 2002 and only 45% in Nor–Man (Brownell et al., 2007. The graph of the screening rate by RHA is reproduced in the Appendix of this report).

We looked at six prenatal and family risk factors in this section: maternal substance use during pregnancy, maternal smoking during pregnancy, degree of social support, maternal depression, maternal education, and relationship distress. There is considerable evidence that maternal alcohol and/or drug use during pregnancy can result in permanent cognitive deficits and behavioural problems in children (Bennett et al., 2002; Chiriboga, 2003; Committee on Substance Abuse and Committee on Children with Disabilities, 2000; Faden and Graubard, 2000; Fried et al., 1992; Leech et al., 1999; Mick et al., 2002; Rasmussen et al., 2006; Streissguth et al., 1994). Using the Families First screen information, we found that 2.8% of mothers giving birth consumed alcohol and/or drugs during pregnancy. This estimate is considerably lower than the rates reported in a national survey. Data from the National Longitudinal Survey of Children and Youth (NLSCY) indicate that in 1998/99, 14.6% of women with children under 2 years of age responded that they had consumed alcohol during pregnancy, with about 10% of women in the prairie provinces responding that they had consumed alcohol during pregnancy (Health Canada, 2003).[17] Whether the underestimate from the Families First screen was due to mothers' reluctance to admit pre–natal alcohol or drug consumption to a Public Health Nurse or other health practitioner or because high–risk women who may be more likely to use alcohol or drugs during pregnancy are also more likely to be missed by the screen was impossible to determine from the existing screening forms. We decided the rates were probably not representative of the actual population rates and so do not show a graph of this indicator by RHA or CA.

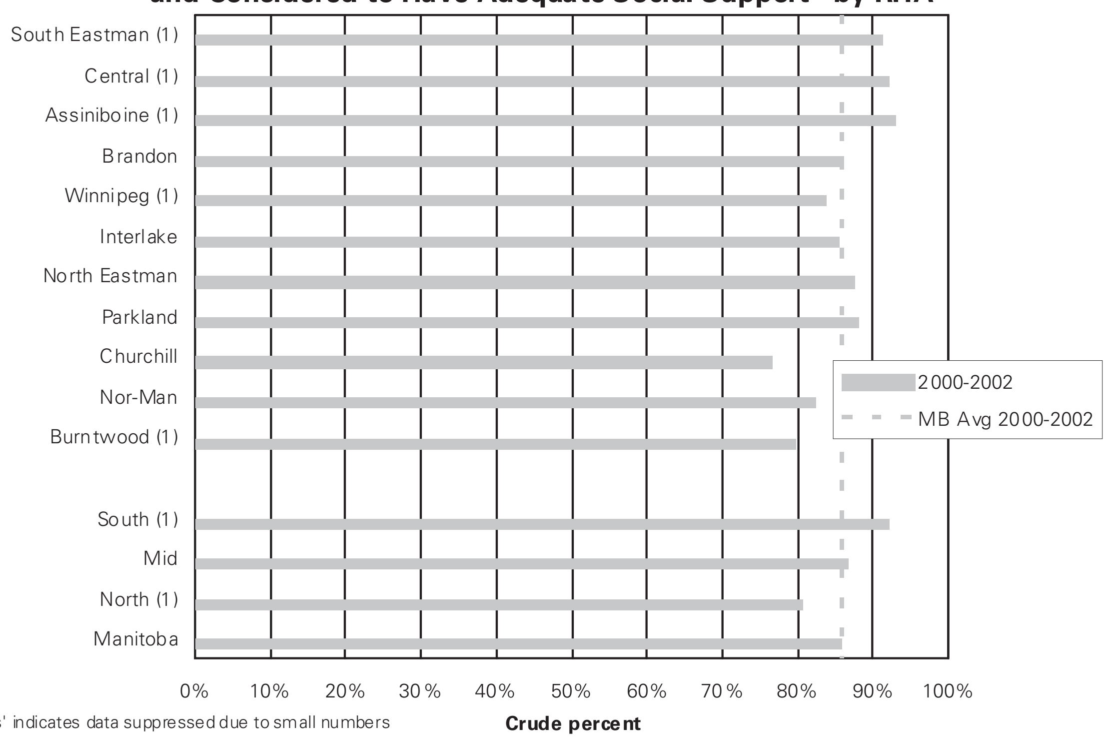
[16] This program was originally called "BabyFirst".

[17] The NLSCY does not survey children and families living in First Nations communities.

Numerous studies have linked prenatal tobacco exposure to low birth weight, short gestation, behavioural problems and poorer health outcomes in infants and children (DiFranza et al., 2004; Ehrlich et al., 1996; Kramer et al., 1990; Leech et al., 1999; Linnett et al., 2003; Mick et al., 2002; Nigg and Breslau, 2007; Pattenden et al., 2006; Ramsay and Reynolds, 2000; Tremblay et al., 2004; Wisborg et al., 1999). From the Families First screen, we found that 13.8% of Manitoba women with babies born in 2000–2002 smoked during pregnancy. Data from the 1998/99 NLSCY indicates that 19.4% of Canadian women who had children under 2 years of age reported smoking during pregnancy, with a higher rate (about 24%) in the prairie provinces (Health Canada, 2003).[18] Once again, because the rates from the Families First survey appear to considerably underestimate actual rates, we have not presented the graphs of these rates by RHA or CA.

Whether or not a child grows up in a two– or lone–parent family can have an impact on cognitive, behavioural, and health outcomes, mainly because family structure is related to other factors such as household income and maternal depression (Lipman et al., 2002; Spencer 2005a,b). The existence of a social support network for the family is also an important factor related to child outcomes (Runyan et al., 1998). Responses on family structure and social support on the **Families First screening form** were divided into four categories: lone–parent families with no social support, lone–parent families

Figure 3.28: Percent of Families with Newborns That Are Headed by Two Parents and Considered to Have Adequate Social Support* by RHA



's' indicates data suppressed due to small numbers
'1' indicates rate was statistically different from Manitoba average
* Information for this graph was taken from newborn screening forms. Because not all newborns and their families were screened, and screening levels varied markedly across RHAs, these results may not provide a true picture of risk levels, particularly for those RHAs where screening levels were low. Please see discussion in this chapter.

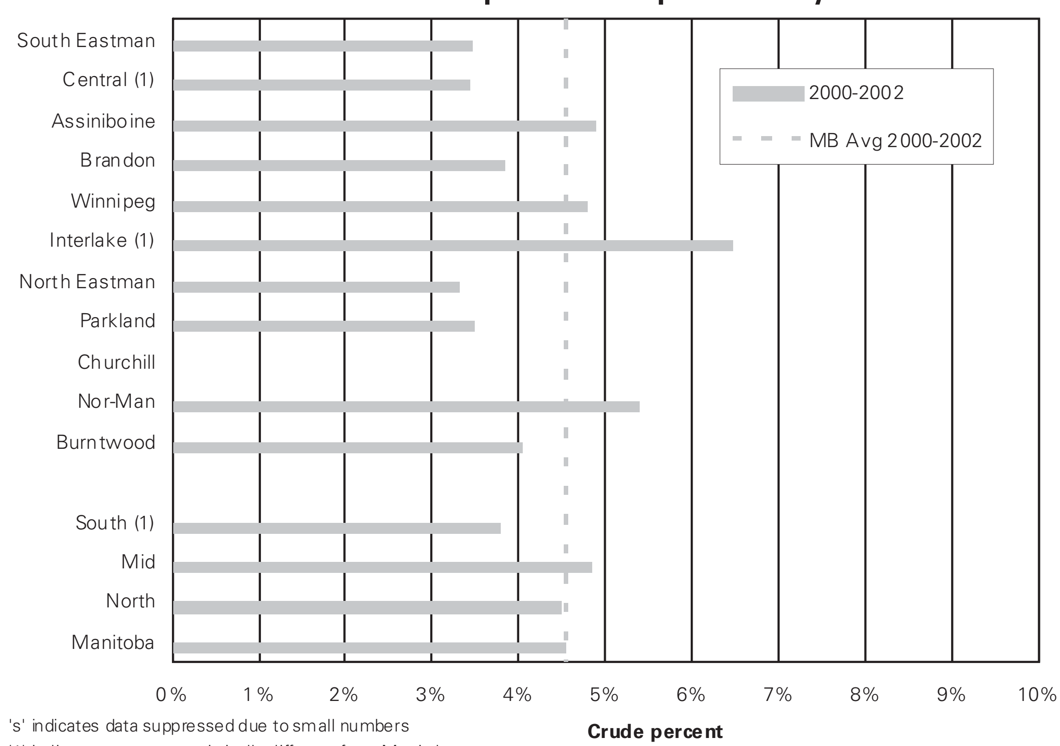
Source: Manitoba Centre for Health Policy, 2008

[18] The NLSCY does not survey children and families living in First Nations communities.

with social support, two–parent families with no social support and two–parent families with social support. Figure 3.28 shows the percent of all families with newborns that fell into this final category—those that had two parents and were considered to have adequate social support networks. Almost 86% of Manitoba families with infants born in 2000–2002 were headed by two parents that had a social support network. South Eastman (91.4%), Central (92.2%) and Assiniboine (93.1%) had rates that were higher than the Manitoba average whereas the rates in Winnipeg (83.8%) and Burntwood (79.7%) were significantly lower. In the Winnipeg CAs, the lowest rates were found in Inkster (78.8%), Downtown (71.5%) and Point Douglas (65.1%) (see Appendix. section 3.7).

Maternal depression, whether in the prenatal or postnatal period, is related to behavioural difficulties and cognitive deficits in infants and children (Diego et al, 2005; Elgar et al., 2003; Lesesne et al., 2003; Lundy et al., 1999; Luoma et al., 2001; O'Connor et al., 2002; Pettersen and Albers, 2001; Somers and Willms, 2002; To et al., 2004). Studies of postnatal maternal depression suggest that anywhere from 8 to 12% of new mothers experience a major depression within the first few months postpartum (Najman et al., 2000). According to the Families First screening results, 4.5 % of Manitoba mothers of newborns experienced depression (Figure 3.29). Rates were significantly lower than the provincial average in Central (3.5%), whereas rates were higher in Interlake (6.5%). In the Winnipeg CAs, the highest rate was found in Point Douglas (7.0%) (see Appendix).

Figure 3.29: Percent of Families with Newborns Where the Mother Experienced Depression* by RHA

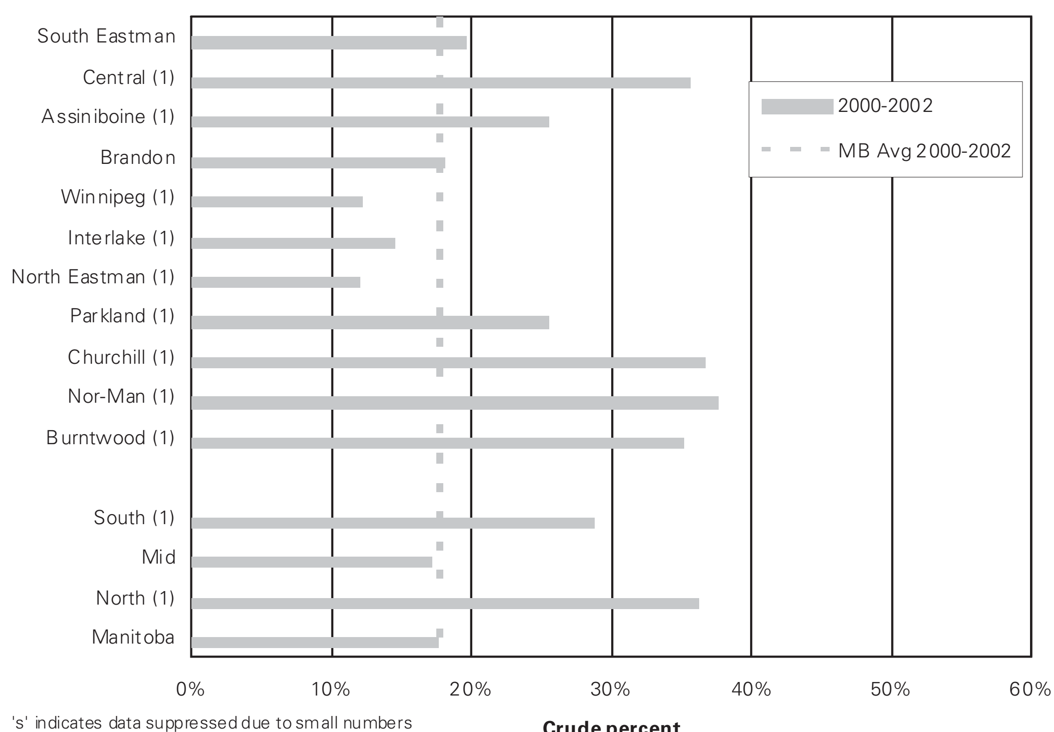


's' indicates data suppressed due to small numbers
'1' indicates rate was statistically different from Manitoba average
* Information for this graph was taken from newborn screening forms. Because not all newborns and their families were screened, and screening levels varied markedly across RHAs, these results may not provide a true picture of risk levels, particularly for those RHAs where screening levels were low. Please see discussion in this chapter.

Source: Manitoba Centre for Health Policy, 2008

Maternal education is one of the strongest predictors of child outcomes across a number of different domains (Davis–Kean, 2005; Macmillan et al., 2004; Nagin and Raikes et al., 2006; Nagin and Tremblay, 2001; Tremblay et al., 2004). National survey results from the 1998/99 NLSCY indicate that 13.4% of new mothers had less than a high school education (Health Canada, 2003). According to the responses on the Families First screening form, almost 18% of Manitoba newborns were born into families where the mother had less than a high school education (Figure 3.30). This varied considerably across RHAs; the lowest rates (indicating higher levels of maternal education) were found in Winnipeg (12.3%), Interlake (14.6%) and North Eastman (12.0%), whereas rates that were higher than the provincial average were found in Central (35.6%), Assiniboine (25.5%), Parkland (25.6%), Churchill (36.7%), Nor–Man (37.6%) and Burntwood (35.2%). In the Winnipeg CAs, most of the areas had lower rates of mothers without a high school education when compared to the Manitoba average; the exceptions were Inkster, which did not differ from the Manitoba average, and Downtown (26.2%) and Point Douglas (31.6%), both having higher rates of mothers without a high school educations compared to the Manitoba average (see the Appendix).

Figure 3.30: Percent of Families with Newborns Where the Mother Had Less Than a Grade 12 Education* by RHA

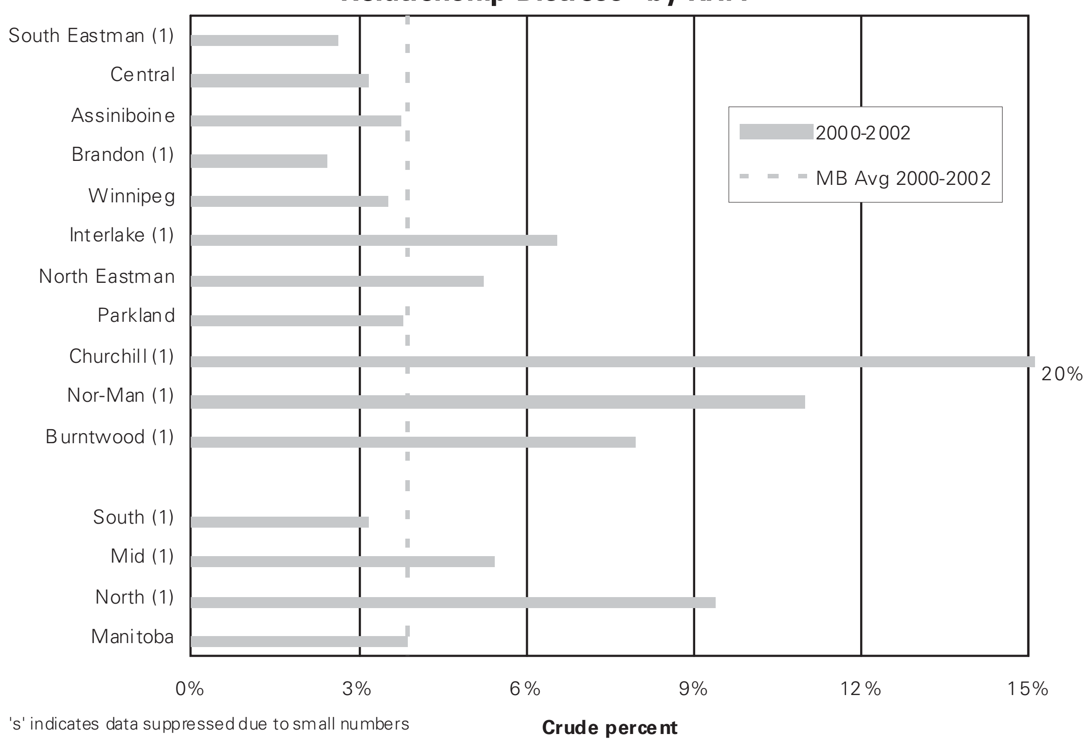


's' indicates data suppressed due to small numbers
'1' indicates rate was statistically different from Manitoba average
* Information for this graph was taken from newborn screening forms. Because not all newborns and their families were screened, and screening levels varied markedly across RHAs, these results may not provide a true picture of risk levels, particularly for those RHAs where screening levels were low. Please see discussion in this chapter.

Source: Manitoba Centre for Health Policy, 2008

The quality of the marital relationship is also associated with child functioning, with higher levels of relationship distress associated with poorer outcomes (Cummings, 1994; Howes and Markman, 1989; Zeanah et al., 1997). According to the results from the Families First screening form, almost 4% of families with newborns experienced relationship distress and this varied considerably across RHAs: South Eastman (2.6%) and Brandon (2.4%) both had rates that were significantly lower than the provincial average, whereas Interlake (6.5%), Churchill (20.0%), Nor–Man (11.0%) and Burntwood (8.0%) all had higher rates (Figure 3.31). Among the Winnipeg CAs, most had rates that were lower than the provincial average; St. Boniface, St. Vital and Inkster did not differ from the provincial average, and Downtown (5.6%) and Point Douglas (6.4%) had higher rates of parental distress compared to the provincial average (see Appendix).

Figure 3.31: Percent of Families with Newborns Where Parents Experienced Relationship Distress* by RHA



's' indicates data suppressed due to small numbers
'1' indicates rate was statistically different from Manitoba average
* information for this graph was taken from newborn screening forms. Because not all newborns and their families were screened, and screening levels varied markedly across RHAs, these results may not provide a true picture of risk levels, particularly for those RHAs where screening levels were low. Please see discussion in this chapter.

Source: Manitoba Centre for Health Policy, 2008

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3.8 Congenital Anomalies

Congenital anomalies refer to medical conditions or abnormalities that are present at birth. Congenital anomalies can be the result of genetic or environmental factors, or both, and often the cause is unknown. Although many congenital anomalies are identified at birth or prenatally, some are not recognized until much later. Congenital anomalies can have a significant impact on infant and child morbidity and mortality. Indeed, 35% of neonatal and 21% of post–neonatal mortality in 2001–2005 can be attributed to congenital anomalies (see section 4.1 Infant Mortality). Congenital anomalies continue as a significant cause of mortality throughout childhood (see section 4.2 Child Mortality). Surveillance through congenital anomaly registries can be used to detect changes in baseline rates of particular congenital anomalies, both to identify potential teratogens as well as to evaluate the effects of preventive measures such as increased folic acid intake before and during pregnancy (Health Canada, 2002).

The International Classification of Diseases devotes an entire chapter to congenital anomaly codes, ranging from mild to life–threatening. Rather than producing rates for all possible congenital anomalies in Manitoba infants, we developed lists of selected congenital anomalies based on reports from the Alberta Congenital Anomalies Surveillance System (Alberta Health and Wellness, 2007) and the Canadian Congenital Anomalies in Surveillance Network (Health Canada, 2002). After reviewing this list with our Working Group, we arrived at a list of key congenital anomalies to include in this report: **Down Syndrome**, **neural tube defects** (and specifically spina bifida), anencephaly and similar anomalies, hydrocephaly, **cleft palate** and/or **cleft lip**,[19] limb reductions, **congenital heart defects** (and specifically hypoplastic left heart syndrome), esophageal atresia/stenosis, anorectal and large intestine atresia/stenosis, hypospadias and epispadias, gastroschisis, and renal agenesis/hypoplasia. **ICD–9–CM** and **ICD–10** codes for each of these congenital anomalies can be found in the glossary, as well as the source of the data used (hospital or physician records, or both).

We calculated rates of congenital anomalies for all infants less than one year old for 1996/97–2000/01 and for 2001/02–2005/06. Shown here is a table of crude rates for the key congenital anomalies for each of the time periods. As can be seen from Table 3.1, rates of congenital anomalies tend to be relatively low with the exception of congenital heart defects and hypospadias/epispadias. The only congenital anomaly where there was a significant change in rates over the study period was hypospadias and epispadias in the male population, which decreased from 6.8/1,000 in time 1 to 5.1/1,000 in time 2. Neural tube defects (1.19/1,000 to 0.89/1,000) and limb reductions (0.53/1,000 to 0.34/1,000) both showed borderline significant reductions in rates ($p<0.08$ and $p<0.09$ respectively).

[19] Due to changes in coding with ICD–10, which occurred in the second time period of this report, these congenital anomalies, which were formerly examined separately, were combined for our analysis.

Table 3.1: Adjusted and Crude Rates for Selected Congenital Anomalies, Manitoba
Rates per 1,000 infants aged <1 year in 1996/2001 and 2001/2006

Selected Anomalies	1996/97-2000/01	2001/02-2005/06	Probability Level for change over time
Down Syndrome	1.53	1.59	0.7861†
Neural Tube Defects	1.19	0.89	0.0779†
Spina Bifida	0.81	0.59	0.1161
Anencephaly and Similar Anomalies	0.30	0.24	0.5089
Hydrocephalus	1.08	0.90	0.2817
Cleft Palate or Cleft Lip	2.61	2.90	0.2903†
Limb Reductions	0.53	0.34	0.0891
Congenital Heart Defects	7.30	7.42	0.7895†
Hypoplastic Left Heart Syndrome	0.34	0.39	0.6615
Esophalgeal Atresia/Stenoisis	0.37	0.23	0.1291
Anorectal and Large Intestine Atresia/Stenoisis	0.44	0.36	0.4484
Hypospadias and Epispadias (male population)	6.80	5.09	**0.0028**
Gastroschisis	0.56	0.79	0.1010
Renal Agenesis	0.45	0.43	0.8405

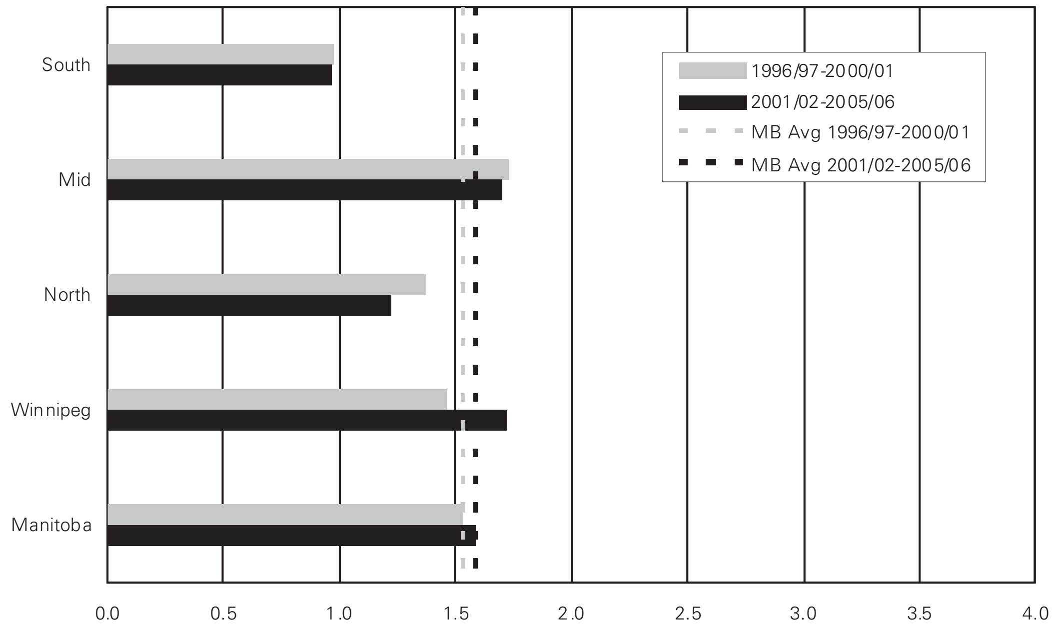
† Note: For those Congenital Anomalies where adjusted rates could be modeled, we have entered the probabilities from the significance tests from the adjusted models here. Graphs of adjusted rates for these Congenital Anomalies can be found in the Appendix.

Source: Manitoba Centre for Health Policy, 2008

Adjusted rates could only be calculated for four of the key congenital anomalies: Down Syndrome, neural tube defects, cleft palate/cleft lip and congenital heart defects. For each of these four, there were no significant changes in rates over the study period at the RHA or Winnipeg Community Area level. Many of the RHAs and Winnipeg CAs had to be suppressed, so results are shown only at the aggregate region level (graphs for most of these congenital anomalies by RHA and Winnipeg CA can be found in the Appendix).

Figure 3.32: Down Syndrome Rates by Aggregate RHA Area

Sex-adjusted rates per 1,000 infants aged <1 year

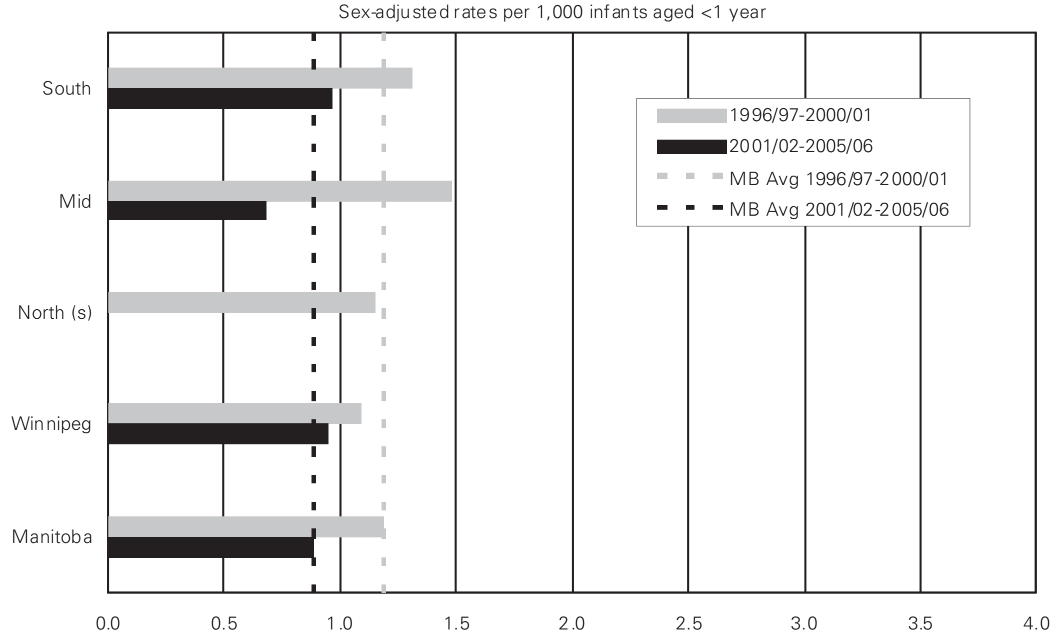


'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

Figure 3.33: Neural Tube Defects Rates by Aggregate RHA Area

Sex-adjusted rates per 1,000 infants aged <1 year

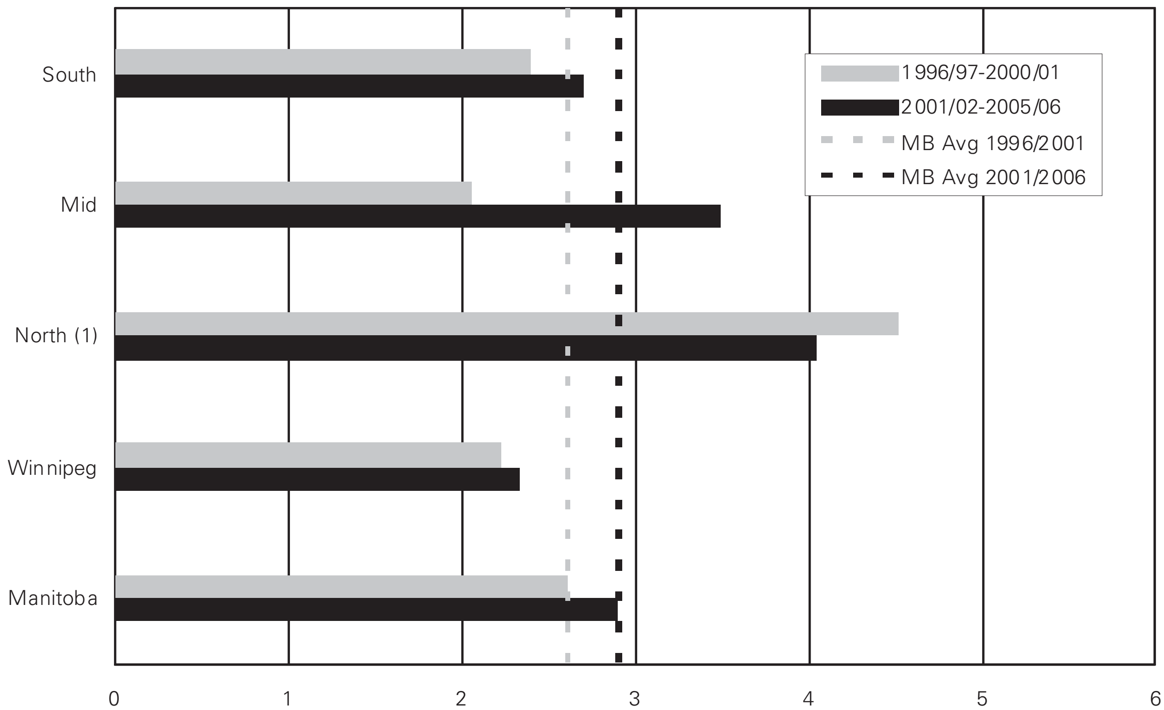


'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

Figure 3.34: Cleft Palate or Cleft Lip Rates by Aggregate RHA Area

Age and sex-adjusted rates per 1000 infants aged <1 year in 1996/2001 and 2001/2006



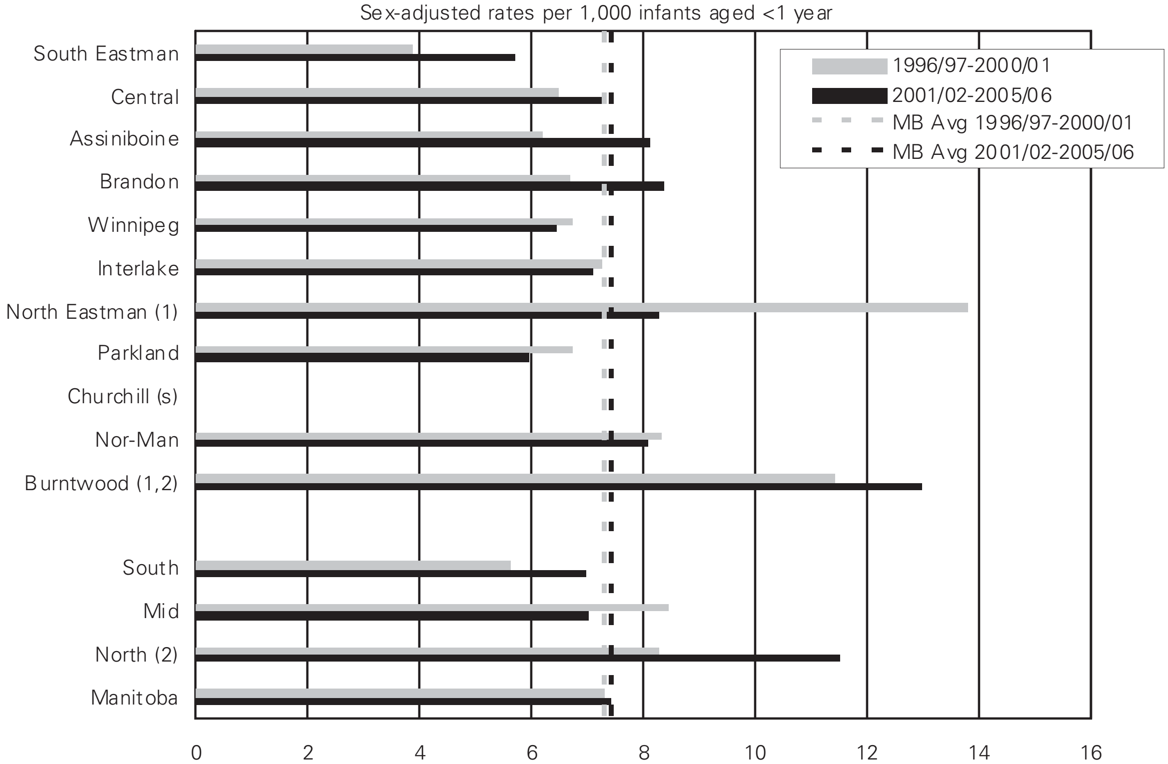
'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

For congenital heart defects, the Manitoba rate remained stable over the study period, at 7.3/1,000 in 1996/97–2000/01 and 7.4/1,000 in 2001/02–2005/06. In North Eastman, the rate of congenital heart defects was significantly higher in time 1 (13.8/1,000) than the Manitoba average, but dropped to 8.3/1,000 (a non–significant decrease at p<.08) which was not significantly different than that Manitoba average in time 2. The rate of congenital heart defects was significantly higher than the Manitoba average in both time periods in Burntwood (11.4/1,000, 13.0/1,000).

Figure 3.35: Congenital Heart Defects Rates by RHA

Sex-adjusted rates per 1,000 infants aged <1 year



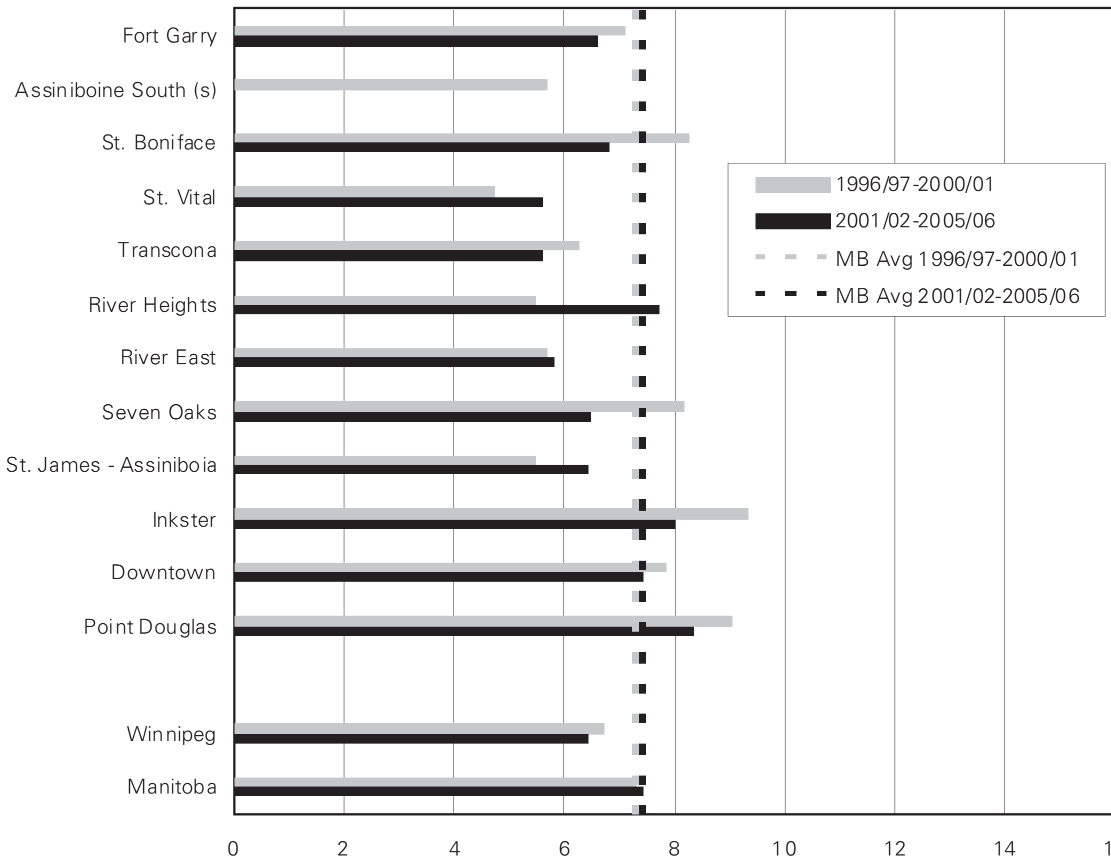
'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

In the Winnipeg Community Areas, there were no significant changes in rates of congenital heart defects over the study period and no significant differences from the provincial average in either time period.

Figure 3.36: Congenital Heart Defects Rates by Winnipeg Community Area

Sex-adjusted rates per 1,000 infants aged <1 year



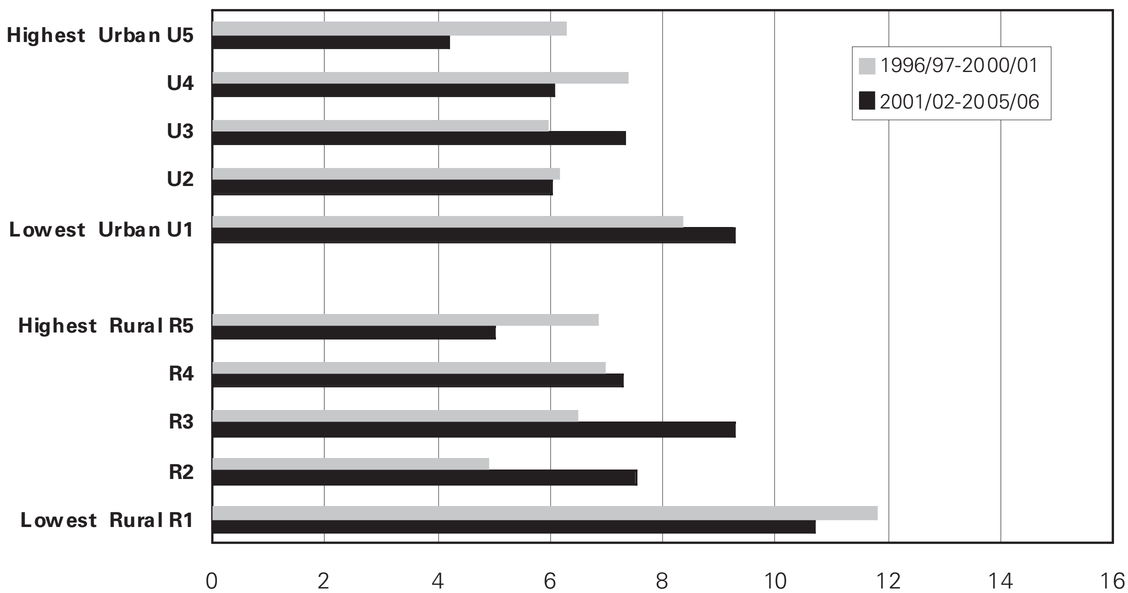
'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

In both time periods, there was a significant relationship between area–level income and the rate of congenital heart defects in infants, for rural areas and in the second time period in urban areas. The highest rates of congenital heart defects are associated with lower income levels. For example, in time 2 in rural areas, the rate of congenital heart defects in the lowest income quintile areas was 10.7/1,000, which is twice as high as the rate for the highest income quintile areas (5.0/1,000). In urban areas in time 2, the rate of congenital heart defects in the lowest income quintile neighbourhoods was 9.2/1,000. This is over two times higher than the rate of 4.2/1,000 observed in the highest income quintile neighbourhoods.

Figure 3.37: Congenital Heart Defects Rates by Income Quintile

Crude rates per 1,000 infants aged <1 year



Linear Trend Test Results

Time 1: Rural: Significant (p<.01)

Time 2: Rural: Significant (p<.01) Urban: Significant (p<.001)

Note: Time change testing is not available

Source: Manitoba Centre for Health Policy, 2008

Graphs for the remaining congenital anomalies by RHA or aggregate regions can be found in the Appendix (section 3.8).

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3.9 Newborn Readmission and Reasons for Readmission

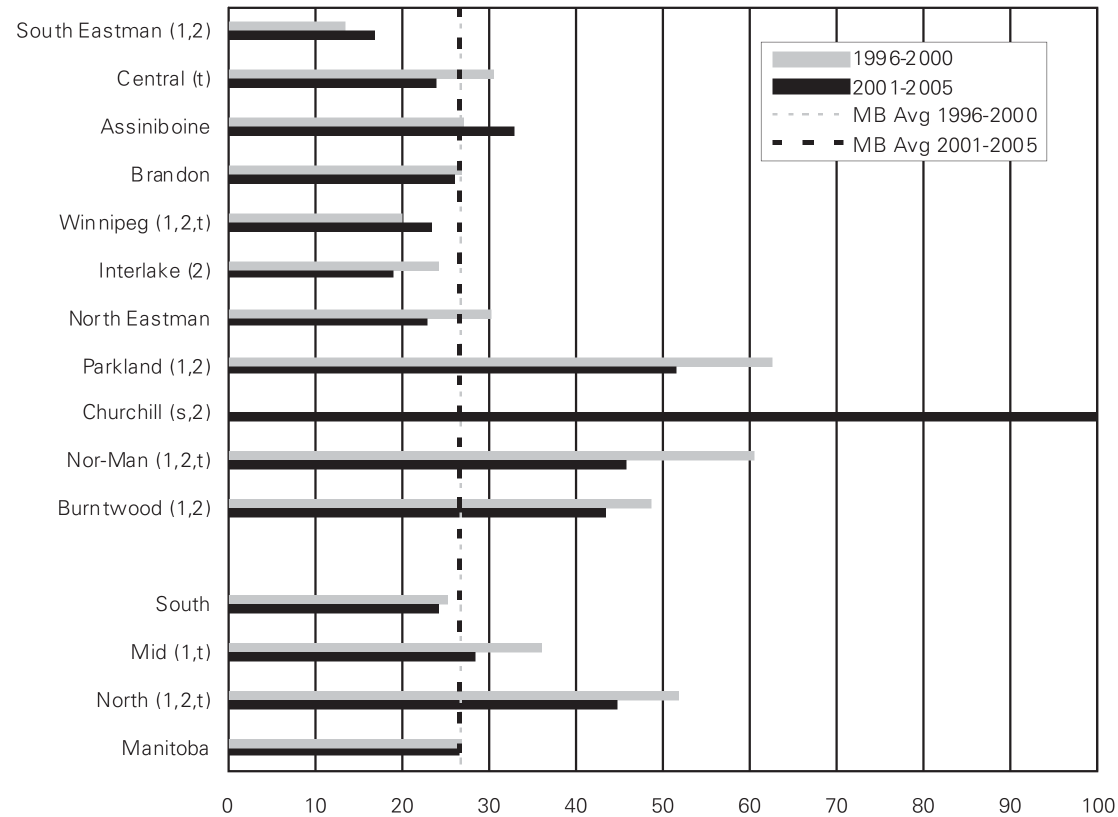
The **newborn readmission rate** is calculated by taking the number of infants who have a hospital stay anywhere from 1 to 28 days after discharge from their birth hospitalization and dividing by the total number of infants who have been discharged alive from their birth hospitalization. Previous work (Brownell et al., 2001; Martens et al., 2004) has followed newborn readmissions for six weeks, however, discussions with our Working Group suggested that following infants beyond 4 weeks discharge would include many admissions that were unrelated to the birth hospitalization.

Newborn readmission is an important indicator of hospital care during the birth hospitalization, particularly with respect to length of stay in hospital (Health Canada, 2003; Martens et al., 2004). In some cases, newborns may be readmitted to hospital not because they are ill themselves, but because their mother is hospitalized and an effort is being made to keep the mother and newborn together. These "boarder babies" comprised 21.6% of all newborn readmissions in the first time period, and 20.3% in the second time period. Because these boarder babies are not sick themselves, we have **excluded** them from the analysis of newborn readmissions discussed in this section. Results with these babies included can be found in the Appendix (section 3.9).

The Manitoba newborn readmission rate was almost identical in both time periods (26.8/1,000 in time 1 and 26.6/1,000 in time 2) (Figure 3.38). Winnipeg residents experienced a significant increase in newborn readmission rates over time (20.0/1,000 to 23.3/1,000) whereas residents of Central (30.6/1,000 to 24.0/1,000) and Nor–Man (60.4/1,000 to 45.7/1,000) experienced a significant decrease in these rates. Residents of "Mid" RHAs (North Eastman, Interlake and Parkland) also showed a significant decrease in newborn readmission rates over time (36.1/1,000 to 28.5/1,000). Compared to the Manitoba average, significantly lower rates of newborn readmission were found in South Eastman (13.6/1,000, 16.9/1,000) and Winnipeg in both time periods and in Interlake (18.9/1,000) in the second time period. Higher rates of newborn readmissions were found in Parkland (62.5/1,000, 51.7/1,000), Nor–Man (60.4/1,000, 45.7/1,000) and Burntwood (48.5/1,000, 43.4/1,000) in both time periods and in Churchill (99.8/1,000) in the second time period.

Figure 3.38: Newborn Hospital Readmission Rates Within 4 Weeks of Birth Discharge by RHA

Sex-adjusted rates per 1,000 infants



'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

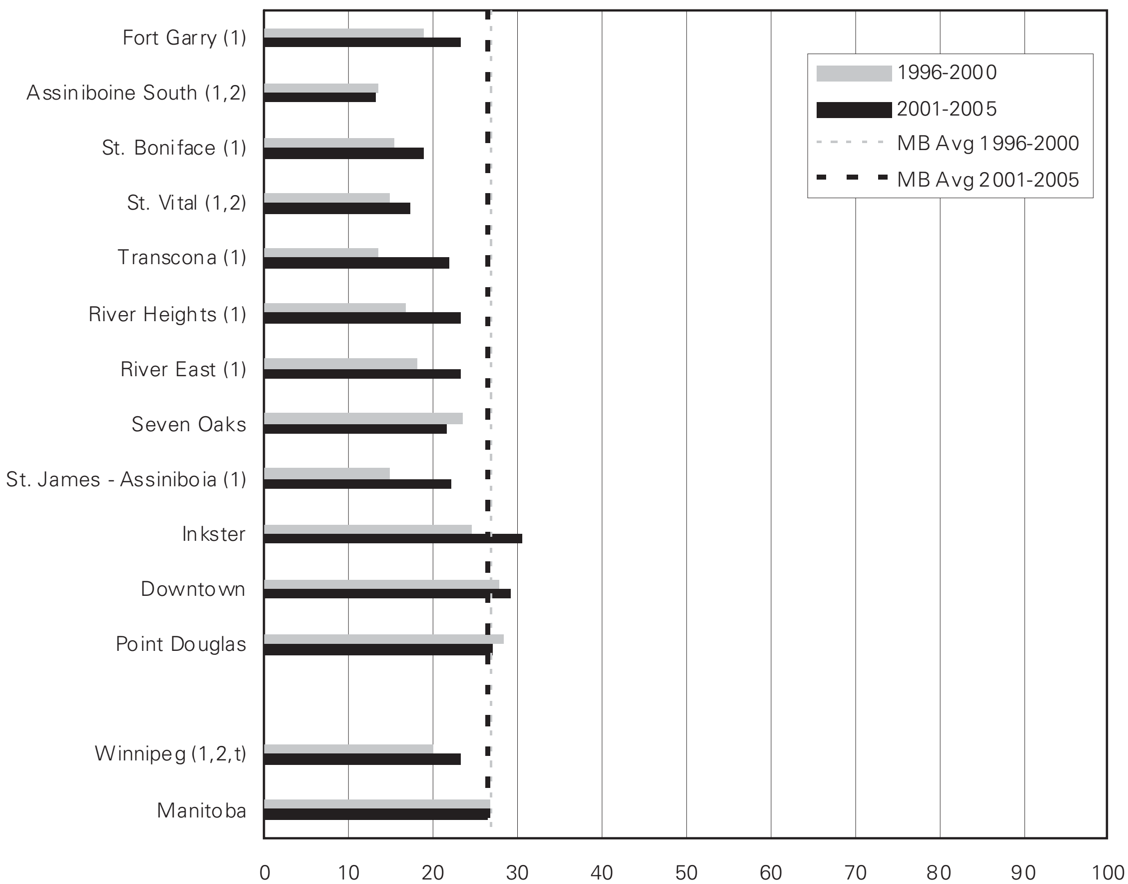
Note: Readmissions with reasons 'accompanying a sick person' or 'require care' were excluded

Source: Manitoba Centre for Health Policy, 2008

Despite a significant increase in newborn readmission rates over time for Winnipeg, none of the individual Winnipeg Community Areas showed a significant increase. Assiniboine South (13.4/1,000, 13.2/1,000) and St. Vital (14.9/1,000, 17.3/1,000) had significantly lower rates of newborn readmission compared to the Manitoba average, in both time periods. Fort Garry, St. Boniface, Transcona, River Heights, River East, and St. James–Assiniboia all had significantly lower rates of newborn readmission in the first time period, but did not differ significantly from the Manitoba average in the second time period of the study.

Figure 3.39: Newborn Hospital Readmission Rates Within 4 Weeks of Birth Discharge by Winnipeg Community Area

Sex-adjusted rates per 1,000 infants



Note: Readmissions with reasons 'accompanying a sick person' or 'require care' were excluded

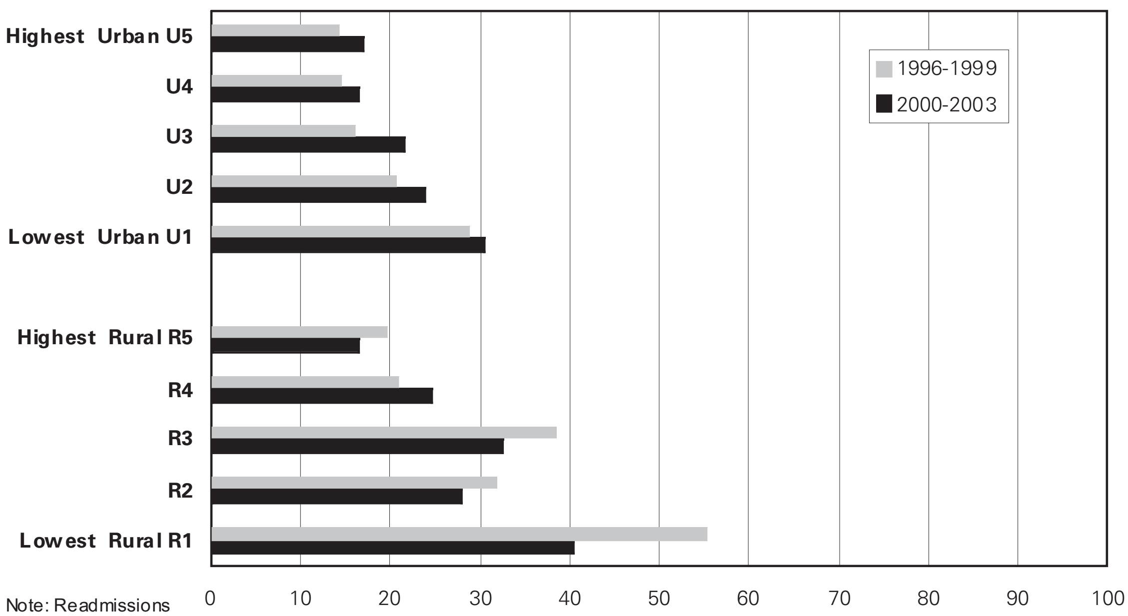
'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

In both urban and rural areas, in both time periods, newborn readmission rates were associated with area–level income, with significant increases in these rates as income decreased. For example, in the second time period rates of newborn readmission were over two times higher in the lowest rural income quintile areas (40.1/1,000) compared to the highest rural income quintiles (16.4/1,000). In urban areas, the rates of newborn readmission were almost two times higher in the lowest urban income quintile neighbourhoods (30.2/1,000) compared to the highest income quintile (16.8/1,000).

Figure 3.40: Readmission Rates
Within 4 Weeks of Birth Discharge by Income Quintile

Sex-adjusted rates per 1,000 newborns



Note: Readmissions with reasons 'accompanying a sick person' or 'require care' were excluded

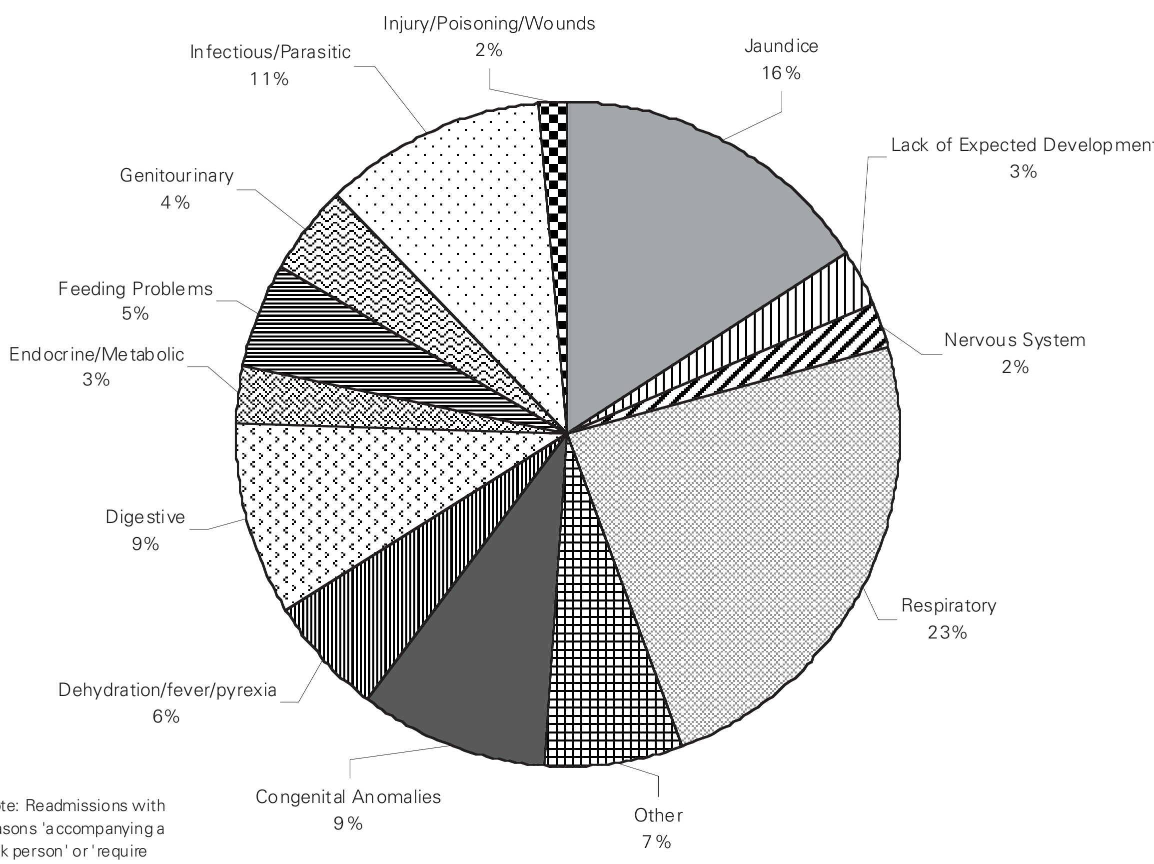
Linear Trend Test Results

Time 1: Rural: Significant (p<.001) Urban: Significant (p<.001)
Time 2: Rural: Significant (p<.001) Urban: Significant (p<.001)

Source: Manitoba Centre for Health Policy, 2008

The pie charts show newborn hospital readmissions divided into the reasons for admission. In both time periods, respiratory conditions accounted for the highest proportion of newborn readmissions (23%). Infectious/parasitic diseases, congenital anomalies and digestive conditions each accounted for 8% to 11% of readmissions. There was very little change in the proportions for any of the reasons for readmission over the two time periods, with the exception of jaundice, which comprised 16% of the newborn readmissions in the first time period and went up to 21% in the second time period. The proportion of readmissions attributed to jaundice varies considerably across aggregate regions, from a low in the second time period of 12% in Winnipeg to a high of 38% in Brandon (see Appendix section 3.9 for pie charts of reasons for newborn readmission by aggregate regions).

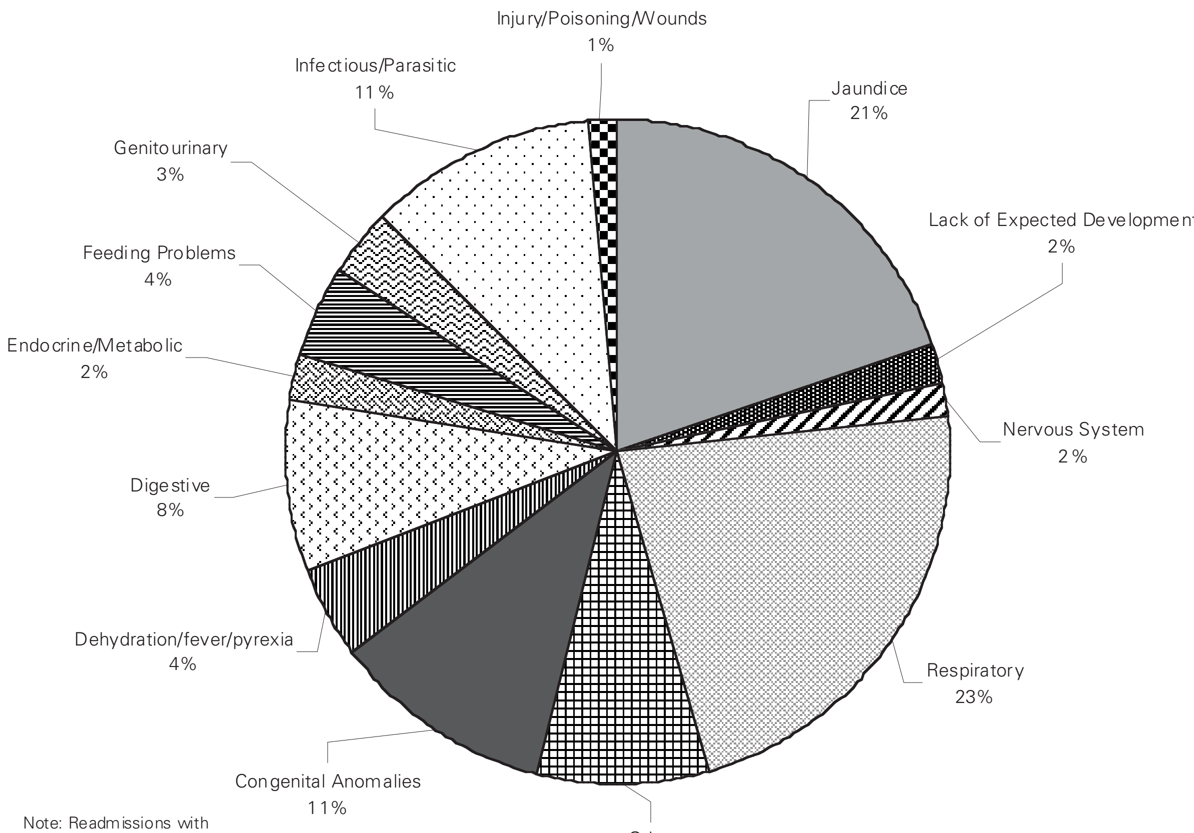
Figure 3.41: Reasons for Newborn Hospital Readmission Within 4 Weeks of Birth Discharge, Manitoba, 1996/97-1999/2000



Note: Readmissions with reasons 'accompanying a sick person' or 'require care' were excluded

Source: Manitoba Centre for Health Policy, 2008

Figure 3.42: Reasons for Newborn Hospital Readmission Within 4 Weeks of Birth Discharge, Manitoba, 2001/02-2004/05



Note: Readmissions with reasons 'accompanying a sick person' or 'require care' were excluded

Source: Manitoba Centre fo rHealth Policy, 2008

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Health Canada. *Canadian Perinatal Health Report*. Ottawa, ON: Minister of Public Works and Government Services Canada, 2003.

Martens P, Derksen S, Gupta S. Predictors of hospital readmission of Manitoba newborns within six weeks postbirth discharge: A population–based study. *Pediatrics* 2004;114(3):708–13.

Chapter 4: Infant and Child Mortality

4.1 Infant Mortality

Infant mortality is considered a useful indicator of the level of health within a community. Infant mortality was measured for two five–year time periods: calendar years 1996–2000 and 2001–2005. Infants born alive in these years and dying before their first birthday were included in the numerator and all infants born alive in these years were included in the denominator. Because the survival of infants with extremely low birth weights and/or extremely short gestational ages may differ across time due to medical advances and changes in rates of multiple births, we calculated infant mortality rates both with and without these extremely "**fragile infants**"—those with a birth weight less than 500 grams and those with a gestational age of less than 22 weeks (Wen et al., 2000). Rates with these fragile infants excluded are shown in this section, and rates with these infants included can be found in the Appendix (section 4.1). Overall patterns were similar for both sets of infants.

The infant mortality rate in Manitoba, excluding the low birth weight and low gestation infants, was 5.8 per 1,000 in the first time period and 5.3 per 1,000 in the second time period, a non–significant decrease (Figure 4.1). With the low birth weight and low gestation infants included, the rates were 7.1/1,000 in time 1 and 6.7/1,000 in time 2, which was somewhat higher than the national rate of 5.4/1,000 in 2005 with all infants included (Statistics Canada, 2008). Although many regions seemed to show a change (mostly decreases) in infant mortality rates overtime, only in the South RHAs (South Eastman, Central and Assiniboine) collectively was this decrease significant (6.2/1,000 to 4.4/1,000) and then only when low birth weight/short gestation infants were excluded. The infant mortality rate was significantly higher in Burntwood (9.2/1,000, 8.0/1,000) compared to the Manitoba average in both time periods and was significantly higher than the rest of the province in Nor–Man (10.2/1,000) in the second time period.

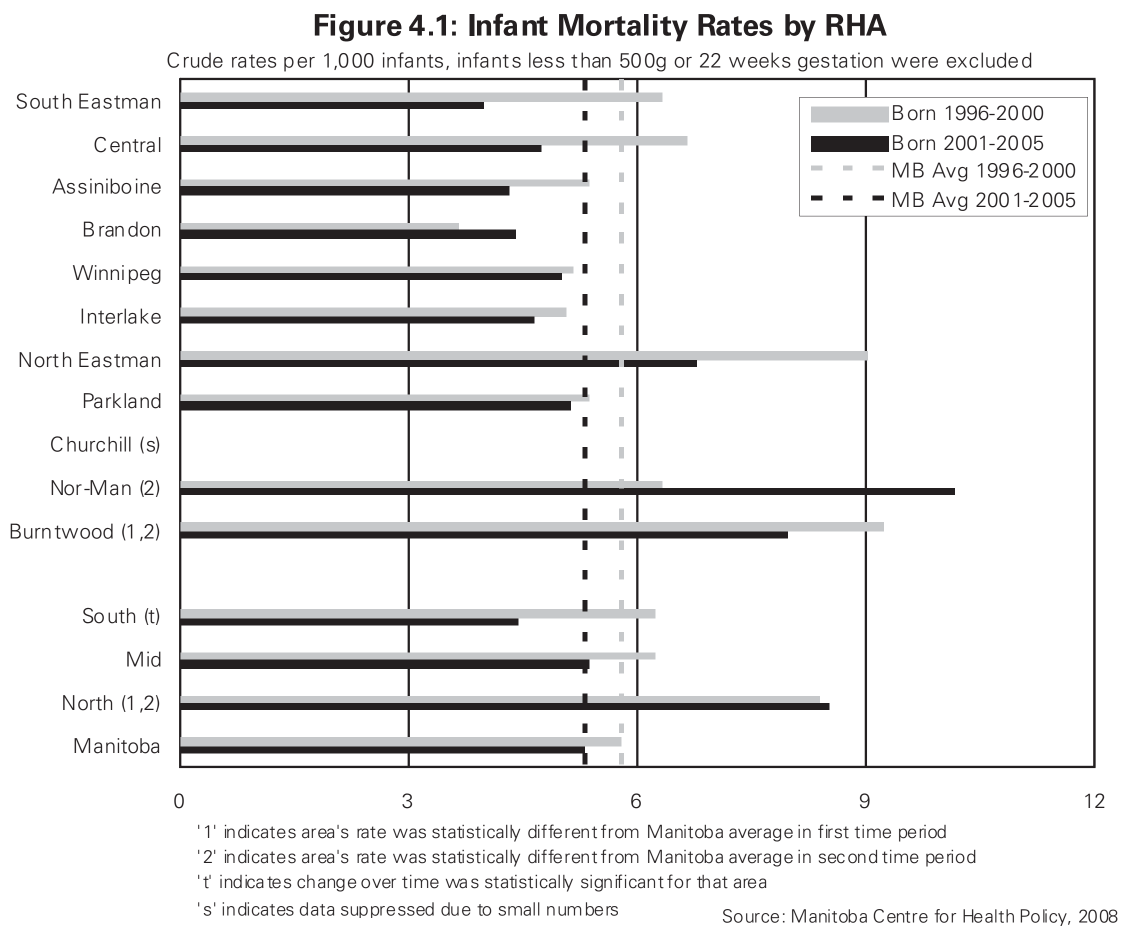
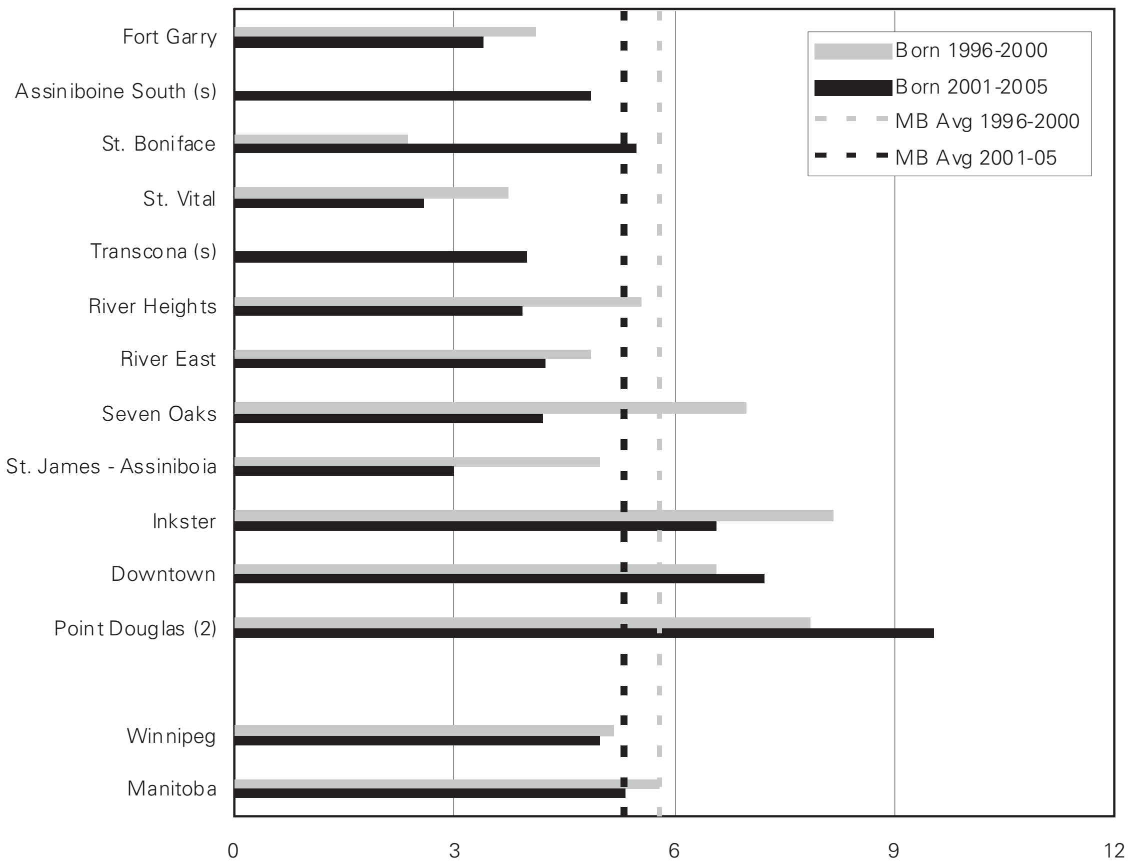


Figure 4.1: Infant Mortality Rates by RHA
Crude rates per 1,000 infants, infants less than 500g or 22 weeks gestation were excluded
South Eastman
Central
Assiniboine
Brandon
Winnipeg
Interlake
North Eastman
Parkland
Churchill (s)
Nor-Man (2)
Burntwood (1,2)
South (t)
Mid
North (1,2)
Manitoba
Born 1996-2000
Born 2001-2005
MB Avg 1996-2000
MB Avg 2001-2005
0
3
6
9
12
'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers
Source: Manitoba Centre for Health Policy, 2008

In the Winnipeg Community Areas there was only one significant difference: in the second time period, the rate of infant mortality in Point Douglas (9.5/1,000) was significantly higher than the Manitoba average.

Figure 4.2: Infant Mortality Rates by Winnipeg Community Area

Crude rates per 1,000 infants, infants less than 500g or 22 weeks gestation were excluded



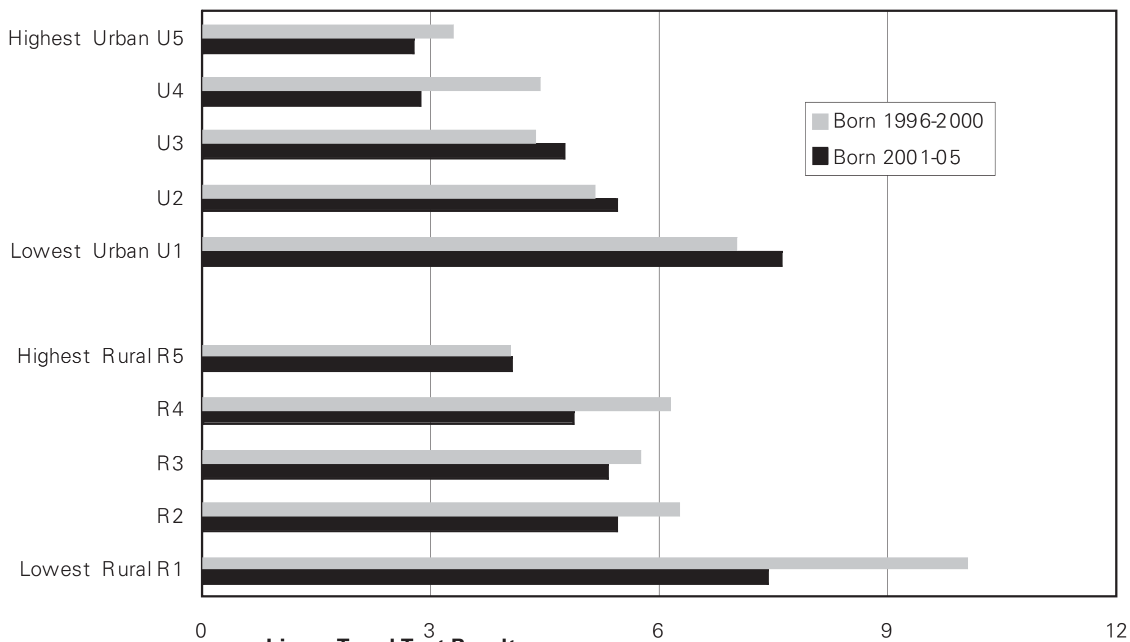
'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

Infant mortality is strongly related to socioeconomic status: as area–level income decreases, infant mortality increases. Indeed, infant mortality is almost (and in some cases greater than) two times higher in the lowest compared to the highest income quintile areas. These trends were significant for both urban and rural areas in time 1, but only significant in urban areas in time 2. For example, in rural areas in time 1, the rate of infant mortality in the highest income quintile areas was 4.1/1,000 compared to 10.1/1,000 in the lowest income quintile areas, over a two–fold difference. In urban areas in time 2, the infant mortality rate was 2.8/1,000 in the highest income quintile neighbourhoods compared to 7.6/1,000 in the lowest income quintile neighbourhoods, an over two–and–half–fold difference.

Figure 4.3: Infant Mortality Rates by Income Quintile

Crude rates per 1,000 infants, infants less than 500g or 22 weeks gestation were excluded



Linear Trend Test Results

Time 1: Rural: Significant (p<.001) Urban: Significant (p<.01)

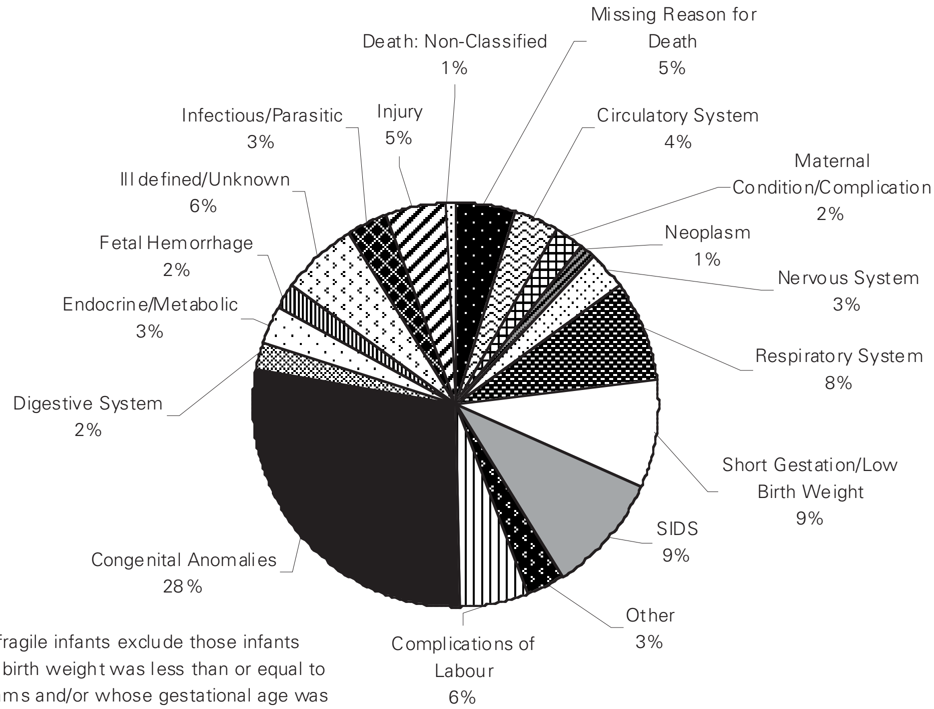
Time 2: Urban: Significant (p<.001)

Source: Manitoba Centre for Health Policy, 2008

We also looked at causes of infant mortality across the two time periods. For this analysis, infancy was divided into two separate phases: neonatal (0–28 days) and post–neonatal (29 to 364 days). As with the overall rates, cause of death analyses were done excluding and including the extremely low birth weight and/or extremely short gestational age infants.[20] Graphs shown in this section have excluded these fragile infants (Figures 4.4 to 4.9); graphs including these infants can be found in the Appendix. Some of the causes of death appear to have shifted somewhat; however, we compared rates for each category and found no significant changes over time. Deaths due to **Sudden Infant Death Syndrome (SIDS)** appear to have shifted the most, particularly for post–neonates (see Figures 4.8 and 4.9) where they comprised 20% of the deaths in time 1 and 15% of the deaths in time 2, however the change in rates of SIDS over the two time periods did not reach statistical significance ($p<0.10$ with fragile infants excluded, $p<0.07$ including fragile infants). In 1999, Health Canada launched the “Back to Sleep” campaign to increase the awareness of the relationship between infant sleeping position and SIDS (Health Canada, 2005), which may have contributed to the near significant decreases in SIDS seen over the study period. Interestingly, research from the U.S. suggests that the apparent decline in SIDS in recent years is at least partly attributable to a change in the way infant deaths are classified (Shapiro–Mendoza et al., 2006). Specifically, the U.S. study found that decreases in SIDS rates were offset by increases in rates of unknown/unspecified deaths and deaths due to accidental suffocation and strangulation in bed. Our own analysis of injury mortality rates indicates that over the two time periods death rates for infants due to suffocation and choking more than doubled, which provides support for the idea that some shifting in classification of deaths for infants may have occurred over the study period (see section 4.3 Injury Mortality).

[20] Recall that extremely low birth weight was defined as birth weight less than 500 grams and extremely short gestation as gestational age less than 22 weeks (i.e., “fragile infants”). Note that in the graphs of cause of mortality, one of the categories is short gestation/low birth weight. Despite our exclusion of fragile infants from the mortality cause graphs, there will still be a portion of infant mortality falling into the short gestation/low birth weight category. This is because this category comprises a broader definition of short gestation and low birth weight: gestational age less than 28 weeks, and birth weight less than 1000 grams.

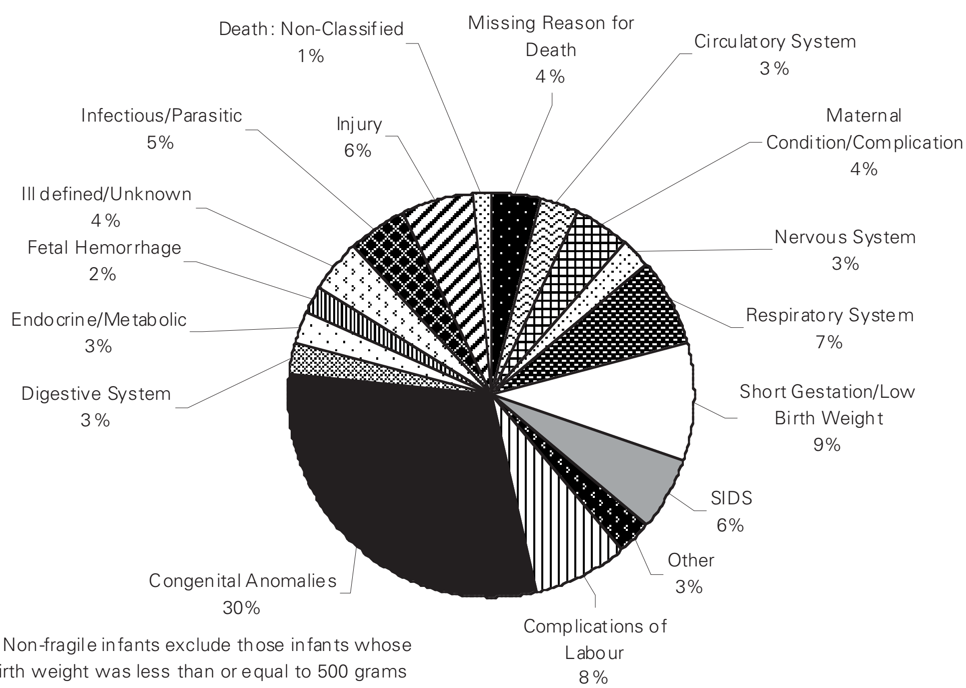
Figure 4.4: Causes of Mortality for Non-Fragile* Infants in Manitoba, 1996-2000



* Non-fragile infants exclude those infants whose birth weight was less than or equal to 500 grams and/or whose gestational age was less than or equal to 22 weeks.

Source: Manitoba Centre for Health Policy, 2008

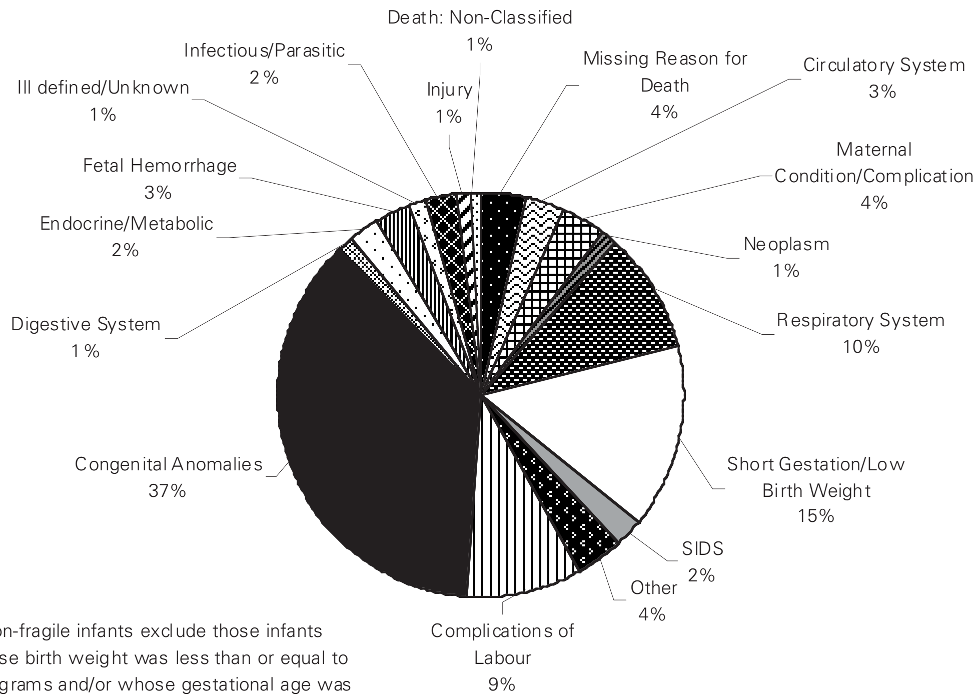
Figure 4.5: Causes of Mortality for Non-Fragile* Infants in Manitoba, 2001-2005



* Non-fragile infants exclude those infants whose birth weight was less than or equal to 500 grams and/or whose gestational age was less than or equal to 22 weeks.

Source: Manitoba Centre for Health Policy, 2008

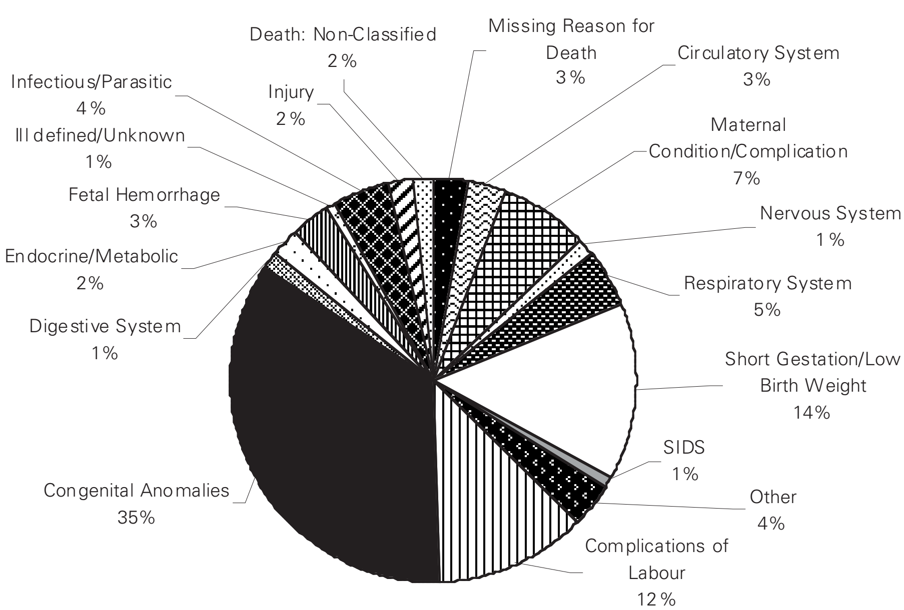
Figure 4.6: Causes of Mortality for Non-Fragile* Neonates (28 days or less) in Manitoba, 1996-2000



* Non-fragile infants exclude those infants whose birth weight was less than or equal to 500 grams and/or whose gestational age was less than or equal to 22 weeks.

Source: Manitoba Centre for Health Policy, 2008

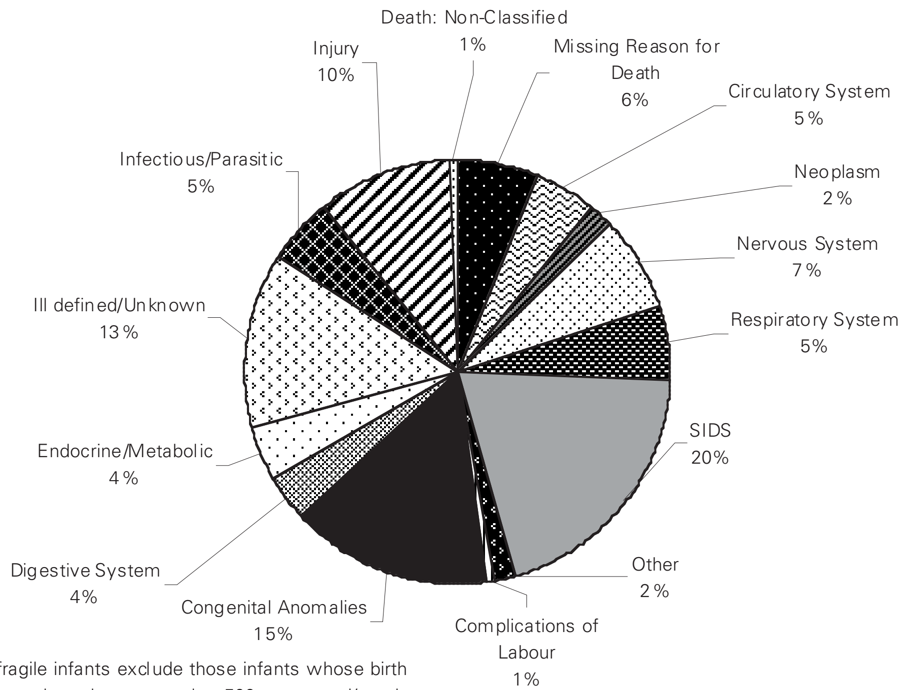
Figure 4.7: Causes of Mortality for Non-Fragile* Neonates (28 days or less) in Manitoba, 2001-2005



* Non-fragile infants exclude those infants whose birth weight was less than or equal to 500 grams and/or whose gestational age was less than or equal to 22 weeks.

Source: Manitoba Centre for Health Policy, 2008

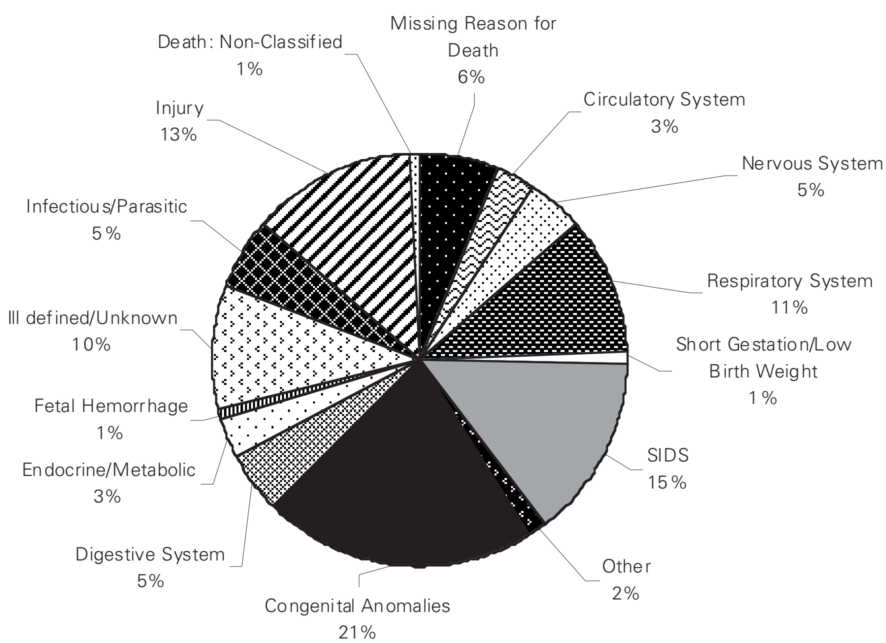
Figure 4.8: Causes of Mortality for Non-Fragile* Post-Neonates (29 days to less than 1 year) in Manitoba, 1996-2000



* Non-fragile infants exclude those infants whose birth weight was less than or equal to 500 grams and/or whose gestational age was less than or equal to 22 weeks.

Source: Manitoba Centre for Health Policy, 2008

Figure 4.9: Causes of Mortality for Non-Fragile* Post-Neonates (29 days to less than 1 year) in Manitoba, 2001-2005



* Non-fragile infants exclude those infants whose birth weight was less than or equal to 500 grams and/or whose gestational age was less than or equal to 22 weeks.

Source: Manitoba Centre for Health Policy, 2008

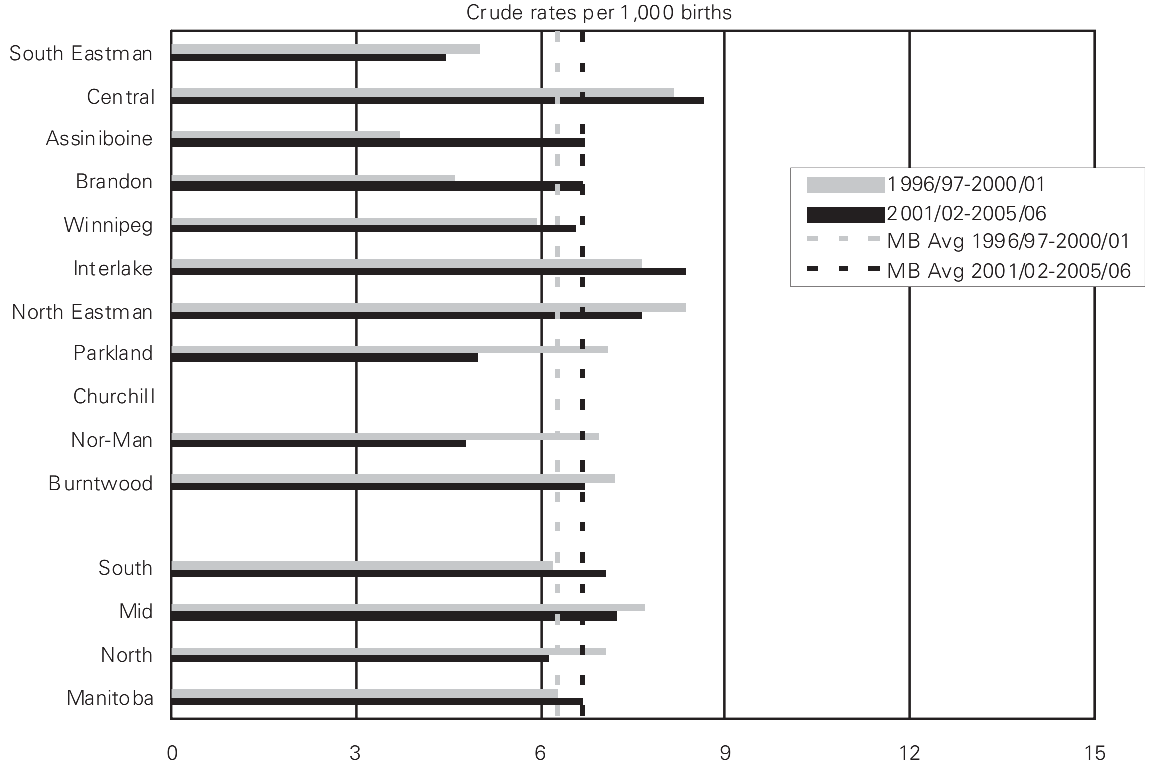
4.1.1 Stillbirths

A **stillbirth** refers to the death of a baby before delivery. The stillbirth rate, or fetal mortality rate, was calculated by taking the number of stillbirths per 1,000 total births (which included live births and stillbirths). Only crude rates are reported here. Two five–year time periods were compared: 1996/97–2000/01 and 2001/02–2005/06. The Manitoba stillbirth rate was 6.3/1,000 in the first time period and 6.7/1,000 in the second time period, an increase which was not statistically significant. These rates were similar to the national rate of 6.1/1,000 in 2001–2004 (Statistics Canada, 2007). When stillbirths were broken down according to gestational age, we found that the majority were "early" stillbirths, occurring between 20 to 27 weeks gestation (53.7% in time 1, 49.6% in time 2); about one–quarter were "late" stillbirths, occurring between 28 to 36 weeks gestation (24.6% in both time periods); and the rest occurred at term or post–term, 37 or more weeks (21.7% in time 1, 25.9% in time 2). A table of stillbirths broken down by gestational age can be found in Appendix 4.1.1).

There were no significant changes over time or differences across RHAs for stillbirth rates.

Figure 4.10: Crude Stillbirth Rates by RHA

Crude rates per 1,000 births



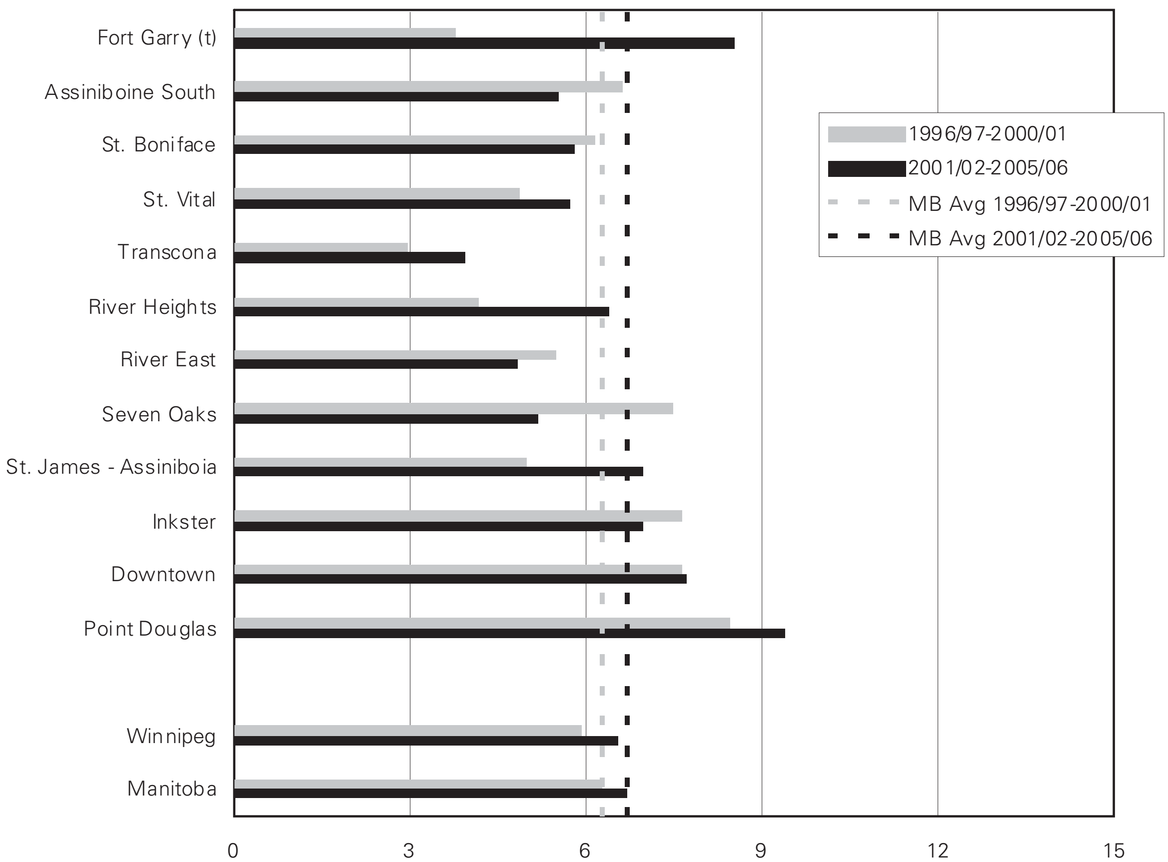
'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

In the Winnipeg CAs, there was a significant increase in stillbirth rates over the study period in Fort Garry (3.8/1,000 to 8.5/1,000).

Figure 4.11: Crude Stillbirth Rates by Winnipeg Community Area

Crude rates per 1,000 births

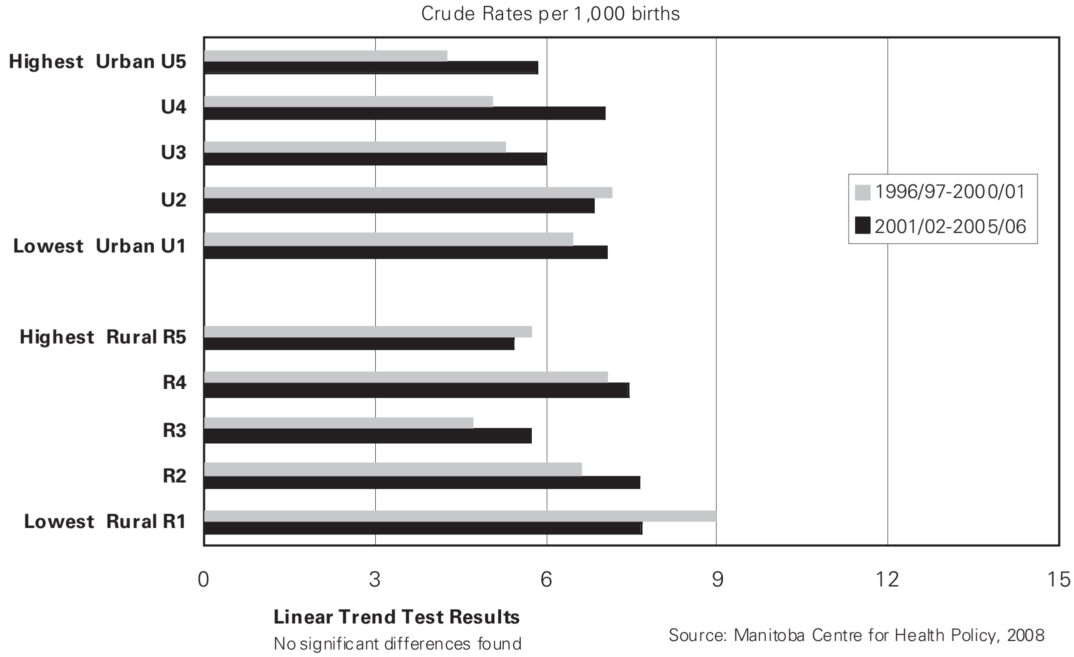


'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

There were no statistically significant associations between area–level income and stillbirth rates, in rural or urban areas.

Figure 4.12: Crude Stillbirth Rates by Income Quintile



Stillbirth rates tend to be higher for older compared to younger mothers. For example, in the second time period in Manitoba there were 11.5/1,000 stillbirths for mothers 35 years of age and over compared to 5.5/1,000 for mothers aged 30 to 34 years. No statistical testing was performed on this analysis. Figures showing stillbirth rates by age of mother, as well as rates by sex of the infant, can be found in the Appendix.

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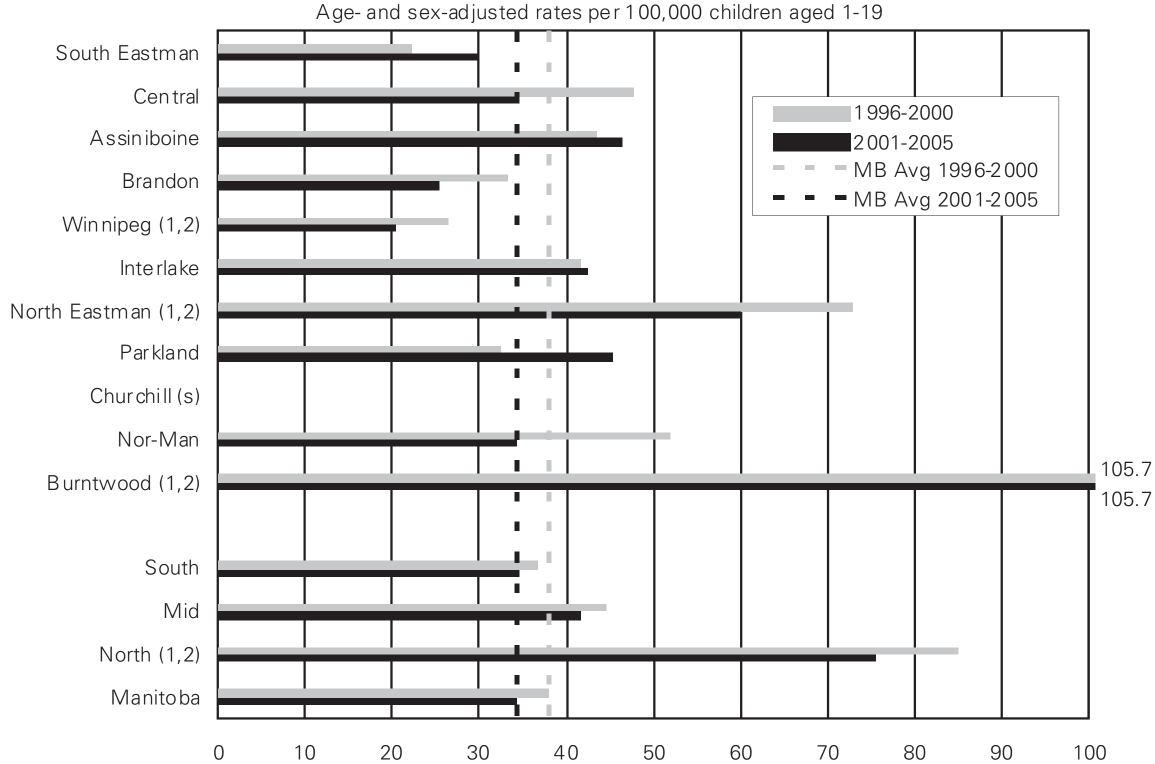
4.2 Child Mortality

Child mortality was calculated by taking the number of deaths of children aged 1 to 19 years per 100,000 children in this age group, for two five–year time periods: 1996–2000 and 2001–2005. In the first time period, the mortality rate for children in Manitoba was 38.1/100,000. This decreased to 34.3/100,000 in the second time period; however, this decrease was not statistically significant (p=.0829). The greatest decreases appear to have occurred for children less than 10 years of age (see graph of crude mortality rates by age in the Appendix). North Eastman and Burntwood RHAs both had significantly higher child mortality rates in both time periods compared to the Manitoba average. North Eastman's child mortality rate appeared to drop over time, from 72.9 to 60.1/100,000, but once again the decrease was not statistically significant. Burntwood's child mortality rate was almost identical in both time periods, 105.5/100,000 in time 1 and 105.7/100,000 in time 2. Winnipeg's child mortality rate was significantly lower than the Manitoba average in both time periods, at 26.4/100,000 in time 1 and 20.4/100,000 in time 2.

Figure 4.13: Child Mortality Rates by RHA

Age- and sex-adjusted rates per 100,000 children aged 1-19



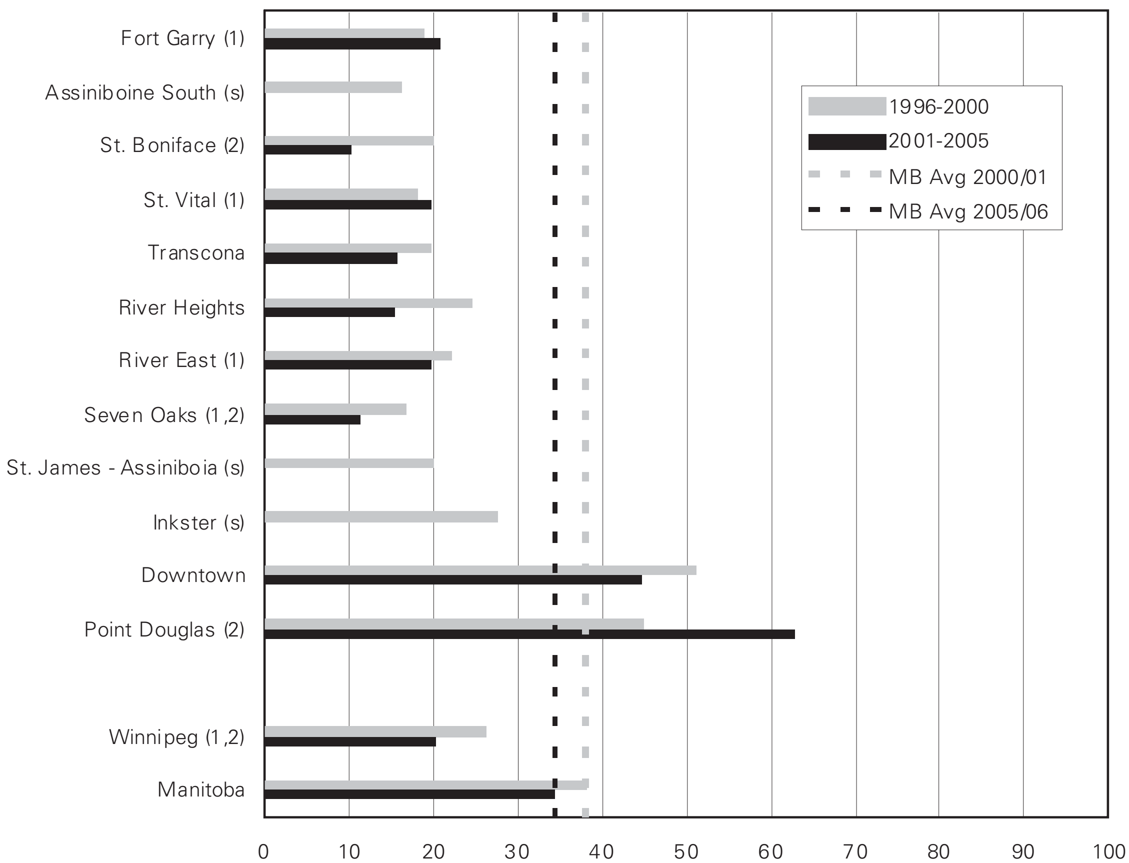
'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

Most of the Winnipeg Community Areas had lower child mortality rates than the Manitoba average in at least one time period. The child mortality rate in Seven Oaks was significantly lower than the Manitoba average in both time periods (16.7/100,000, 11.3/100,000). Only Point Douglas in the second time period had a significantly higher child mortality rate than the Manitoba average with 62.7 deaths per 100,000 residents 1 to 19 years of age.

Figure 4.14: Child Mortality Rates by Winnipeg Community Areas

Age- and sex-adjusted rates per 100,000 children aged 1-19



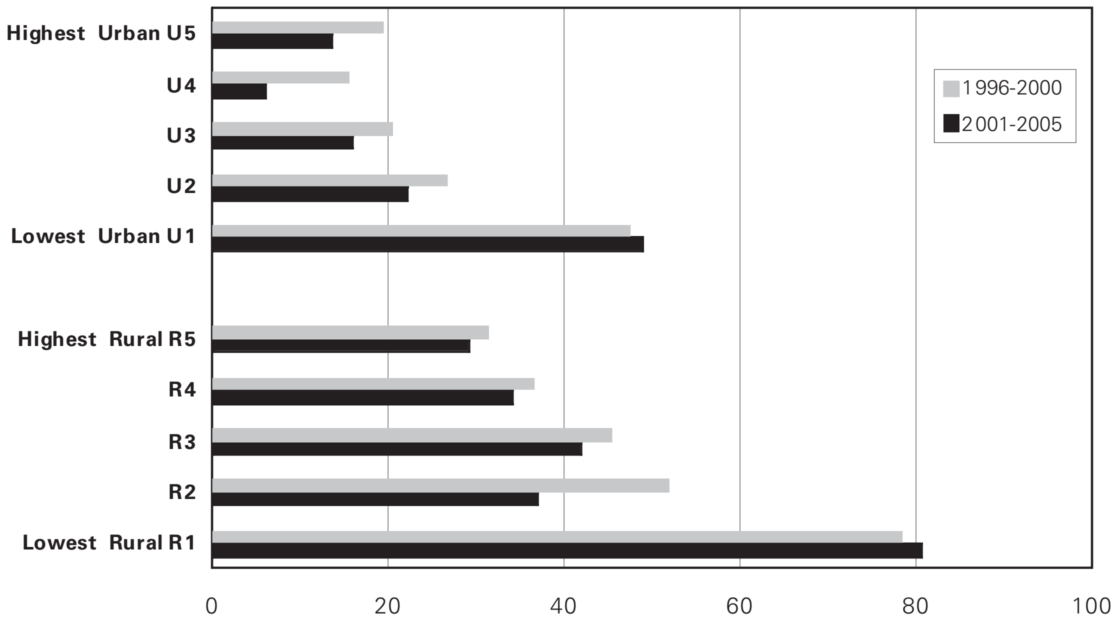
'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

There was a statistically significant relationship between area–level income and child mortality rates with these rates increasing as income decreased. This relationship was significant for both urban and rural areas in both time periods. Child mortality rates were almost two–and–a–half times higher in the lowest (47.5/100,000) compared to the highest (19.5/100,000) urban income quintile neighbourhoods in time 1, and over three–and–a–half times higher in the lowest (48.7/100,000) compared to the highest (13.4/100,000) urban income quintile neighbourhoods in time 2. In rural areas, the child mortality rate was two–and–a–half times higher in the lowest (78.4/100,000) compared to the highest (31.2/100,000) income quintile areas in time 1, and over two–and–a–half times higher in the lowest (80.4/100,000) compared to the highest (28.9/100,000) rural income quintile areas in time 2. The graph illustrating the child mortality rates by income quintiles also makes clear the higher rates of child deaths in rural compared to urban areas.

Figure 4.15: Child Mortality Rates by Income Quintile

Age- and sex-adjusted rates per 100,000 children ages 1-19



Linear Trend Test Results

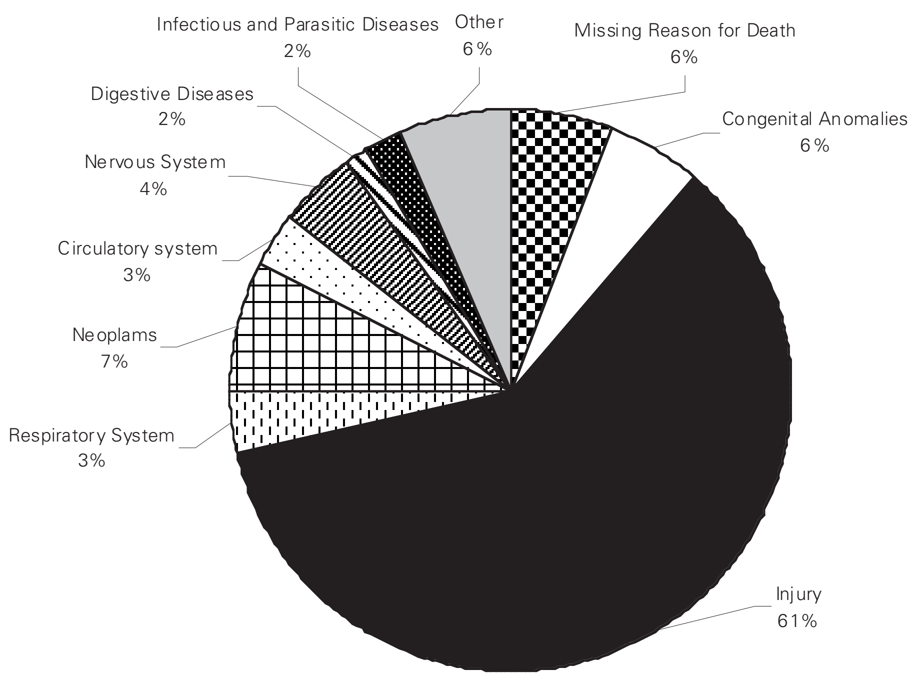
Time 1: Urban: Significant (p<.001) Rural: Significant (p<.001)
Time 2: Urban: Significant (p<.001 Rural: Significant (p<.001)

Source: Manitoba Centre for Health Policy, 2008

We also looked at causes of child mortality (Figures 4.16 and 4.17). Injury is by far the number one cause of death for children 1 to 19 years of age, accounting for about 60% of all deaths. Injury increases in importance as a cause of death factor as children age: slightly less than half of the deaths to children 1 to 4 years of age were due to injuries whereas almost three–quarters of the deaths to youths 15 to 19 years of age were due to injuries (see section 4.3 Injury Mortality for more information on childhood deaths due to injury and the Appendix for this section for pie graphs of child mortality by cause broken down into age groups). Interestingly, there appears to be quite a dramatic drop in the percent of deaths attributable to injuries for children 5 to 9 years over the two time periods: in the first time period, injuries accounted for 51% of the deaths whereas in the second time period, they accounted for 36% of the deaths. And the number of injury deaths for this age group in the second time period was less than half the number of injury deaths in the first time period (from 44 to 20 deaths). Deaths in this age group should be monitored to determine whether this drop is due to a random fluctuation or a trend that may be due to improved injury prevention in this age group. Further discussion of injury deaths can be found in the next section, 4.3 Injury Mortality.

Across all age groups, there was relatively little change in the causes of death for children aged 1 to 19.

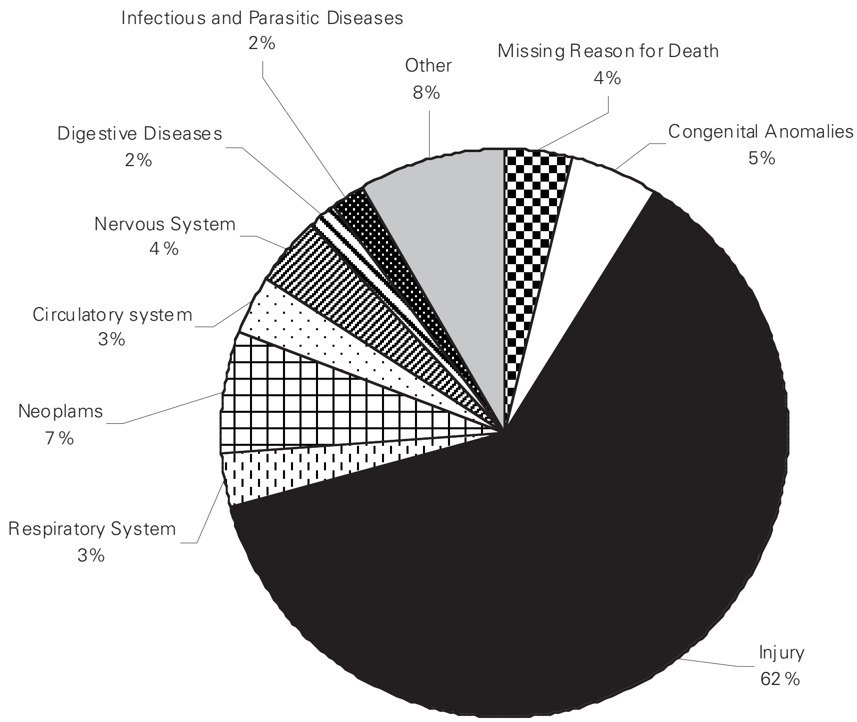
Figure 4.16: Causes of Death, Manitoba Children Aged 1-19 Years 1996-2000



Note: Some percentages may fluctuate greatly over time due to small numbers (total deaths=297).

Source: Manitoba Centre for Health Policy, 2008

Figure 4.17: Causes of Death, Manitoba Children Aged 1-19 Years 2001-2005



Note: Some percentages may fluctuate greatly over time due to small numbers (total deaths=297).

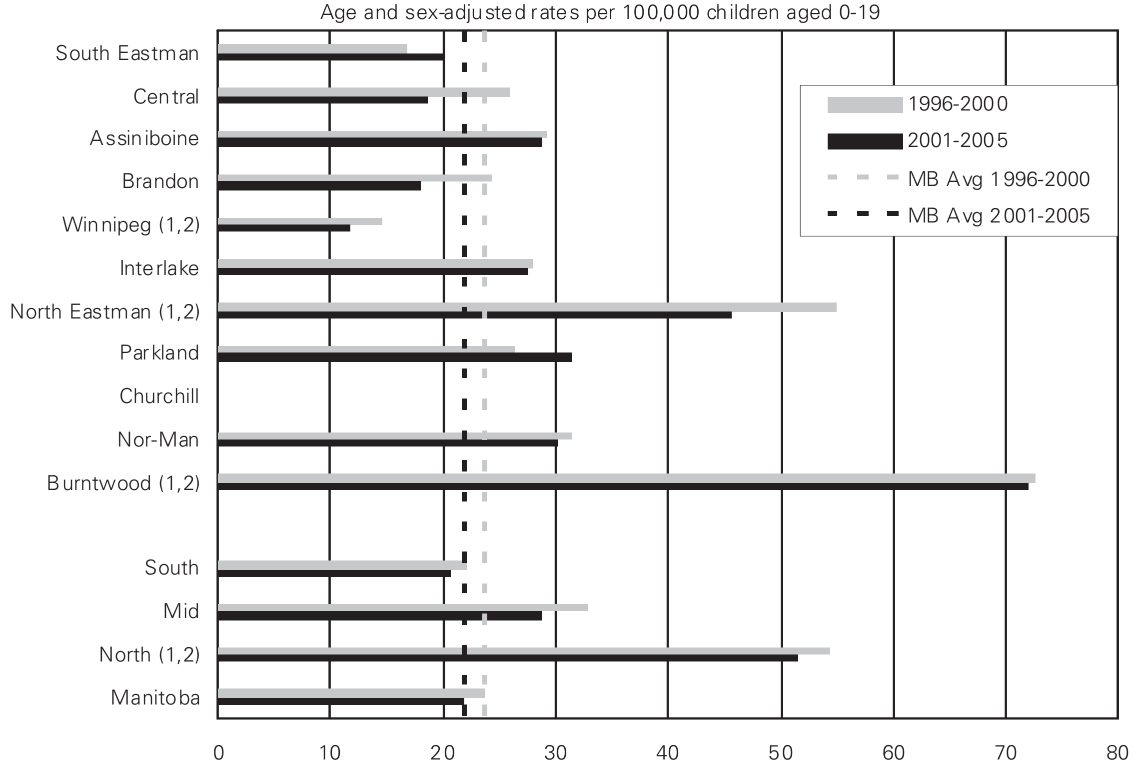
Source: Manitoba Centre for Health Policy, 2008

4.3 Injury Mortality

Injuries are the most common cause of death in children aged 1 to 19 years, comprising about half of all deaths in children 1 to 14 years of age and almost three–quarters of the deaths in adolescents 15 to 19 years (see section 4.2 Child Mortality). In this report we looked at **injury mortality**[21] for children 0 to 19 years of age in two time periods: 1996–2000 and 2001–2005. Injury mortality rates were calculated by dividing the total number of injury deaths in each time period by the total population in the same time period and are expressed as per 100,000 children. In the first time period the Manitoba child injury mortality rate was 23.7/100,000. This dropped to 21.9/100,000, a non–significant decrease. Children from North Eastman and Burntwood RHAs experienced significantly higher injury mortality rates in both time periods compared to the Manitoba average. In North Eastman, the injury mortality rate was over two times higher than the Manitoba average, at 54.9/100,000 in the first time period and 45.7/100,000 in the second time period. In Burntwood, the injury mortality rate was over three times higher than the Manitoba average, at 72.6/100,000 in the first time period and 72.0/100,000 in the second time period. Children living in Winnipeg had significantly lower injury mortality rates than the provincial average—14.7/100,000 in time 1 and 11.7/100,000 in time 2. There were no statistically significant changes in injury mortality rates over the two time periods.

Figure 4.18: Injury Mortality Rates by RHA

Age and sex-adjusted rates per 100,000 children aged 0-19



'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

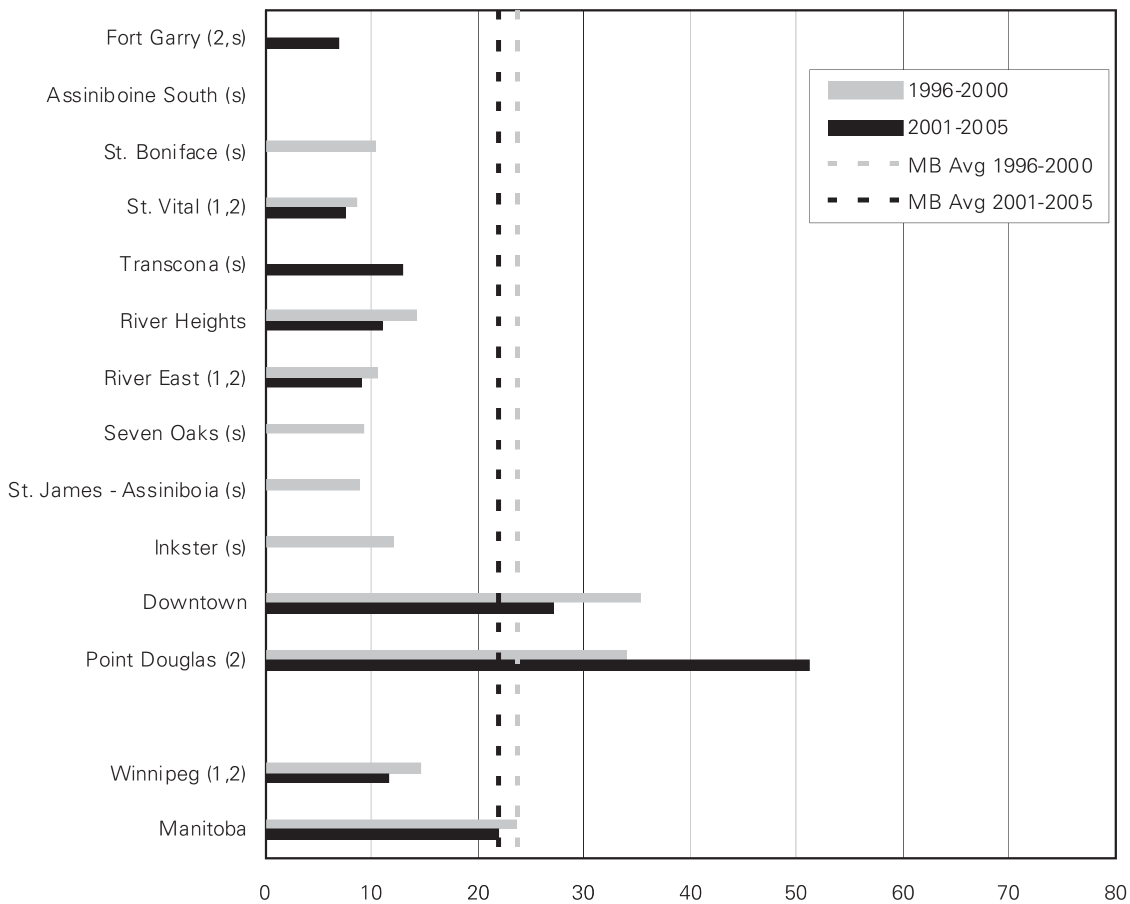
Source: Manitoba Centre for Health Policy, 2008

[21] Both unintentional and intentional injuries are included here. For a listing of the injuries included in this chapter please see the Appendix.

With the injury rates for Winnipeg children so much lower than the provincial average, many of the rates for the Winnipeg Community Areas are suppressed due to low numbers. Notable in the CA graph are the much higher rates of injury mortality in Downtown and Point Douglas compared to the rest of Winnipeg. The injury mortality rate for Point Douglas in the second time period (51.3/100,000) was significantly higher than the provincial average.

Figure 4.19: Injury Mortality Rates by Winnipeg Community Area

Age and sex-adjusted rates per 100,000 children aged 0-19



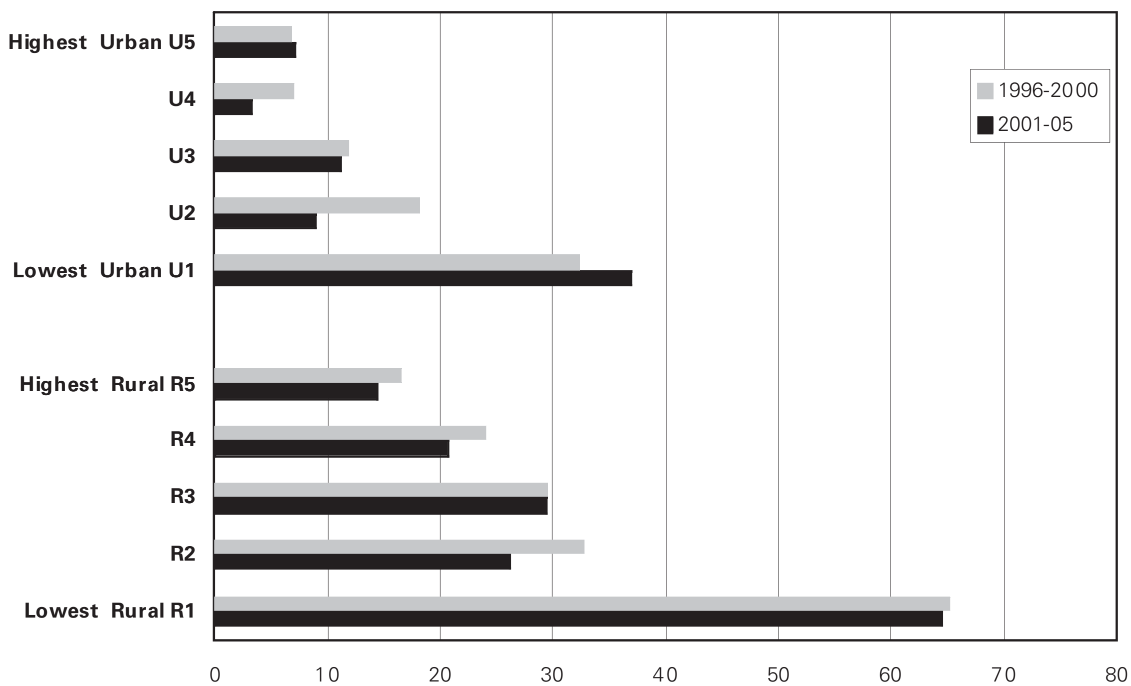
'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

Injury mortality rates are strongly related to socioeconomic status—with each decrease in area level income, there is an increase in injury mortality rates. This gradient is found in both urban and rural areas. In urban areas, injury mortality rates for children living in the lowest income quintile neighbourhoods were almost five times greater than those for children living in the highest income quintile neighbourhoods (32.5/100,000 for U1 in time 1 compared to 6.8/100,000 for U5; 36.9/100,000 for U1 in time 2 compared to 7.0/100,000 for U5). In rural areas, the injury mortality rates for children living in the lowest income quintile neighbourhoods were almost four times greater in time 1 and four–and–a–half times greater in time 2 than the rates for children living the highest income quintile neighbourhoods (65.1/100,000 for R1 in time 1 compared to 16.5/100,000 for R5; 64.4/100,000 for R1 in time 2 compared to 14.3/100,000 for R5). As with overall child mortality rates, the income quintile graph illustrates the much higher injury mortality rates for rural compared to urban children.

Figure 4.20: Injury Mortality Rates by Income Quintile

Age and sex-adjusted rates per 100,000 children aged 0-19



Linear Trend Test Results

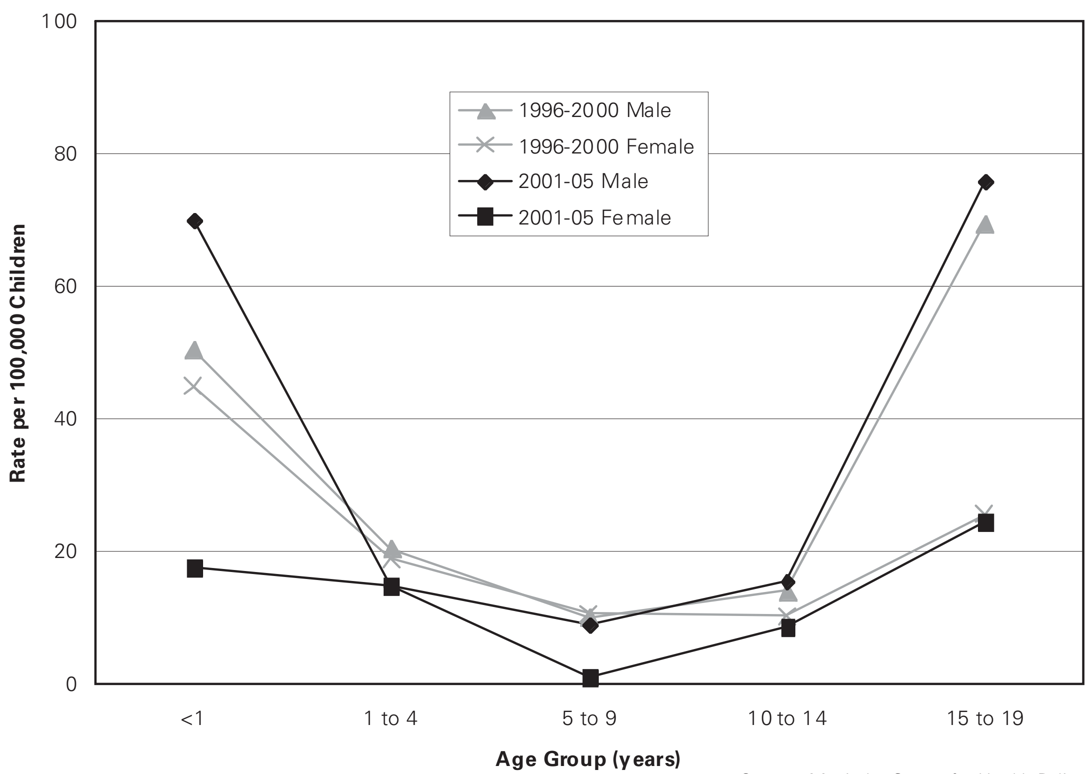
Time 1: Rural: Significant ($p<.001$) Urban: Significant ($p<.001$)

Time 2: Rural: Significant ($p<.001$) Urban: Significant ($p<.001$)

Source: Manitoba Centre for Health Policy, 2008

Males tend to have higher injury mortality rates, particularly in adolescence. The line graph by age and sex indicates that in the first time period (light grey lines), male and female injury rates were similar for all age groups except the 15– to 19–year–olds, where male rates (69.6/100,000) were over two–and–a–half times higher than female rates (25.7/100,000). In the second time period, the rate for 15– to 19–year–old males (75.8/100,000) was over three times higher than that for females (24.6/100,000) of the same age. Unlike the pattern in the first time period, in the second time period, the injury mortality rate for infant males (70.0/100,000) was four times higher than that for infant females (17.5/100,000). This discrepancy between time periods appears to be driven by both an increase in the infant male injury mortality rate and a decrease in the infant female injury mortality rate over the two time periods. Injury mortality in infants should be monitored to determine whether this pattern continues or whether it was due to random fluctuation. The graph also shows a substantial decrease in injury mortality rates for 5– to 9–year–old girls in the second time period, which was found to be statistically significant in subsequent analysis (p<0.01). Further exploration of this reduction in injury rates for young girls and the emerging sex differences in younger children could help inform injury prevention efforts.

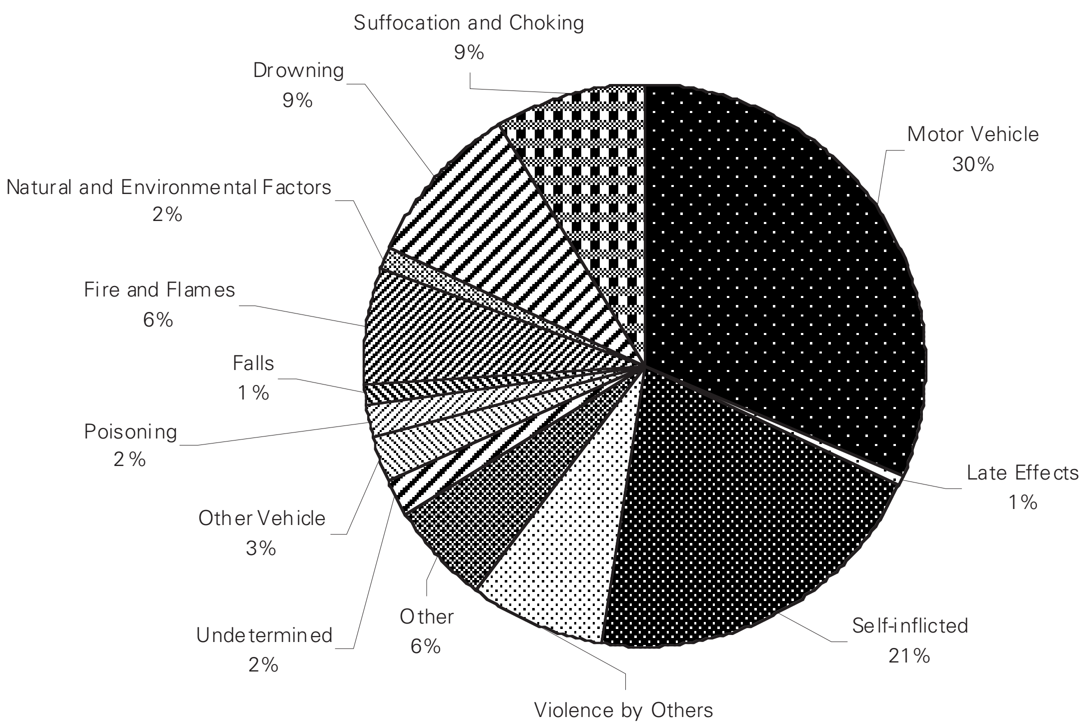
Figure 4.21: Crude Injury Mortality Rates by Sex and Age Group 1996/97-1999/2000 and 2001/02-2004/05



Source: Manitoba Centre for Health Policy, 2008

We also looked at types of injuries to determine which injuries were the most common causes of death (Figures 4.22 and 4.23). Motor vehicle collisions and self–inflicted injuries were the most common causes of death for children up to 19 years of age in both time periods, however their relative ranking changed over time: in the first time period more deaths were due to motor vehicle collisions (30%) than self–inflicted injuries (violence to self–21%) whereas in the second time period slightly more deaths were due to self–inflicted injuries (violence to self–27%) than motor vehicle collisions (25%). Other significant contributors to injury deaths in Manitoba children were suffocation and choking (9% in time 1 and 13% in time 2), violence by others (8% in time 1 and 12% in time 2) and drowning (9% in time 1 and 8% in time 2). Information on the causes of injury mortality by age and by sex can be found in the Appendix for this section.

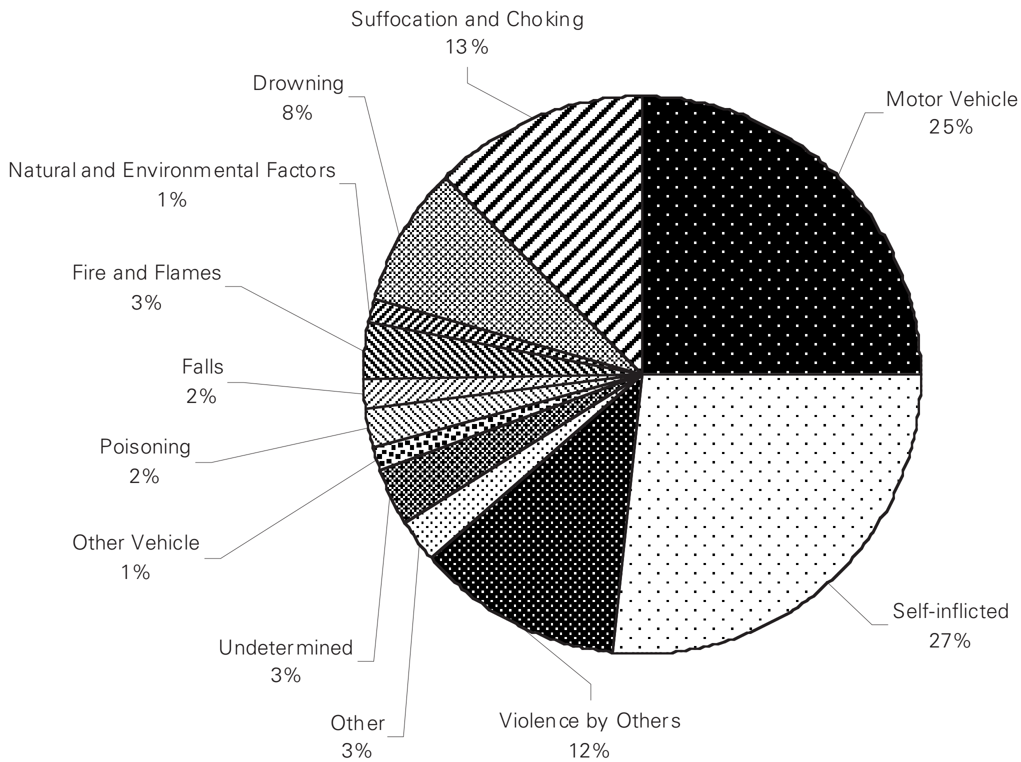
Figure 4.22: Causes of Injury Mortality Children up to Age 19, 1996-2000



Note: Categories of <1% were excluded

Source: Manitoba Centre for Health Policy, 2008

Figure 4.23: Causes of Injury Mortality Children up to Age 19, 2001-05



Note: Categories of <1% were excluded

Source: Manitoba Centre for Health Policy, 2008

The following table (4.1) shows the top five causes of injury deaths by age group. The most significant contributors to injury deaths tend to differ across age: deaths due to suffocation and choking tend to be highest in infancy, whereas motor vehicle collisions and self–inflicted injuries are highest in adolescence, particularly the 15 to 19 year age group. Violence by others is highest in infancy after which it drops, but increases again in late adolescence. Stacked bar graphs showing the percent of injury deaths due to the top six causes of injury by age group and time period can be found in the Appendix.

Table 4.1: Injury Mortality for Children by Age Group

Top Overall Causes in 2001-05 (crude rates per 100,000)

	Ages < 1	Ages 1 to 4	Ages 5 to 9	Ages 10 to 14	Ages 15 to 19
#1	Suffocation and Choking (21.44)	Motor Vehicle (4.51)	Motor Vehicle AND Fire and Flames (s)	Self-inflicted (5.64)	Self-inflicted (16.54)
#2	Violence by Others (s)	Suffocation and Choking (2.43)	Drowning (s)	Motor Vehicle (2.11)	Motor Vehicle (15.10)
#3	Drowning (s)	Drowning (2.08)	Suffocation and Choking AND Falls (s)	Suffocation and Choking (s)	Violence by Others (7.19)
#4	————	Fire and Flames (s)	Self-inflicted (s)	Violence by Others AND Drowning (s)	Suffocation and Choking (3.84)
#5	————	Violence by Others (s)	————	Fire and Flames (s)	Drowning (2.64)

Top Overall Causes in 1996-00 (crude rates per 100,000)

	Ages < 1	Ages 1 to 4	Ages 5 to 9	Ages 10 to 14	Ages 15 to 19
#1	Violence by Others (12.30)	Drowning (4.77)	Motor Vehicle (4.27)	Motor Vehicle (3.86)	Motor Vehicle (17.49)
#2	Suffocation and Choking (9.57)	Motor Vehicle AND Fire and Flames (3.81)	Drowning (1.66)	Self-inflicted (3.38)	Self-inflicted (15.24)
#3	Motor Vehicle (s)	Violence by Others (2.86)	Fire and Flames (1.19)	Suffocation and Choking (s)	Suffocation and Choking (3.00)
#4	Fire and Flames (s)	Suffocation and Choking (s)	Suffocation and Choking (s)	Drowning (s)	Drowning (2.25)
#5	Falls (s)	————	Violence by Others (s)	Violence by Others (s)	Violence by Others (2.00)

's' indicates data suppressed due to small numbers

Note: Categories 'undetermined' or 'other' as cause of death are excluded from the table

Source: Manitoba Centre for Health Policy, 2008

Chapter 5: Health Care Utilization

5.1 Complete Immunization Schedule

Immunization is a primary preventive care intervention to initiate or increase resistance against infectious disease. Immunization is arguably the single most important public health achievement in the past century as infectious diseases have dropped from being the leading cause of death a century ago to accounting for less than 5% of the deaths in Canada today (Canadian Coalition for Immunization Awareness and Promotion, 2008).

Despite these achievements, a telephone survey found that national rates of children with up–to–date **immunization coverage** decreased for both 2–year–olds and 7–year–olds between 1990 and 2000 (PHAC, 2002).[22] Another recent study in Saskatoon found immunization coverage was relatively stable between 1999 and 2002 (Avis et al., 2007). Immunization coverage rates have been associated with neighbourhood income, the proportion of female headed one–parent households in a neighbourhood, family religious beliefs, **continuity of care**, physician time in practice, and physician volume of primary care billing (Avis et al., 2007; Guttmann et al., 2006; Kulig et al., 2002).

The recommended immunization schedule for children depends on the child's age. In this section, we looked at complete immunization rates for children 1, 2, 7 and 11 years of age. The list of immunizations recommended for each age group can be found in the Glossary. The information on immunizations comes from the Manitoba Immunization Monitoring System (MIMS).[23]

5.1.1 Rates for 1–year–old children

For immunization rates for 1–year–old children we looked at two birth cohorts—those born in 1998 through 2000 and those born in 2003 through 2005. Both cohorts were followed until their first birthday. Immunizations by one year include diphtheria, pertussis, tetanus, polio (all combined in one vaccine—DaPTP) and *Haemophilus influenzae B* (HiB). Complete immunization rates for children 1 year of age decreased significantly in Manitoba for the second time period compared to the first, going from 84.6% to 82.5%[24] (Figure 5.1). Four of the RHAs also showed significant decreases in 1–year–old immunization rates over time: South Eastman (89.8% to 84.8%), Central (80.6% to 75.1%), Winnipeg (87.7% to 85.8%) and Interlake (86.9% to 82.0%). Children living in Assiniboine (87.8%, 86.9%), Brandon (87.7%, 87.8%) and Winnipeg had significantly higher 1–year–old immunization rates in both time periods than the provincial average, whereas children living in Central, North Eastman (79.6%, 78.2%), Nor–Man (73.8%, 76.1%) and Burntwood (66.2% in both time periods) had significantly lower rates in both time periods. South Eastman had higher rates in the first time period and Parkland had higher rates in the second time period compared to the provincial average.

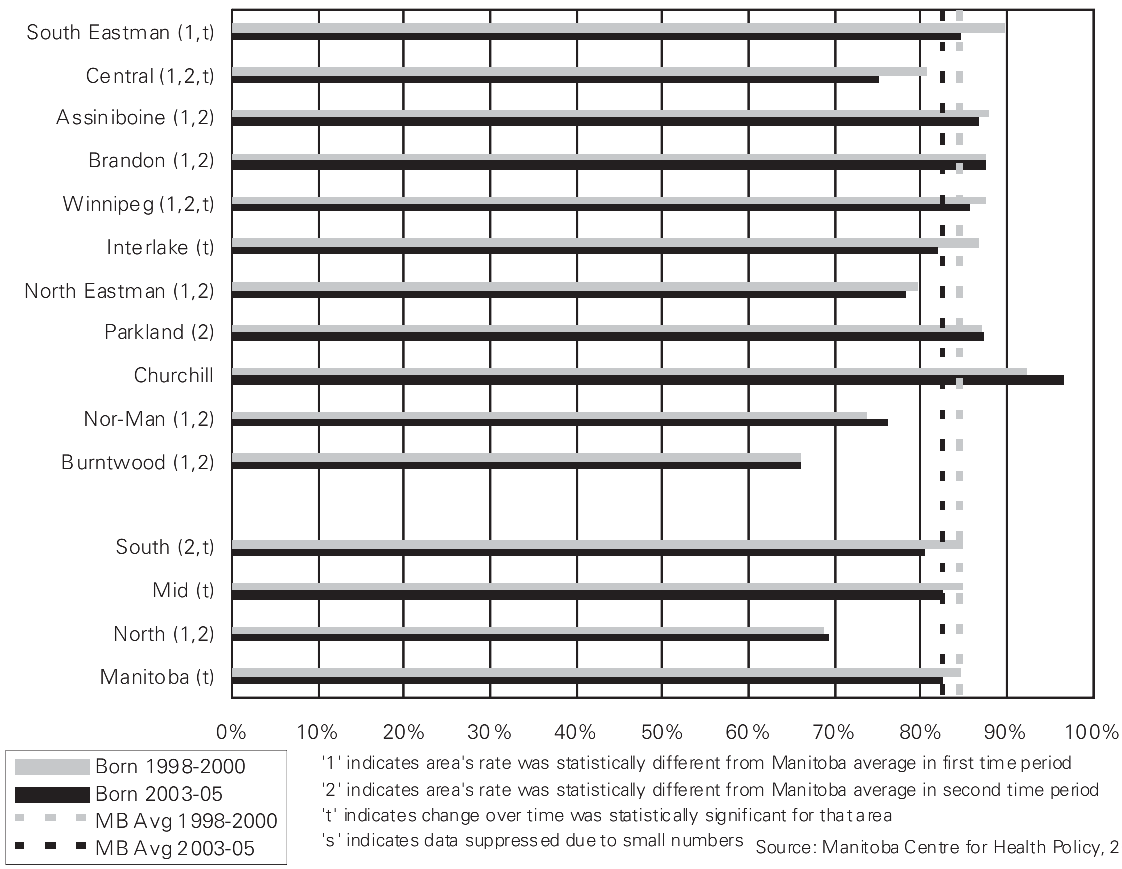
[22] One limitation of determining immunization coverage through a telephone survey is that those households without telephones would not be included.

[23] MIMS relies on medical claims submissions for records of immunizations performed by physicians. Failure of salaried physicians to submit evaluation claims for immunizations could result in under–estimates of immunization rates.

[24] An analysis of separate vaccines required at this age revealed that the immunizations requiring 3 doses by age 1 (DaPTP, HiB) were the ones that contributed to the decrease.

Figure 5.1: Complete Immunization Rates for Infants Aged 1 Year by RHA

Sex-adjusted percent of infants who have completed immunization schedules



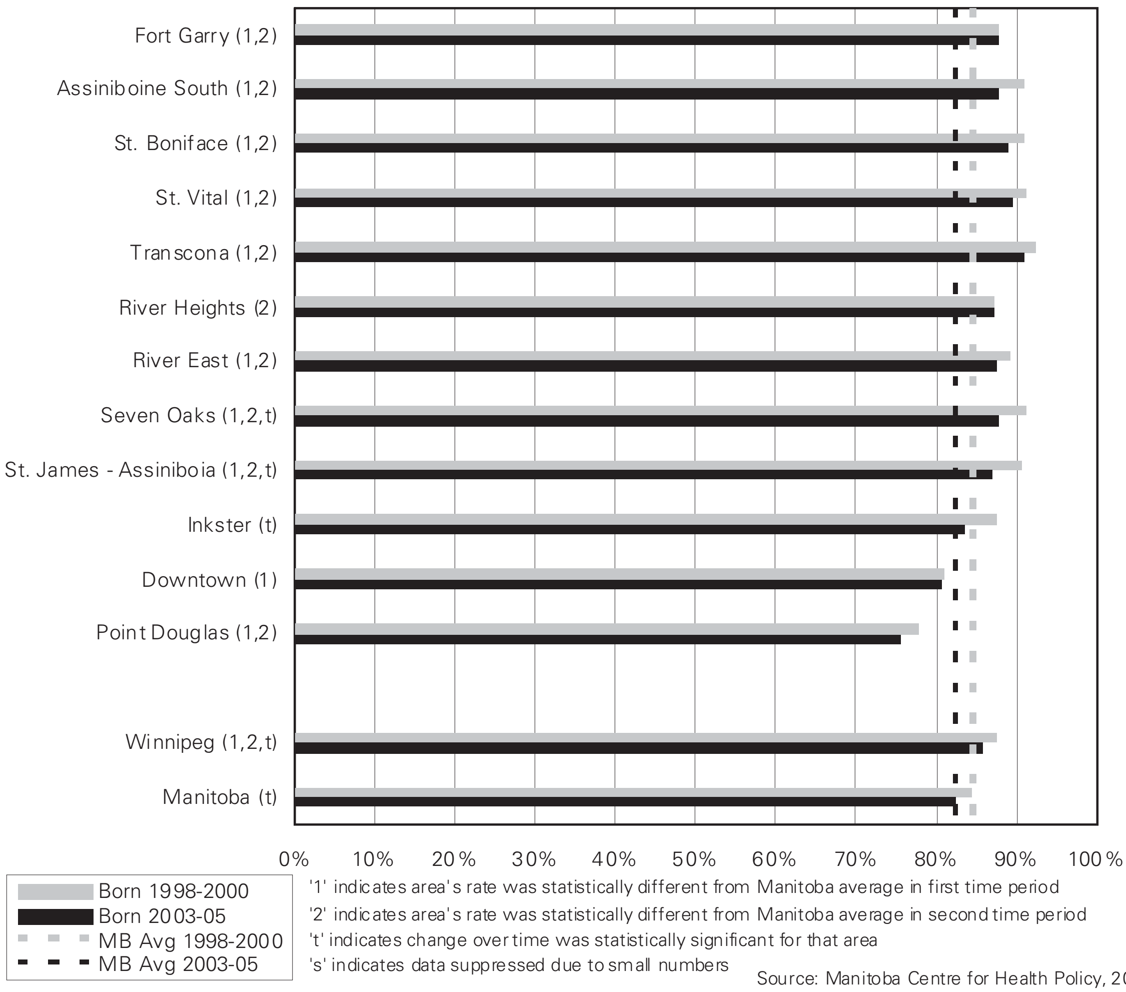
'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

Most of the Winnipeg Community Areas had significantly higher 1–year–old immunization rates than the provincial average except Downtown, which had significantly lower rates in the first time period (81.0%), and Point Douglas, where rates were significantly lower in both time periods (78.0% and 75.7%). Rates decreased significantly over the study period in Seven Oaks (91.2% to 88.0%), St. James–Assiniboia (90.8% to 87.0%) and Inkster (87.6% to 83.6%).

Figure 5.2: Complete Immunization Rates for Infants Aged 1 Year by Winnipeg Community Area

Sex-adjusted percent of infants who have completed immunization schedules



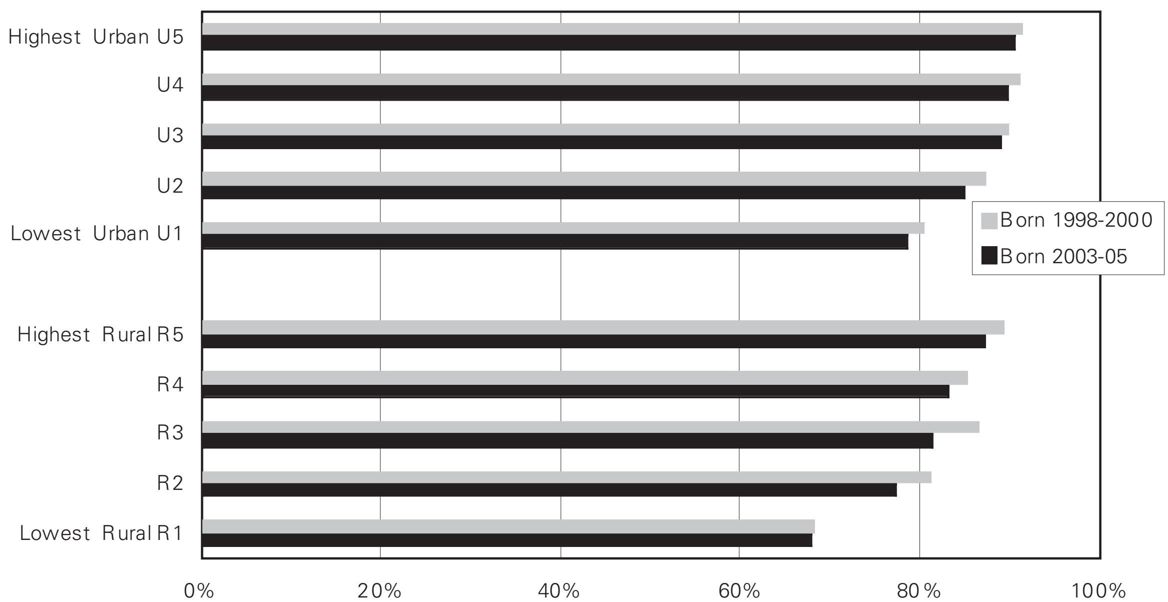
'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

Immunization rates for 1–year–old children were significantly related to area–level income in both rural and urban areas in both time periods. Rates decreased as area–level income decreased. For example, in the second time period, the immunization rate for children in urban areas was 90.5% for those living in the highest income quintile neighbourhoods and 78.5% for those in the lowest income quintile neighbourhoods. In rural areas, the gap between highest and lowest income quintile areas was even more dramatic with 87.2% of the children from the highest income quintile areas having complete immunizations at 1 year of age compared to 67.8% in the lowest income quintile areas.

Figure 5.3: Complete Immunization Rates for Infants Aged 1 Year by Income Quintile

Sex-adjusted percent of infants who have completed immunization schedules



Linear Trend Test Results

Time 1: Rural: Significant (p<.001) Urban: Significant (p<.001)

Time 2: Rural: Significant (p<.001) Urban: Significant (p<.001)

Source: Manitoba Centre for Health Policy, 2008

5.1.2 Rates for 2–year–old children

For immunization rates for 2–year–old children we looked at children born in 1997 through 1999 and those born in 2002 through 2004. Both cohorts were followed until their second birthday. Immunizations required by two years include additional doses of DaPTP and HiB, as well as the measles, mumps and rubella (MMR) vaccine.[25] As was found for 1–year–old rates, complete immunization rates for children 2 years of age decreased significantly in Manitoba over the study period, going from 72.3% to 69.6%[26] (Figure 5.4). Three of the four RHAs that showed significant

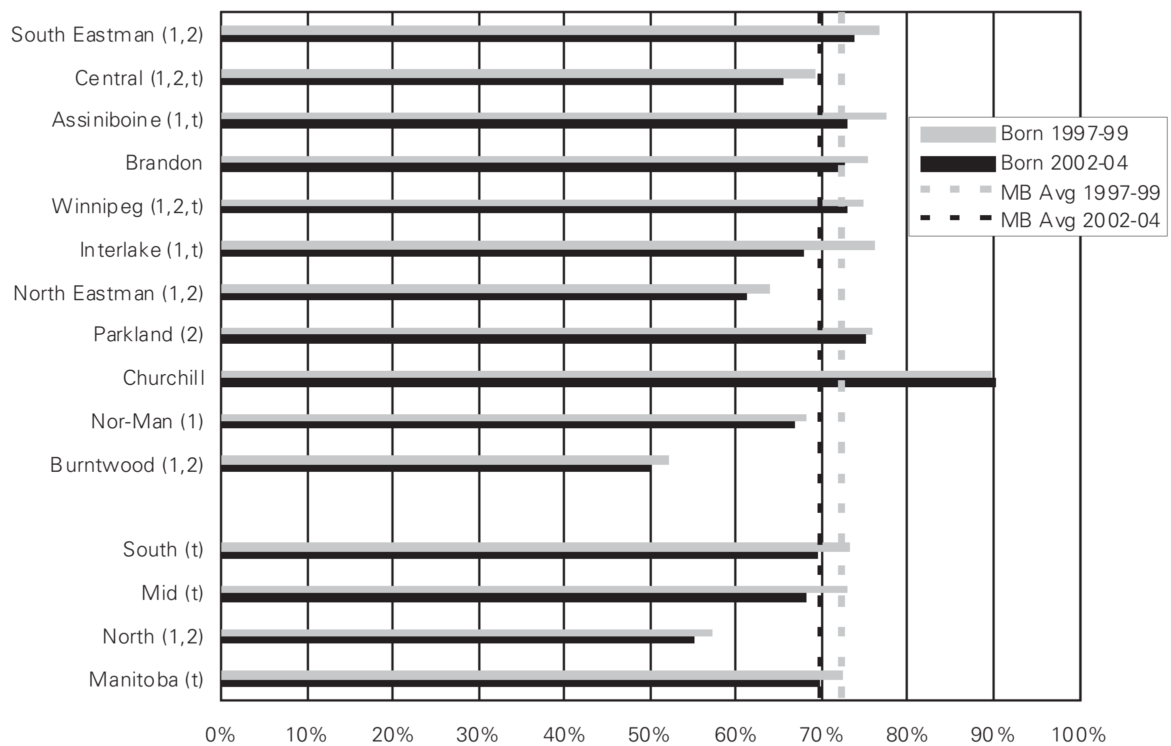
[25] Immunizations required for our study excluded Pneumococcal conjugate 7 valent and Varicella which were not introduced to the immunization schedule until 2004.

[26] An analysis of separate vaccines required at this age revealed that the immunizations requiring 4 doses (DaPTP, HiB) were the ones that contributed most to the decrease. See also Martens et al., 2008.

decreases in 1–year–old immunization rates also showed significant decreases in 2–year–old immunization rates over time: Central (69.3% to 65.6%), Winnipeg (74.8% to 73.0%) and Interlake (76.2% to 67.8%). Children in Assiniboine also experienced a significant decrease in 2–year–old immunization rates (77.6% to 72.9%). Children living in South Eastman (76.6%, 73.8%) and Winnipeg had significantly higher 2–year–old immunization rates in both time periods than the provincial average, whereas children living in Central, North Eastman (63.8%, 61.2%) and Burntwood (52.0%, 49.9%) had significantly lower rates in both time periods. In time 1, Assiniboine and Interlake had significantly higher rates than the provincial average and Nor–Man rates were significantly lower. Rates in Parkland were significantly higher than the provincial average in time 2. It is interesting to note that although not statistically significant, when compared to the other RHAs, the rates of complete immunization for both 1– and 2–year–olds in Churchill are consistently high relative to the other RHAs.

Figure 5.4: Complete Immunization Rates for Children Aged 2 Years by RHA

Sex-adjusted percent of children who have completed immunization schedules



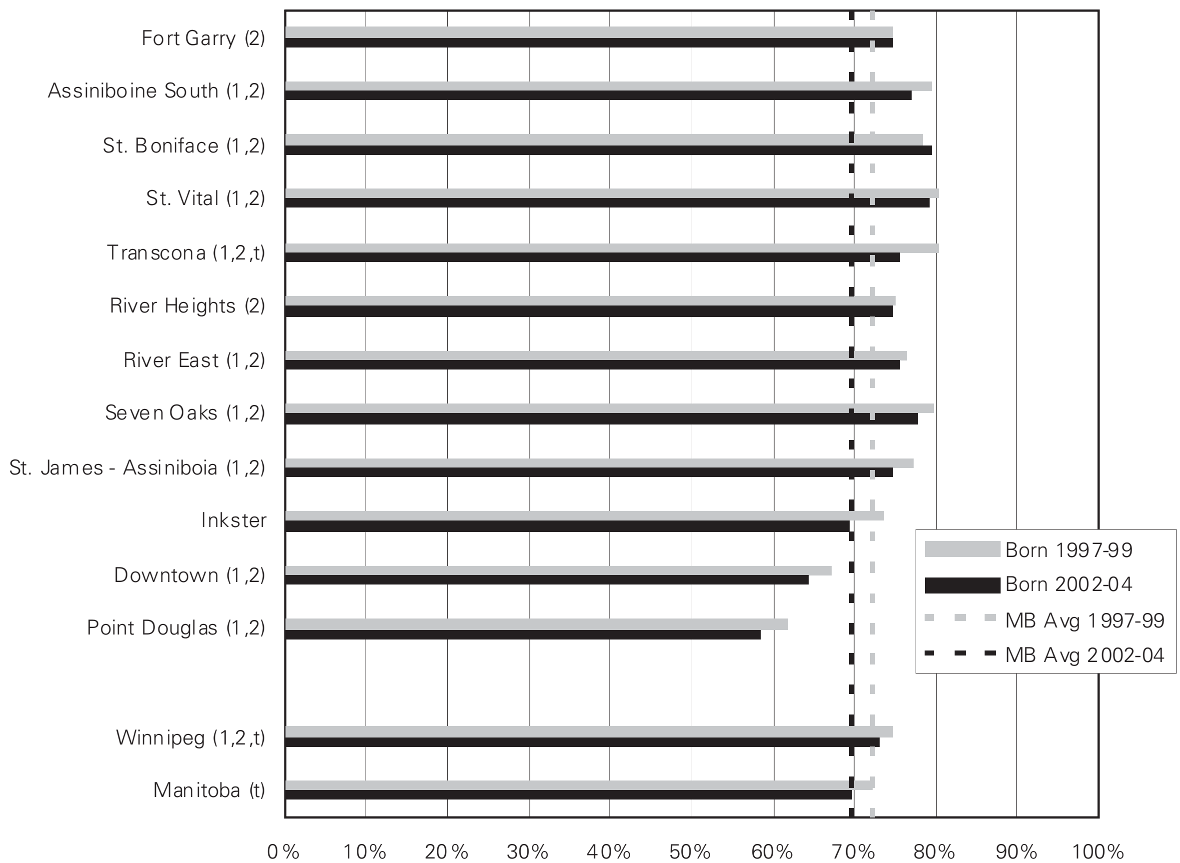
'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

Most of the Winnipeg Community Areas had significantly higher 2–year–old immunization rates than the provincial average. The exceptions are Inkster, where rates were not significantly different from the provincial average in either time period, and Downtown and Point Douglas, which both had significantly lower rates in both time periods (Downtown—67.1%, 64.4%; Point Douglas—61.9%, 58.5%). Only in Transcona did the 2–year–old immunization rates decrease significantly over the study period (80.2% to 75.7%)

Figure 5.5: Complete Immunization Rates for Children Aged 2 Years by Winnipeg Community Area

Sex-adjusted percent of children who have completed immunization schedules



'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

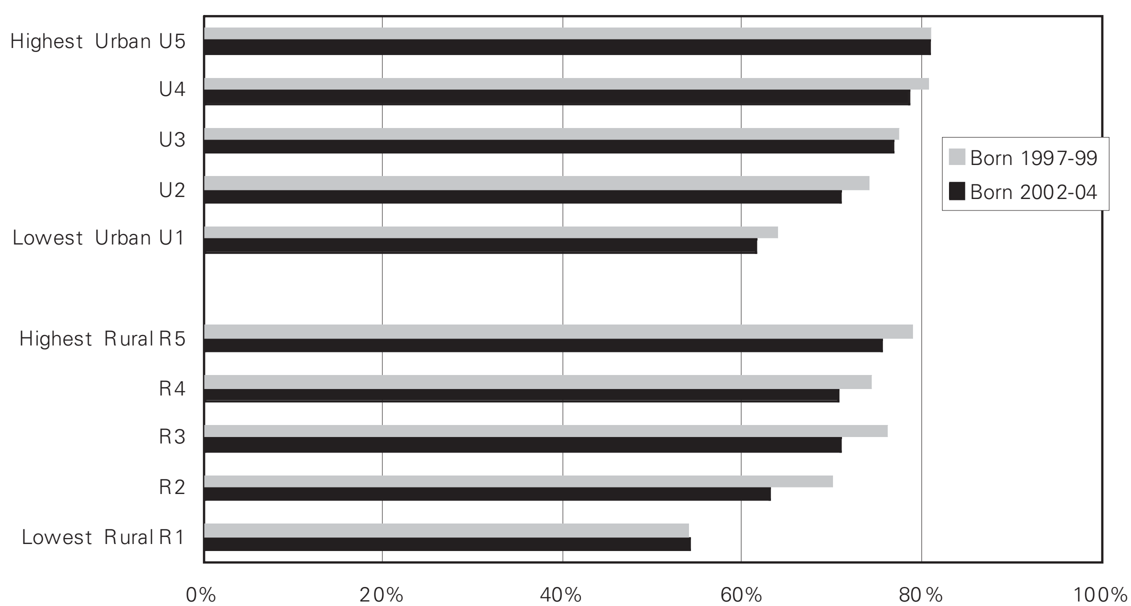
Source: Manitoba Centre for Health Policy, 2008

As was the case with the 1–year–old immunization rates, immunization rates for 2–year–old children were significantly related to area–level income in both rural and urban areas in both time periods. Rates decreased as area–level income decreased. For example, in the second time period, the immunization rate for children in urban areas was 80.9% for those living in the highest income quintile neighbourhoods and 61.5% for those in the lowest income quintile neighbourhoods. In rural areas, 75.5% of the children from the highest income quintile areas had complete immunizations at 2 years of age compared to 54.1% in the lowest income quintile areas.

In an attempt to increase the immunization rates of 2–year–old children, reminder letters are now sent to families when a child is 20 months old. This practice began province–wide in 2006 and so any impact this has had on immunization rates would not be evident in this report, but should be monitored in future analyses. For a thorough discussion of 2–year immunization rates, including factors that contribute to changes over time and regional variations in rates and a break down of rates for individual vaccines, see Martens et al. (2008).

Figure 5.6: Complete Immunization Rates for Children Aged 2 Years by Income Quintile

Sex-adjusted percent of children who have completed immunization schedules



Linear Trend Test Results

Time 1: Rural: Significant (p<.001) Urban: Significant (p<.001)

Time 2: Rural: Significant (p<.001) Urban: Significant (p<.001)

Source: Manitoba Centre for Health Policy, 2008

5.1.3 Rates for 7–year–old children

For immunization rates for 7–year–old children we looked at children born in 1992 through 1994 and those born in 1997 through 1999. Both cohorts were followed until their seventh birthday. Immunizations required by 7 years include additional doses of the same vaccines required at 2 years[27] (Figure 5.7). In contrast to findings for 1– and 2–year–old rates, complete immunization rates for children 7 years of age actually increased significantly in Manitoba over the study period, going from 74.2% to 76.4%.[28] Seven of the RHAs experienced significant increases in 7–year–old immunization rates over time. Some of the increases were substantial: Central (80.1% to 82.3%), Assiniboine (83.4% to 88.3%) Interlake (68.6% to 77.8%) North Eastman (66.8% to 81.6%), Parkland (80.8% to 86.9%), Nor–Man (71.1% to 86.0%) and Burntwood (40.2% to 72.0%). Further exploration of what contributed to these increases could help inform programs aimed at increasing immunization rates. Children in Winnipeg experienced a significant decrease in 7–year–old immunization rates over the study period (76.7% to 71.1%). Children living in South Eastman (83.6%, 85.2%), Central, Assiniboine, Brandon (80.5%, 83.2%) and Parkland all had significantly higher 7–year immunization rates in both time periods compared to the provincial average, whereas children living in Winnipeg had significantly lower rates in both time periods. Interestingly, North Eastman had significantly lower rates than the provincial average in time 1, but significantly higher rates than the provincial average in time 2.

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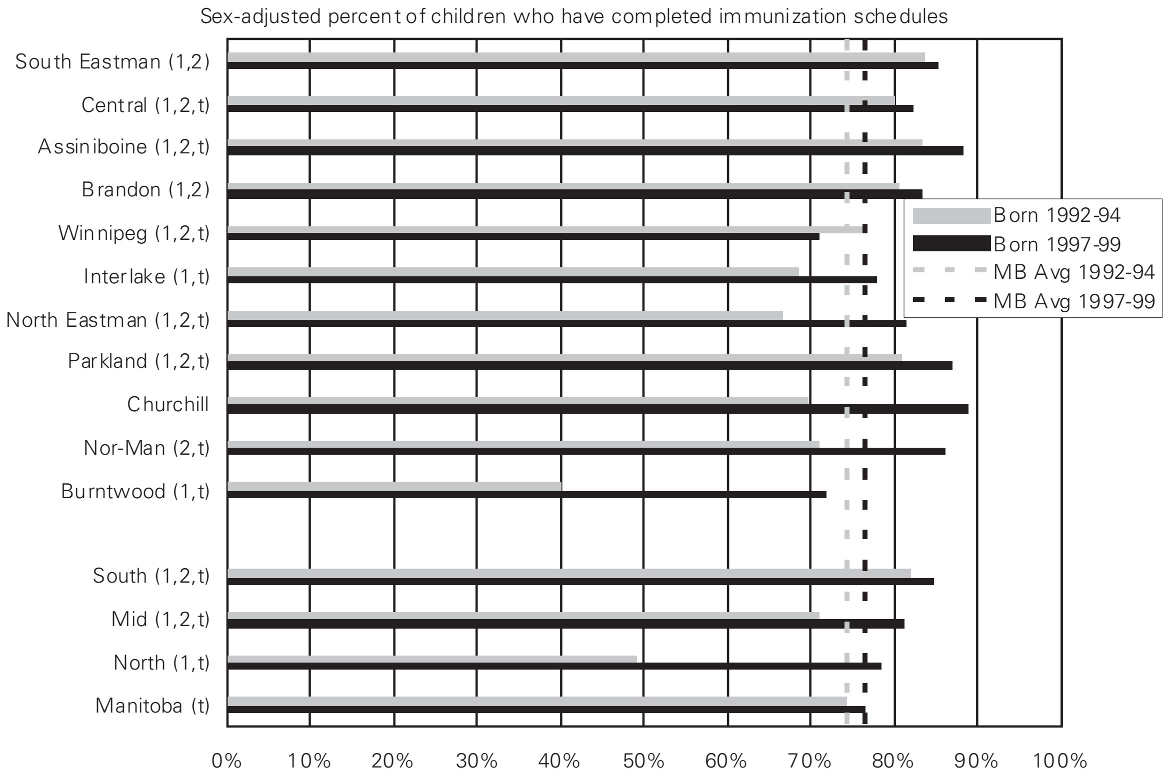
[27] The earlier cohort for this age group did not receive the combined DaPTP, but a separate vaccine for diphtheria, pertussis and tetanus (DPT) and polio.

[28] Separate analysis by vaccine revealed that the increase was due to increases for polio and HiB vaccines. DPT/DaPTP and MMR vaccines actually decreased slightly for this age group. It is possible that the decrease in MMR in the second cohort may have been associated with the publication of a study in 1998 (Wakefield et al., 1998) suggesting a possible link between the vaccine and autism and the widespread media attention following the study. Numerous subsequent studies have found no such association (Demicheli et al., 2005).

Figure 5.7: Complete Immunization Rates for Children Aged 7 Years by RHA



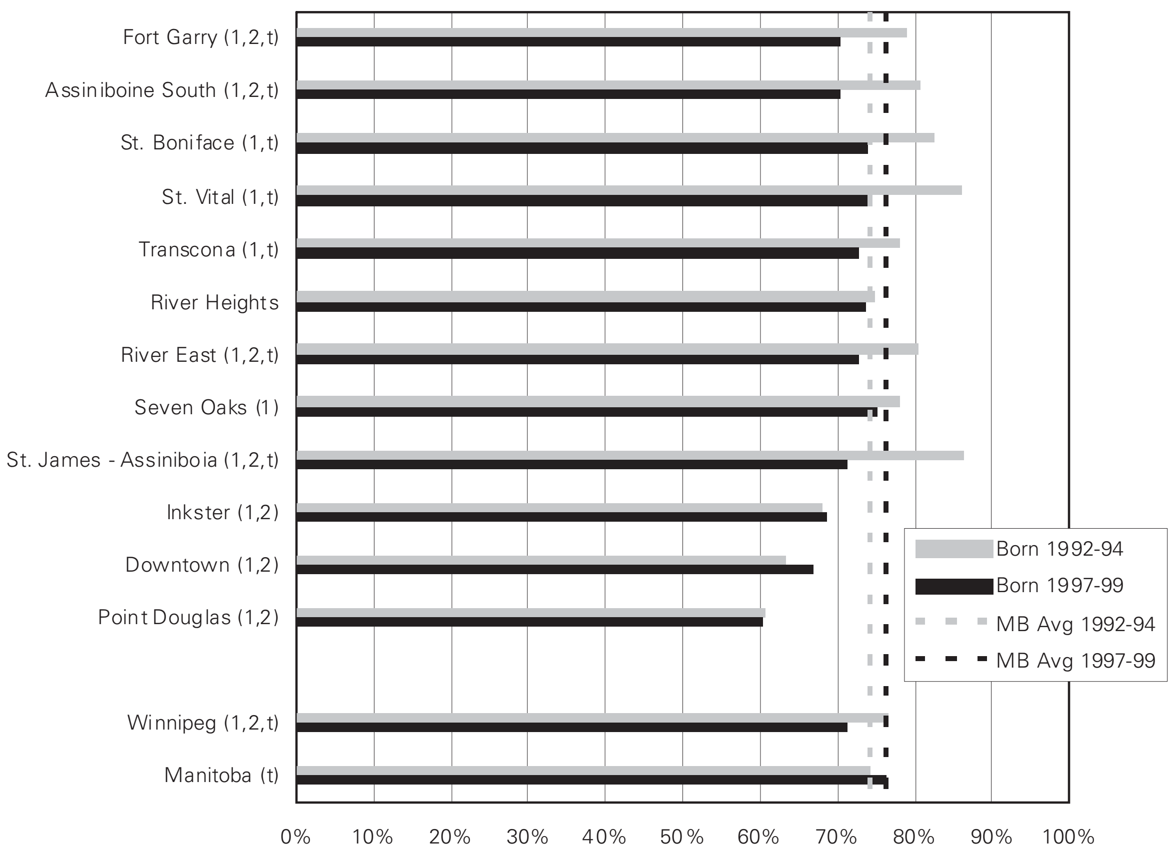
'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

In contrast to the increases in rates seen in many rural RHAs, seven of the 12 Winnipeg Community Areas experienced significant decreases in the rates of 7–year–old complete immunizations over the study period. Indeed, for four of the CAs, the 7–year–old rates were significantly higher than the Manitoba average in time 1, but were significantly lower than the provincial average in the second time period: Fort Garry (78.9% to 70.3%), Assiniboine South (80.6% to 70.4%), River East (80.3% to 72.8%) and St. James–Assiniboia (86.4% to 71.2%). An exploration as to why rates in some Winnipeg areas have decreased so substantially while at the same time many rural areas have shown dramatic increases is warranted. Children living in Inkster (68.0%, 68.6%), Downtown (63.4%, 66.8%) and Point Douglas (60.6%, 60.5%) had significantly lower 7–year–old immunization rates in both time periods, with only about 60% of children in Point Douglas having complete immunizations in either time period.

Figure 5.8: Complete Immunization Rates for Children Aged 7 Years by Winnipeg Community Area

Sex-adjusted percent of children who have completed immunization schedules



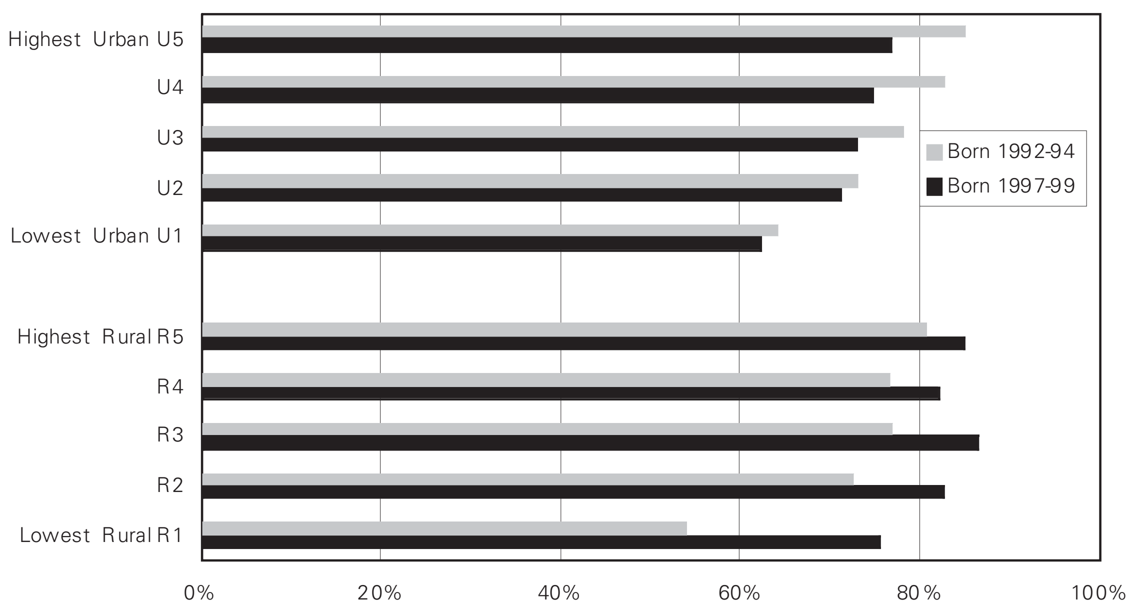
'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

As was the case with the 1– and 2–year–old immunization rates, immunization rates for 7–year–old children were significantly related to area–level income in both rural and urban areas in both time periods. Rates decreased as area–level income decreased. These trends changed significantly over the time period for both urban and rural areas; and in both cases, the change in trends was driven by a closing of the gap between the lowest and highest income quintiles over time. The trend for urban areas suggests that the decrease in 7–year–old immunization rates observed for Winnipeg is driven mainly by higher income areas. For example, the immunization rate for children in the highest income quintile neighbourhoods dropped from 85.1% to 76.6% whereas the drop in the lowest income quintile was minimal, going from 64.2% to 62.2%. In rural areas, the decreasing gap between high and low income was mostly driven by the increase in immunization rates for the lowest income quintile, from 54.2% to 75.3%. The increase in the highest income quintiles was not as dramatic, going from 80.9% to 84.9%. It is also interesting to note in this graph the higher rates of immunization for 7–year–old children in rural compared to urban areas in the second time period. Further exploration of these differences, and potential reasons they exist, could help highlight effective ways of increasing immunization rates at this age.

Figure 5.9: Complete Immunization Rates for Children Aged 7 Years by Income Quintile

Sex-adjusted percent of children who have completed immunization schedules



Linear Trend Test Results

Time 1: Rural: Significant (p<.001) Urban: Significant (p<.001)
Time 2: Rural: Significant (p<.001) Urban: Significant (p<.001)
Rural time change: Significant (p<.001) Urban time change (p<.001)

Source: Manitoba Centre for Health Policy, 2008

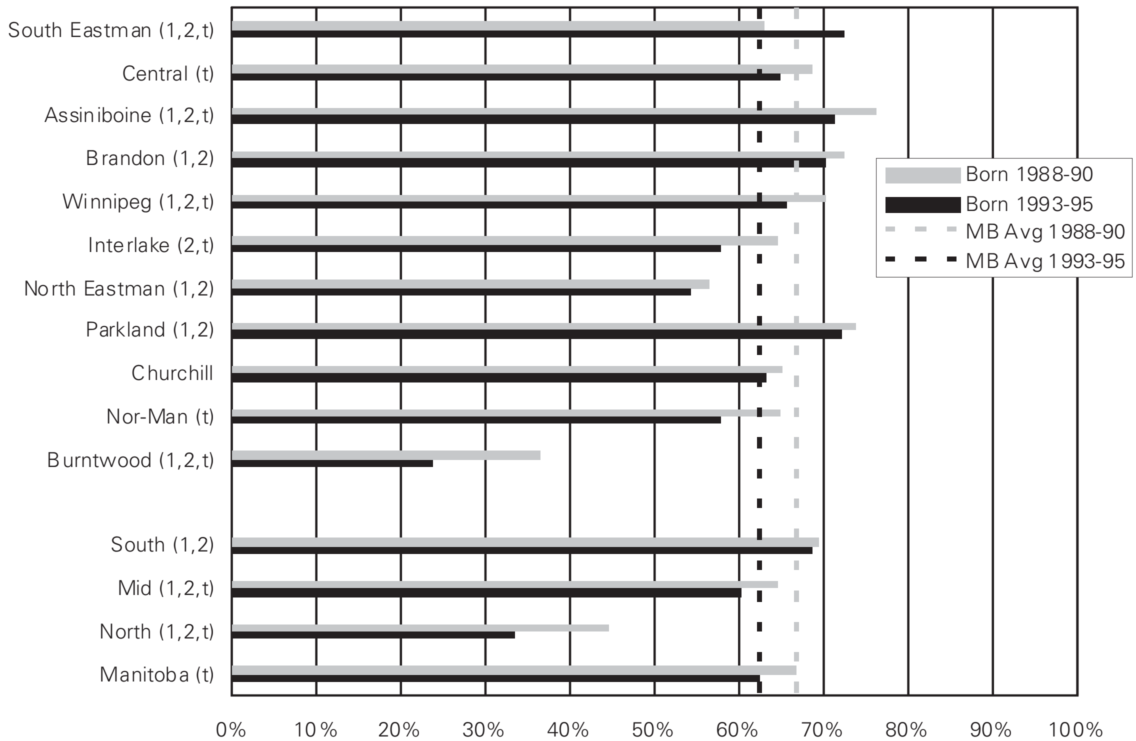
5.1.4 Rates for 11–year–old children

For immunization rates for 11–year–old children we looked at children born in 1988 through 1990 and those born in 1993 through 1995. Both cohorts were followed until their eleventh birthday. Immunizations required by 11 years include the DPT, polio, MMR and hepatitis B. Complete immunization rates for children 11 years of age decreased significantly in Manitoba over the study period, going from 66.9% to 62.4%[29] (Figure 5.10). Six of the RHAs experienced significant decreases in 11–year–old immunization rates over time: Central (68.8% to 64.8%), Assiniboine (76.3% to 71.4%), Winnipeg (70.4% to 65.9%), Interlake (64.6% to 57.9%), Nor–Man (64.9% to 58.0%) and Burntwood (36.6% to 23.9%). Only South Eastman RHA showed a significant increase over time in 11–year–old immunization rates from 63.0% to 72.4% and from significantly lower in time 1 to significantly higher in time 2 than the provincial average. Assiniboine, Brandon, Winnipeg and Parkland RHAs had significantly higher rates in both time periods compared to the provincial average, whereas North Eastman and Burntwood had significantly lower rates. Burntwood's rate in time 2 was the lowest at 23.9%.

[29] Separate analysis by vaccine revealed that the lower rates in the second time period were driven by multiple factors. For the first 11–year–old cohort, the rate of immunization for the MMR vaccine was 97%. In the second cohort, this dropped to 90%. Also, the entire second cohort was required to have the HiB vaccine, but because this vaccine was not introduced into the schedule until May of 1992, it was not required for the completed schedule for the first cohort. Finally, the Hepatitis B vaccine was introduced for grade 4 students in 1998, meaning that for half the first cohort it was not required in the completed schedule. Uptake of this vaccine was relatively low, particularly when it was launched in the 1998–99 school year, due to media coverage of the cessation of the Hepatitis B vaccine program in France. Therefore, the requirement of this vaccine in the completed schedule for the entire second birth cohort contributed to lower overall rates of completed immunizations for this group.

Figure 5.10: Complete Immunization Rates for Children Aged 11 Years by RHA

Sex-adjusted percent of children who have completed immunization schedules



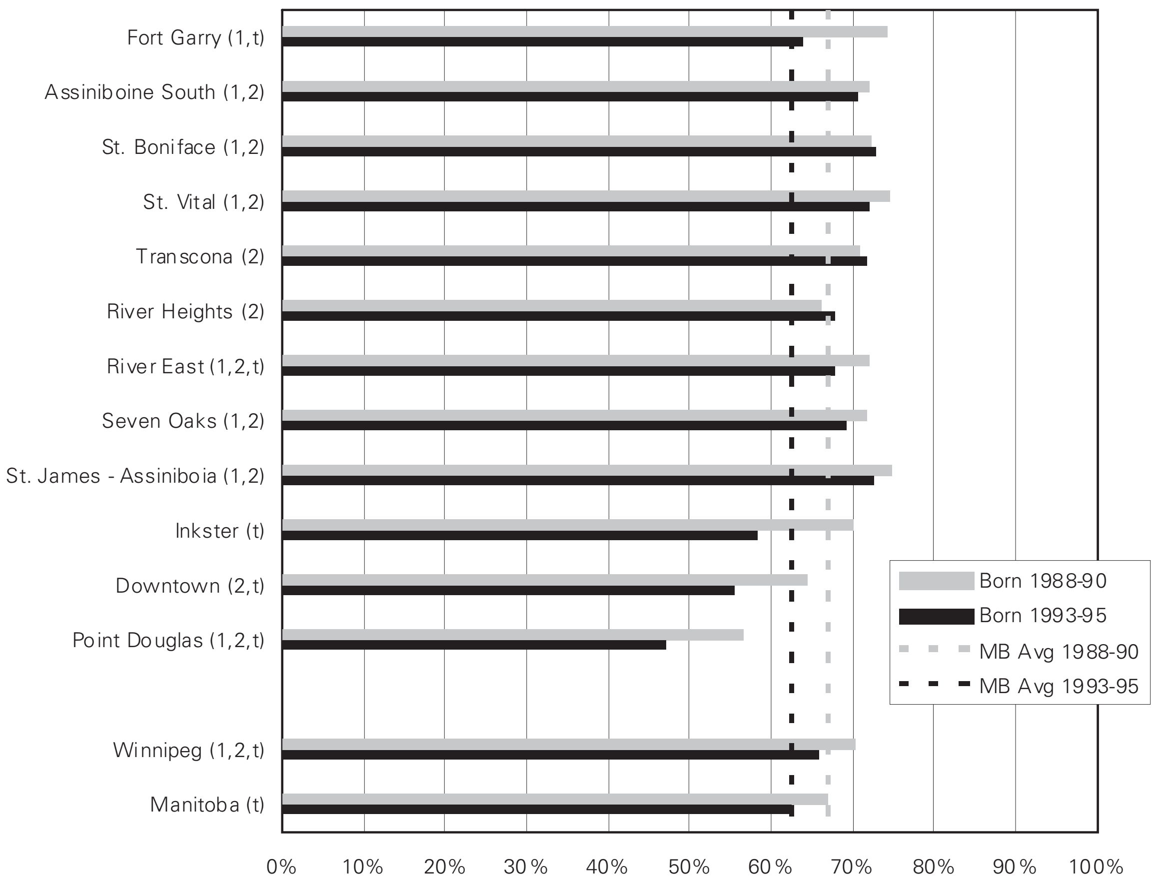
'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

The Winnipeg Community Areas of Fort Garry (74.3% to 64.0%), River East (71.9% to 67.9%), Inkster (70.2% to 58.4%), Downtown (64.5% to 55.4%) and Point Douglas (56.5% to 47.0%) all showed significant decreases in the complete 11–year–old immunization rates over the time period. Several of the Winnipeg CAs had significantly higher 11–year immunization rates in both time periods than the provincial average; Point Douglas had significantly lower rates in both time periods than the provincial average.

Figure 5.11: Complete Immunization Rates for Children Aged 11 Years by Winnipeg Community Area

Sex-adjusted per cent of children who have completed immunization schedules



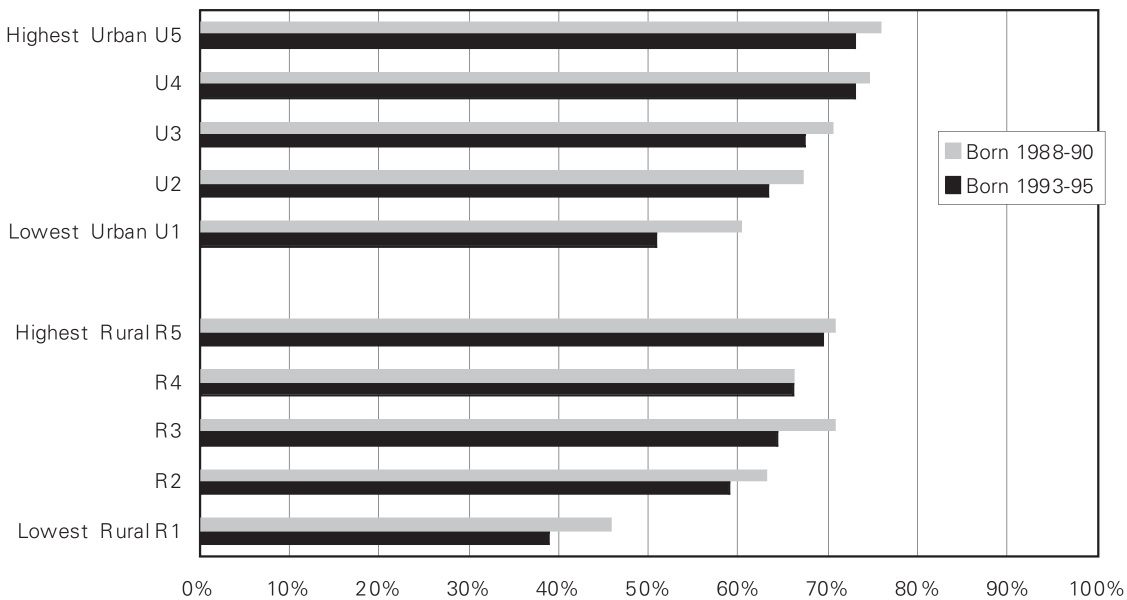
'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

As was the case with all the other age–group immunization rates, immunization rates for 11–year–old children were significantly related to area–level income in both rural and urban areas in both time periods. Rates decreased as area–level income decreased. These trends changed significantly over the time period for both urban and rural areas. In both cases the change in trends this time, in contrast to the 7–year–old rates, was driven by a widening of the gap between the lowest and highest income quintiles over time. The largest decrease in the urban areas was for the lowest income quintile neighbourhoods, which dropped from 60.5% to 50.7%, compared to a drop of 75.9% to 72.8% for the highest income quintile neighbourhoods. In rural areas, the same pattern was evident with a larger decrease for the lowest income quintile areas (46.0% to 38.7%) than the highest income quintile areas (70.9% to 69.2%).

Figure 5.12: Complete Immunization Rates for Children Aged 11 Years by Income Quintile

Sex-adjusted percent of children who have completed immunization schedules



Linear Trend Test Results
Time 1: Rural: Significant (p<.001) Urban: Significant (p<.001)
Time 2: Rural: Significant (p<.001) Urban: Significant (p<.001)
Rural time change: Significant (p<.001) Urban time change (p<.01)

Source: Manitoba Centre for Health Policy, 2008

There has been a great deal of discussion regarding the potential role of chiropractors in influencing immunization rates. Specifically, some chiropractors have stated that they think that immunizations are harmful, and therefore, recommend that children not receive them. Martens et al. (2008) explored the potential influence of chiropractors on decreasing immunization rates by looking at the association between maternal chiropractic use and child immunization. They found that the use of chiropractic by mothers did not affect the likelihood of immunization for 2–year–old children in Manitoba. Please see Martens et al. (2008) for a full discussion of this issue.

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5.2 Inpatient Hospitalizations for Vaccine–Preventable Infections

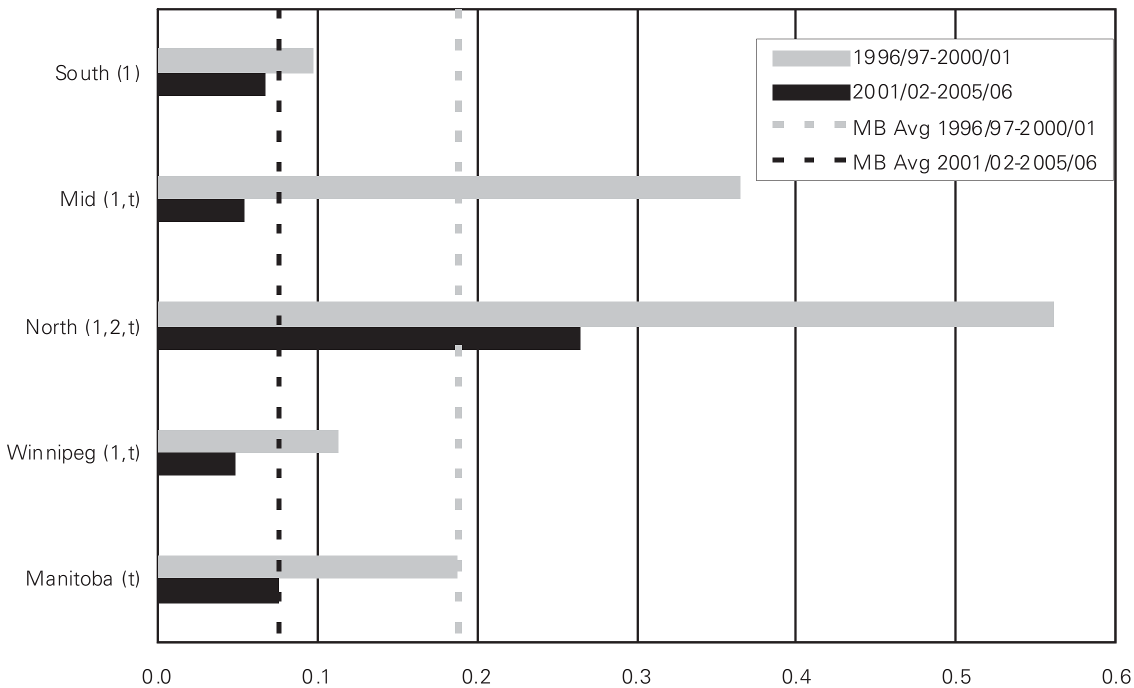
As part of the National Immunization Strategy, the Public Health Agency of Canada (PHAC) reports on a number of selected notifiable infectious diseases that are considered to be vaccine preventable (PHAC, 2006). Using the list from PHAC, we looked at hospitalization rates for children 0 to 19 years of age for the following preventable infections: *Haemophilis influenzae B*, diphtheria, pertussis, tetanus, poliomyelitis, measles, mumps, rubella, hepatitis B and congential rubella syndrome.[30] Rates of hospitalizations for vaccine–preventable infections tend to be low, and so are reported only at the aggregate region level. Rates were calculated for two five–year time periods: 1996/97–2000/01 and 2001/02–2005/06.

Hospitalization rates for **vaccine–preventable diseases** decreased significantly in Manitoba over the study period, falling from 0.19/1,000 in time 1 to 0.08/1,000 in time 2 (Figure 5.13). Hospitalizations for vaccine preventable diseases also decreased significantly for three of the four aggregate regions: Mid (0.37/1,000 to 0.05/1,000), North (0.56/1,000 to 0.26/1,000) and Winnipeg (0.11/1,000 to 0.05/1,000). Perhaps not surprisingly, aggregate regions that demonstrated lower immunization rates (see section 5.1 Immunizations) experienced significantly higher rates of hospitalizations for vaccine–preventable diseases compared to the provincial average. For the North region, where immunization rates at all ages were generally lower in both time periods, the hospitalization rates for vaccine–preventable diseases were significantly higher in both time periods than the provincial average. In the Mid region, hospitalizations for vaccine–preventable diseases were significantly higher than the provincial average only in the first time period. Interestingly, the 7– and 11–year immunization rates were significantly lower in the first time period for the Mid region (see Appendix section 5.1 on Immunizations). Both the South and Winnipeg aggregate regions demonstrated significantly lower rates of hospitalizations for vaccine–preventable infections in the first time period.

[30] Excluded from this list were vaccine–preventable diseases for which the vaccines only became part of the immunization schedule in Manitoba in 2004: invasive meningococcal disease, invasive pneumococcal disease, influenza, and varicella.

Figure 5.13: Hospitalization Rates for Vaccine-Preventable Infections by Aggregate RHA Area

Age- and sex-adjusted rates per 1,000 children aged 0-19



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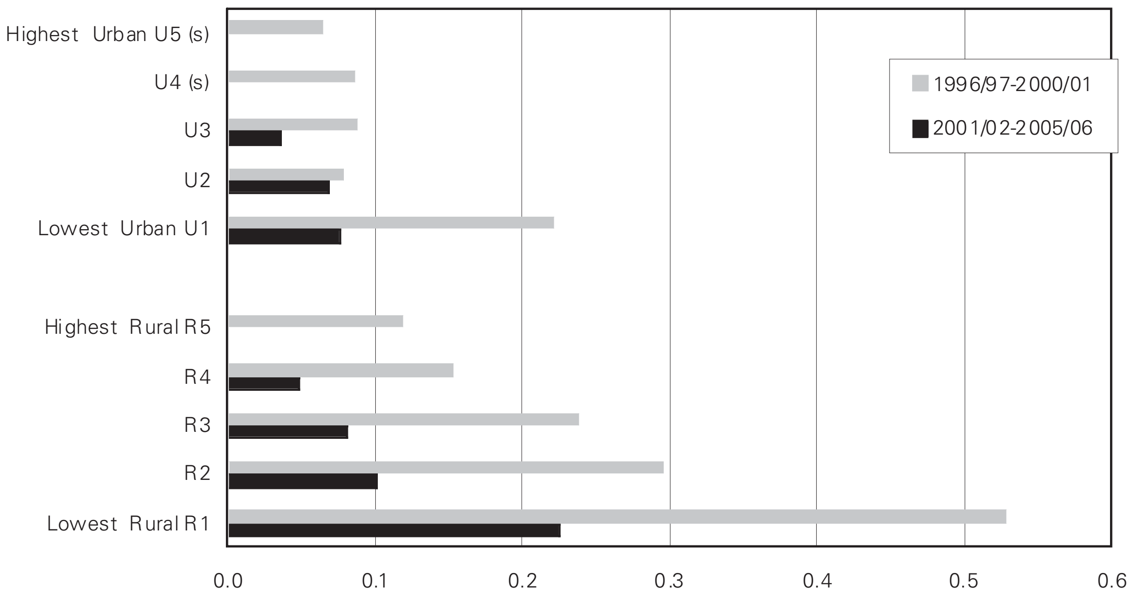
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

Vaccine–preventable hospitalization rates were significantly related to area–level income, with higher rates of these hospitalizations found for children living in lower income areas (Figure 5.14). This relationship was significant in both time periods for children living in rural areas and in the first time period for children living in urban areas. For example, in time 1, the rate of hospitalization for vaccine–preventable diseases for rural children from the highest income quintile neighbourhoods was 0.12/1,000 compared to 0.53/1,000 for children from the lowest income quintile neighbourhoods. In time 2, there were no hospitalizations for these infections for children from the highest rural income quintile neighbourhoods, compared to a rate of 0.22/1,000 for children from the lowest rural income quintile neighbourhoods.

Figure 5.14: Hospitalization Rates for Vaccine-Preventable Infections by Income Quintile

Age- and sex-adjusted rates per 1,000 children aged 0-19



Linear Trend Test Results

Time 1: Rural: Significant (p<.001) Urban: Significant (p<.01)
Time 2: Rural: Significant (p<.001)

Source: Manitoba Centre for Health Policy, 2008

The majority of children hospitalized for vaccine–preventable illnesses are infants, who accounted for over 60% of the vaccine–preventable hospitalizations in both time periods. Almost 80% of the vaccine–preventable hospitalizations in both time periods were to children under the age of 5 years. The most common causes of vaccine–preventable illness hospitalizations were pertussis, which accounted for about half of these hospitalizations, and *Haemophilus influenzae B*, which accounted for over a third of these hospitalizations. Tables showing the breakdown of vaccine–preventable hospitalization by age and the diseases that were the most common reasons for hospitalization by age group and time period can be found in the Appendix.

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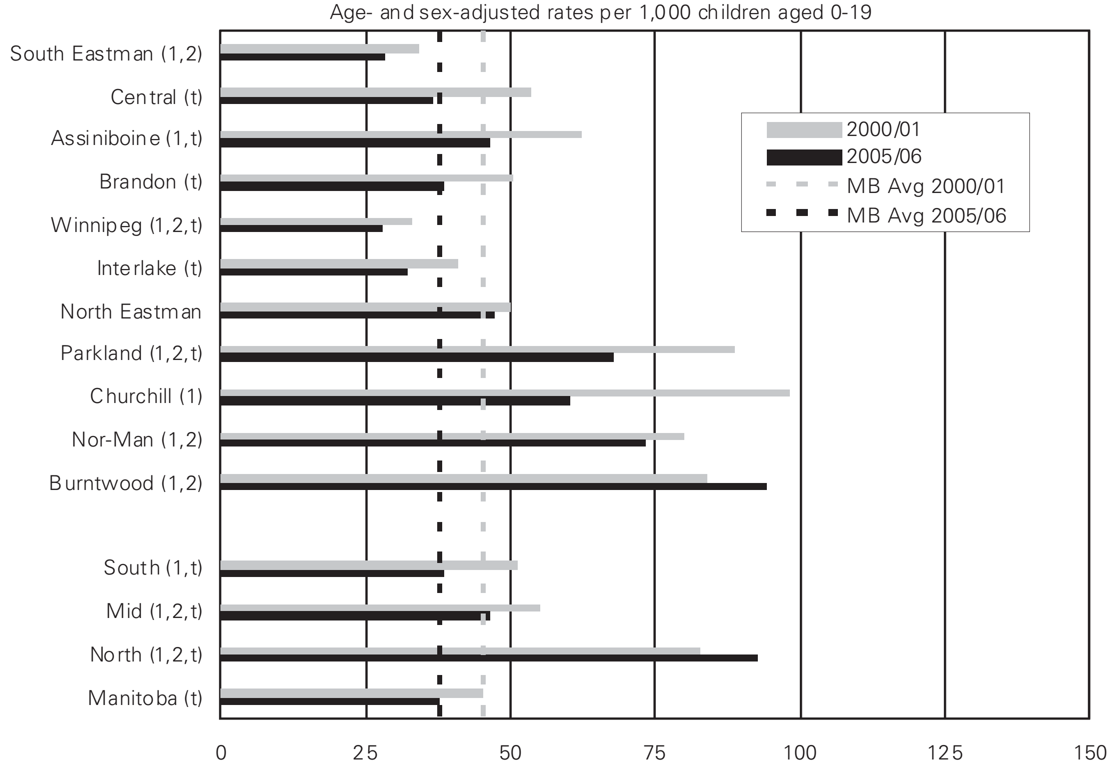
5.3 Inpatient Hospital Episode Rates

Hospital utilization was measured by looking at **hospital episode** rates in 2000/01 and 2005/06. If a child was hospitalized in one hospital and then transferred to a different hospital, it was counted as one episode. A hospital episode is attributed to the region of the child's residence, regardless of where the **hospitalization**(s) took place. Information on crude hospital episode rates by location of hospitalization can be found in the Appendix (section 5.3).

In the first time period, in Manitoba, there were 45.4 hospital episodes per 1,000 children and this rate dropped significantly, to 38.9/1,000, in the second time period. Hospital episode rates decreased significantly over time in six of the 11 RHAs: Central (53.8/1,000 to 36.6/1,000), Assiniboine (62.1/1,000 to 46.6/1,000), Brandon (50.4/1,000 to 38.6/1,000), Winnipeg (33.2/1,000 to 28.0/1,000), Interlake (41.0/1,000 to 32.2/1,000) and Parkland (88.5/1,000 to 67.6/1,000). In the first time period, Assiniboine, Parkland, Churchill, Nor–Man and Burntwood had significantly higher rates of hospital episodes than the Manitoba average (ranging from 62.1/1,000 for Assiniboine to 98.4/1,000 for Churchill) whereas the hospital episode rates for South Eastman (34.3/1,000) and Winnipeg children were significantly lower than the Manitoba average. In the second time period, Parkland (67.6/1,000), Nor–Man (73.1/1,000) and Burntwood (94.1/1,000) children continued to have significantly higher hospital episode rates, whereas South Eastman (28.5/1,000) and Winnipeg (28.0/1,000) children continued to have significantly lower rates than the Manitoba average.

Figure 5.15: Hospital Episode Rates by RHA

Age- and sex-adjusted rates per 1,000 children aged 0-19



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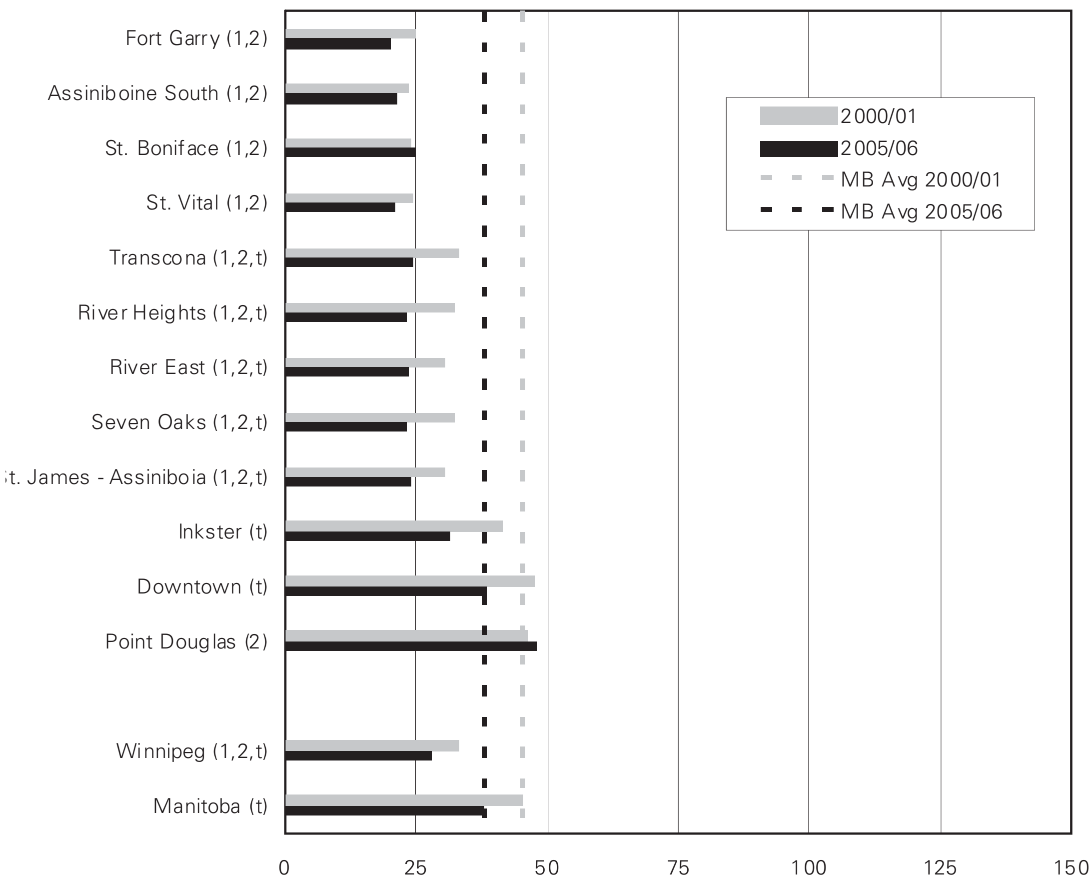
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

In the Winnipeg Community Areas, hospital episode rates decreased significantly over time in Transcona (33.1/1,000 to 24.6/1,000), River Heights (32.2/1000 to 23.2/1000), River East (30.6/1,000 to 25.6/1,000), Seven Oaks (32.3/1000 to 23.0/1000), St. James–Assiniboia (30.4/1,000 to 24.1/1,000), Inkster (41.7/1,000 to 31.4/1,000) and Downtown (47.6/1,000 to 38.6/1,000). Most Winnipeg Community Area children experienced lower hospital episode rates than the Manitoba average in both time periods with the exceptions of Inkster and Downtown children, whose rates were not significantly different from the Manitoba average, and Point Douglas children, whose rates were significantly higher than the Manitoba average in the second time period (48.1/1000).

Figure 5.16: Hospital Episode Rates by Winnipeg Community Area

Age- and sex-adjusted rates per 1,000 children aged 0-19



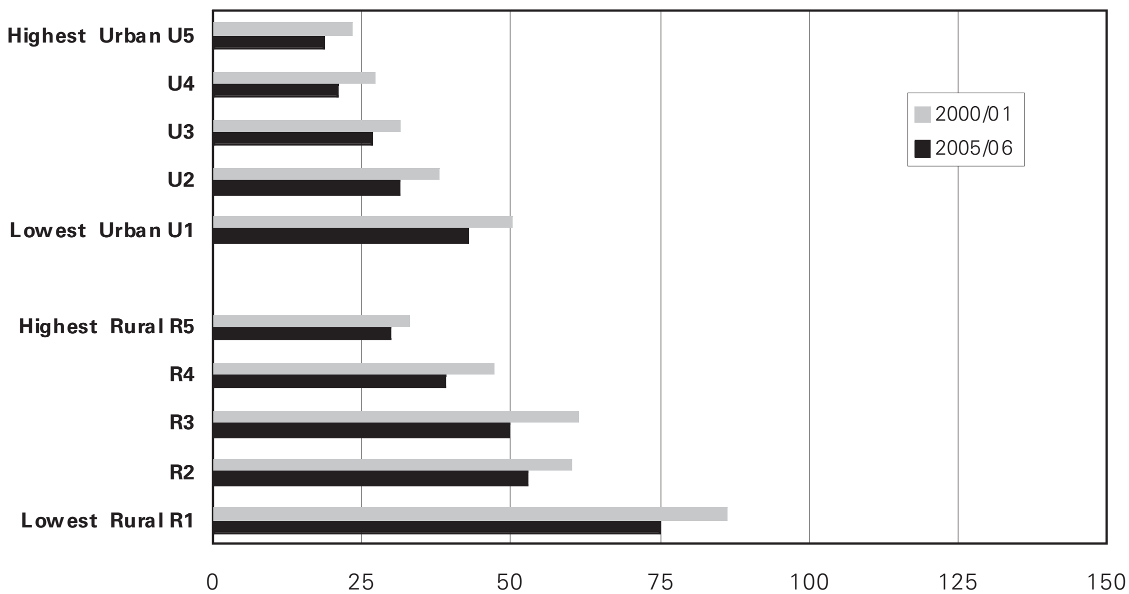
'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

Children from lower income areas had higher hospital episode rates than children from higher income areas, in both urban and rural regions of the province. These income gradients in hospital episodes were significant in both time periods. In urban areas, children from the lowest income quintile neighbourhoods had over twice the hospital episode rate of children from the highest income quintile neighbourhoods. And in rural areas, children from the lowest income quintile neighbourhoods had over two–and–a–half times the hospital episode rate of children from the highest income quintile neighbourhoods. The graph also illustrates the substantially higher hospital episode rates for rural compared to urban children.

Figure 5.17: Hospital Episode Rates by Income Quintile

Age- and sex-adjusted rates per 1,000 children aged 0-19



Linear Trend Test Results

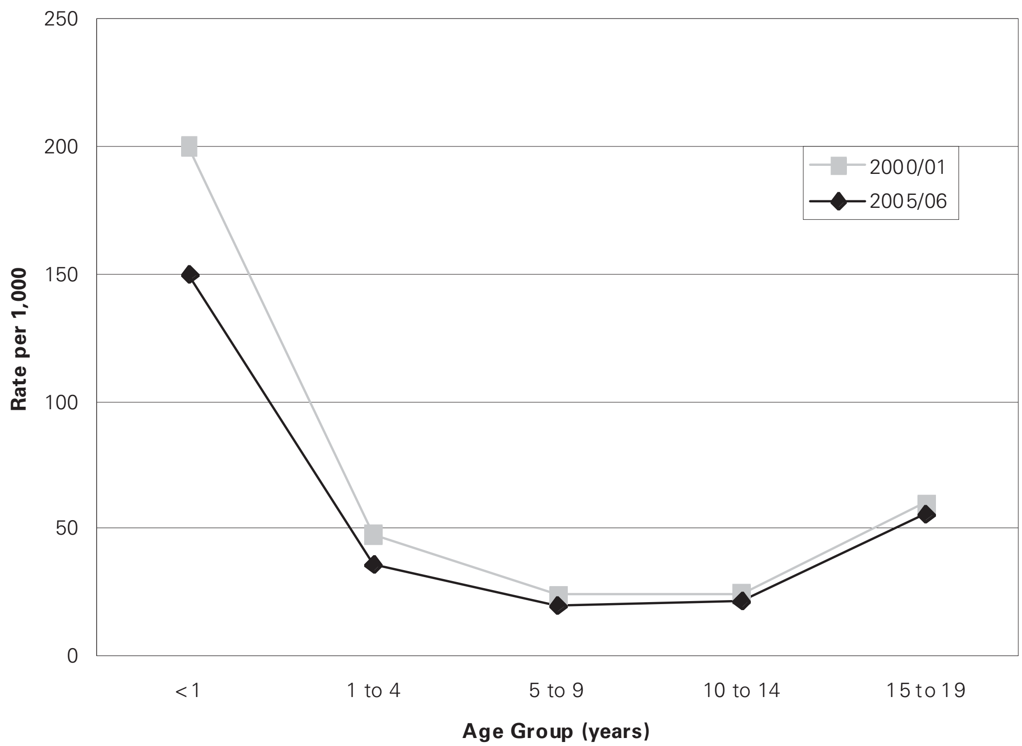
Time 1: Rural: Significant (p<.001) Urban: Significant (p<.001)

Time 2: Rural: Significant (p<.001) Urban: Significant (p<.001)

Source: Manitoba Centre for Health Policy, 2008

The graph of hospital episodes by age demonstrates that hospitalization rates are highest during infancy, decrease during middle childhood, and increase during later adolescence. The graph also suggests that decreases in hospital episode rates have been greater for infants and young children than older age groups.

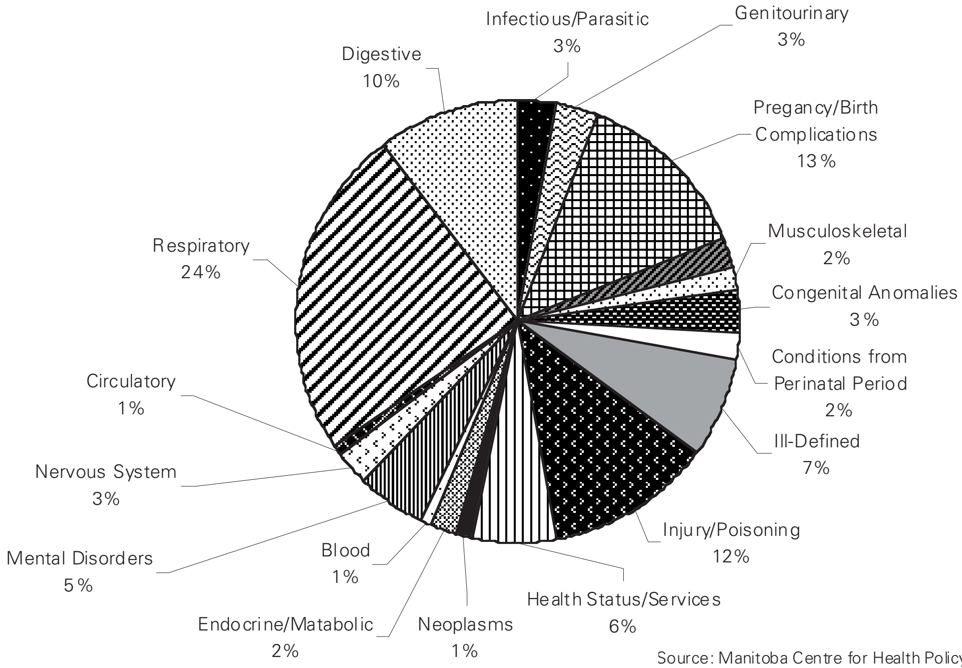
Figure 5.18: Manitoba Hospital Episode Rates for Children by Age Group



Source: Manitoba Centre for Health Policy, 2008

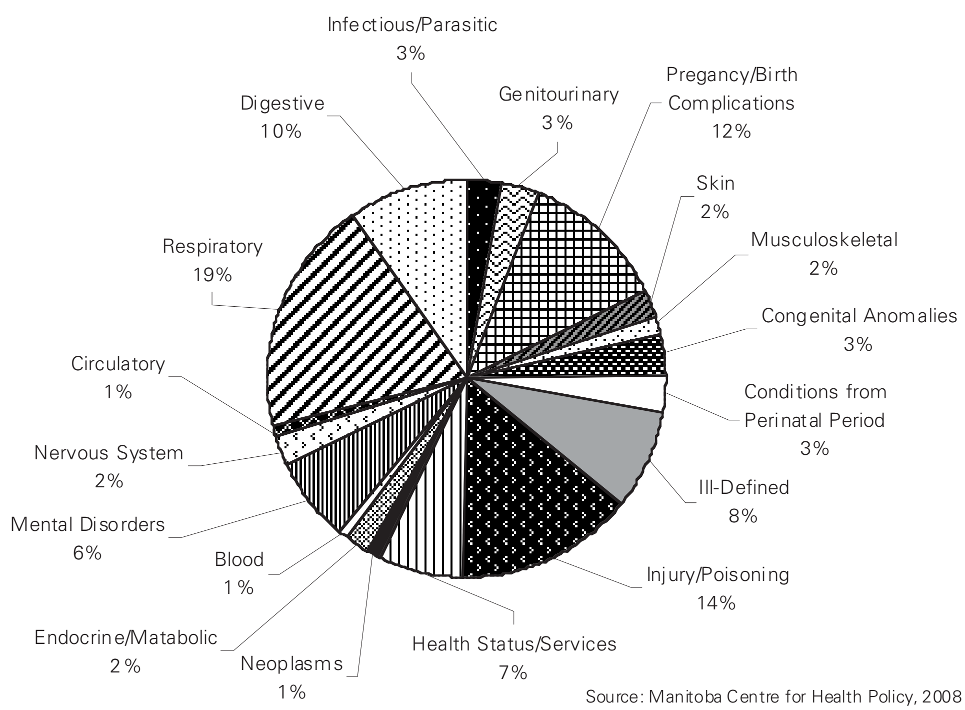
We also looked at inpatient hospitalization episodes by cause and found that the top reasons for hospitalization were respiratory conditions (24% in time 1, 19% in time 2), injury and poisoning (12% in time 1, 14% in time 2), pregnancy and birth complications (13% in time 1, 12% in time 2), and digestive disorders (10% in both time periods). The proportions of hospitalizations by cause vary across age groups (pie graphs of causes of hospitalization episodes by age group can be found in the Appendix). Interestingly, the "pregnancy and birth complication" category is not a cause of hospitalization for infants, but for youths 15 to 19 years of age (in this case females). In fact, pregnancy and birth complication is the top reason for hospitalization in this age group with nearly twice as many hospitalizations for this cause compared to the next highest category, which is injury and poisoning (tables of causes of hospitalization episodes by age and sex can be found in the Appendix).

Figure 5.19: Causes of Inpatient Hospitalization in Manitoba 2000/01



Source: Manitoba Centre for Health Policy, 2008

Figure 5.20: Causes of Inpatient Hospitalization in Manitoba 2005/06



Source: Manitoba Centre for Health Policy, 2008

5.4 Hospitalization for Injury

Injuries are not only the most common cause of death in children (see section 4.3), but they are also one of the most common reasons for children being hospitalized. In this section, we look at inpatient hospitalizations for injuries[31] for two time periods: 1996/97–2000/01 and 2001/02–2005/06.[32] The injury hospitalization rate for Manitoba children 0 to 19 years of age decreased significantly over the two time periods, going from 68.5/10,000 in time 1 to 57.8/10,000 in time 2. The decrease in injury hospitalization could be the result of more injuries being treated on an outpatient basis, or real decreases in injuries that may be the result of programs and policies in place aimed at reducing injuries. Other jurisdictions have also experienced decreases in injury rates over time (Safe Kids Canada, 2006). Note that the injury mortality rate (discussed in Section 4.3) did not decrease over the study period.

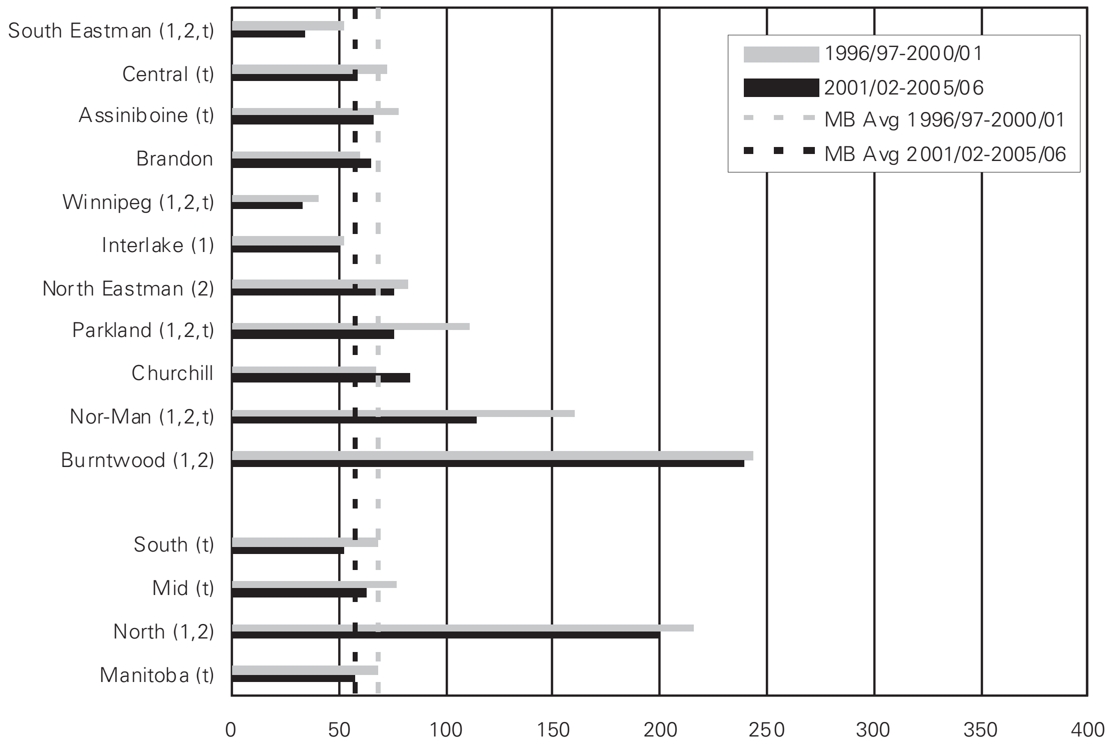
Several of the RHAs also showed significant decreases in injury rates over the two time periods (Figure 5.21): South Eastman (52.0/10,000 to 34.3/10,000), Central (72.3/10,000 to 56.3/10,000), Assiniboine (77.8/10,000 to 65.8/10,000), Winnipeg (41.1/10,000 to 33.2/10,000), Parkland (111.3/10,000 to 75.7/10,000) and Nor–Man (160.6/10,000 to 114.4/10,000). Parkland, Nor–Man and Burntwood (243.2/10,000, 239.3/10,000) all had significantly higher rates of injury hospitalization than the Manitoba average in both time periods, whereas South Eastman and Winnipeg had significantly lower rates in both time periods. Interlake (52.0/10,000) had a significantly lower rate of injury hospitalization than the Manitoba average in the first time period and North Eastman (75.4/10,000) had a significantly higher rate in the second time period. The injury hospitalization rates for Burntwood are notable: 243.2/10,000, or over three–and–a–half times higher than the provincial average in time 1, and 239.3/10,000, or over four times higher than the provincial average in time 2.

[31] Because we were primarily interested in examining injuries as the reason for admission to hospital, we have excluded from our analysis misadventures due to medical and surgical care, as well as adverse drug reactions. There were 702 (5.9% of total injury hospitalizations) such injuries in 1996/97–1999/2000 and 1039 (9.7% of total injury hospitalizations) of these injuries in 2001/02–2005/06. Given these numbers, subsequent research on patient safety issues for the pediatric population may be warranted.

[32] Children who died from their injuries are not included in this analysis.

Figure 5.21: Injury Hospitalization Rates by RHA

Age- and sex-adjusted rates per 10,000 children aged 0-19



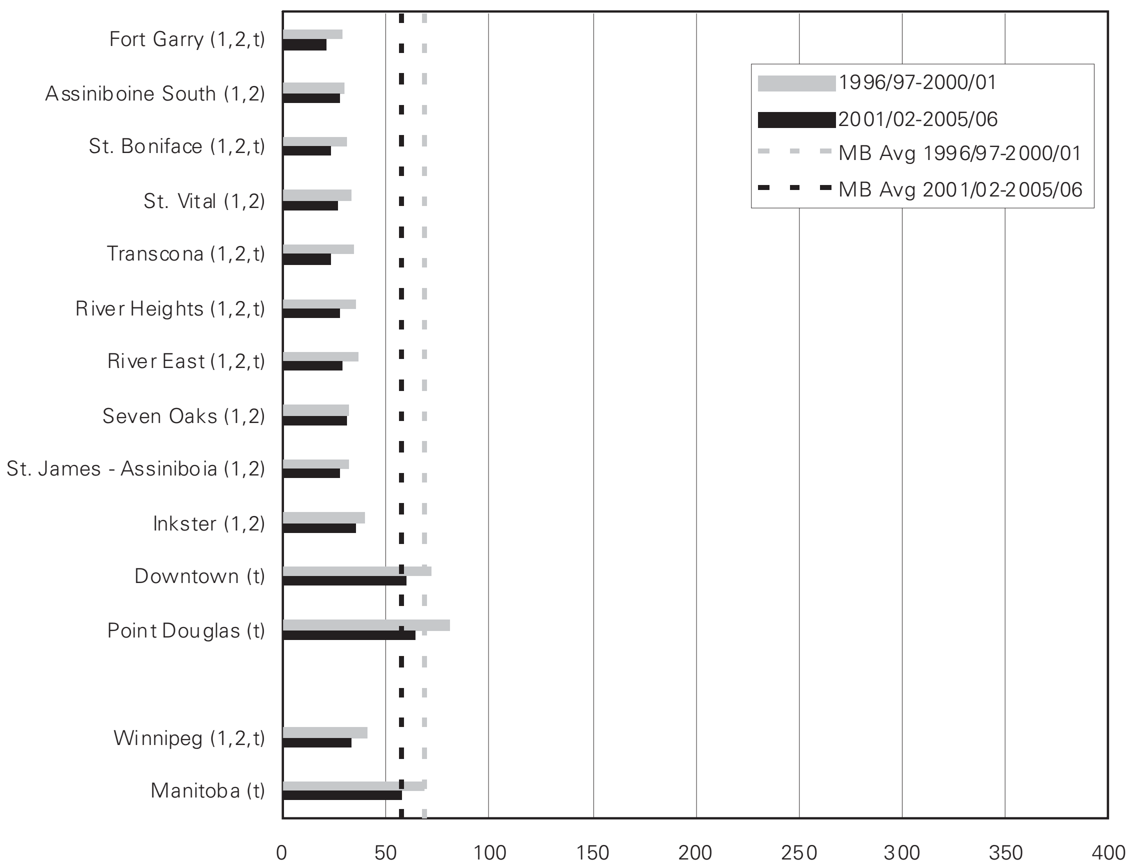
'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

Within Winnipeg, Fort Garry (28.7/10,000 to 20.9/10,000), St. Boniface (31.3/10,000 to 23.4/10,000), Transcona (34.8/10,000 to 23.1/10,000), River Heights (35.2/10,000 to 27.6/10,000), River East (37.0/10,000 to 28.9/10,000), Downtown (71.5/10,000 to 59.8/10,000) and Point Douglas (80.8/10,000 to 64.4/10,000) all showed significant decreases in injury hospitalization rates over the two time periods. All Winnipeg CAs, with the exceptions of Downtown and Point Douglas, had significantly lower injury hospitalization rates than the provincial average in both time periods. The rates of injury hospitalization in Downtown and Point Douglas were very close to the provincial rates in both time periods.

Figure 5.22: Injury Hospitalization Rates by Winnipeg Community Area

Age- and sex-adjusted rates per 10,000 children aged 0-19



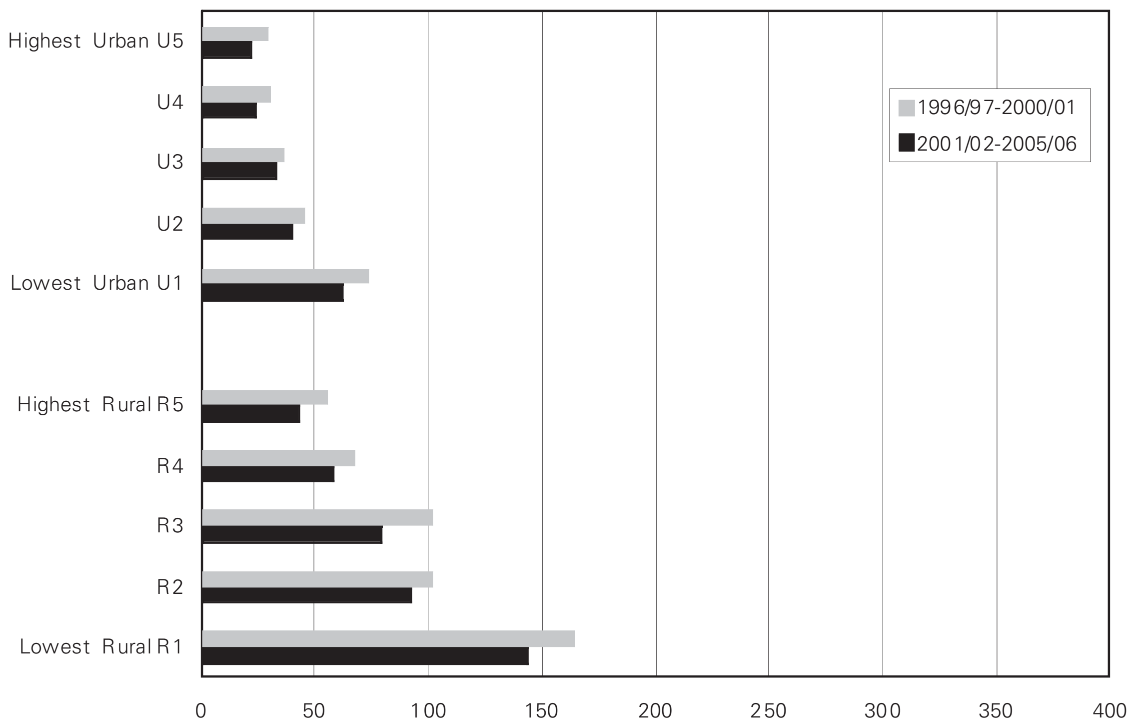
'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

Injury hospitalization rates were strongly related to socioeconomic status, with increases in injury hospitalizations in both rural and urban areas as area–level income decreased. For example, in rural areas in the second time period, the injury hospitalization rate in the lowest income quintile areas was over three times higher than that in the highest income neighbourhoods (lowest quintile—143.8/10,000 compared to highest quintile—43.1/10,000). In urban areas in the second time period, there was almost a three–fold difference in rates of injury hospitalizations: 62.3/10,000 for the lowest urban income quintile neighbourhoods compared to 22.0/10,000 for the highest income quintile. The graph showing injury rates by income quintiles also highlights the much higher rates of injury hospitalization for children living in rural compared to urban areas.

Figure 5.23: Injury Hospitalization Rates by Income Quintile

Age- and sex-adjusted rates per 10,000 children aged 0-19



Linear Trend Test Results

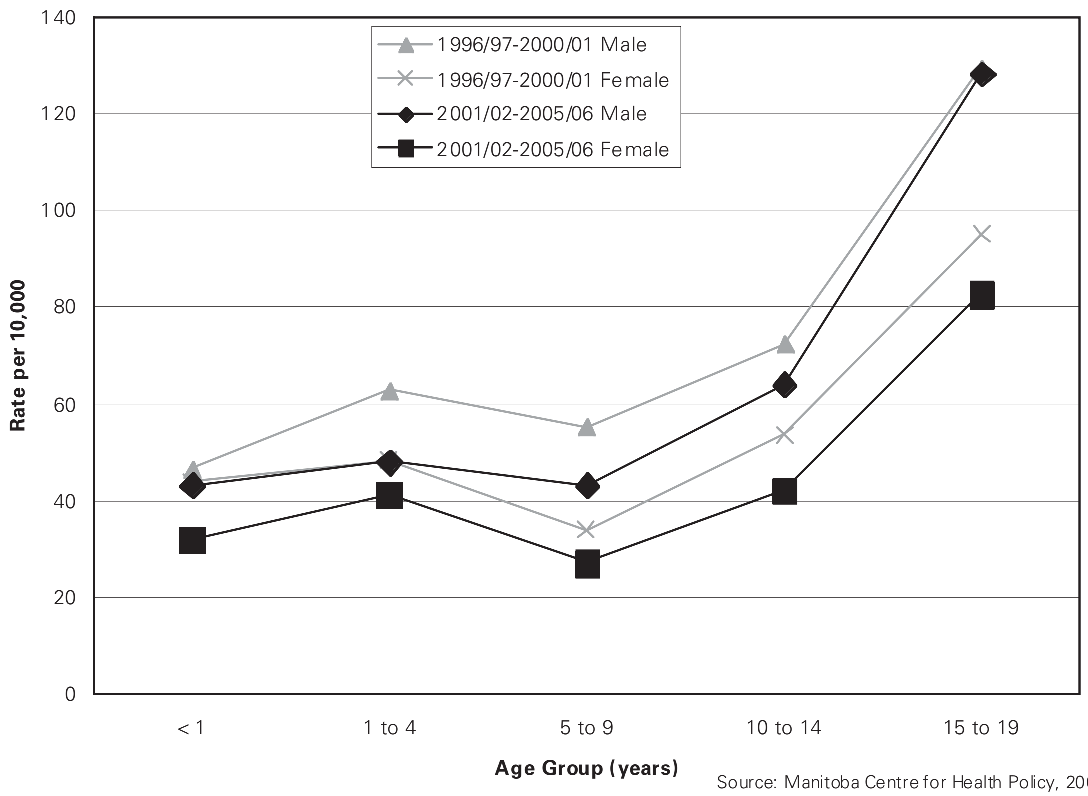
Time 1: Rural: Significant (p<.001) Urban: Significant (p<.001)

Time 2: Rural: Significant (p<.001) Urban: Significant (p<.001)

Source: Manitoba Centre for Health Policy, 2008

Injury rates tend to increase as children age, with the highest rates of hospitalized injuries found for the 15– to 19–year–old age group. Injury hospitalizations also tend to be higher for males compared to females and these sex differences are particularly apparent in adolescence.

Figure 5.24: Injury Hospitalization Rates for Children by Age Group and Sex, 1996/97-2000/01 and 2001/02-2005/06



Source: Manitoba Centre for Health Policy, 2008

We also examined injury hospitalization rates by cause of injury. Besides the category "other", which includes all injuries that were not grouped into another of the cause categories,[33] the most common causes of injury hospitalization are falls (20% in both time periods), motor vehicle collisions (12% in time 1 and 11% in time 2), self–inflicted injury (11% in both time periods), and violence by others (7% in time 1 and 8% in time 2) (Figures 5.25 and 5.26). The most common causes of injury hospitalization differ somewhat at different ages: for younger children, falls are the predominant reason for injury hospitalizations whereas for older adolescents, motor vehicle collisions and self–inflicted injures (violence to self) become the predominant causes. Pie graphs and tables showing injury hospitalization by cause for different age groups and by sex can be found in the Appendix. A graph showing the top injury hospitalization causes by RHA can be found in the Appendix, as well as a table of all types of injury hospitalizations by RHA.

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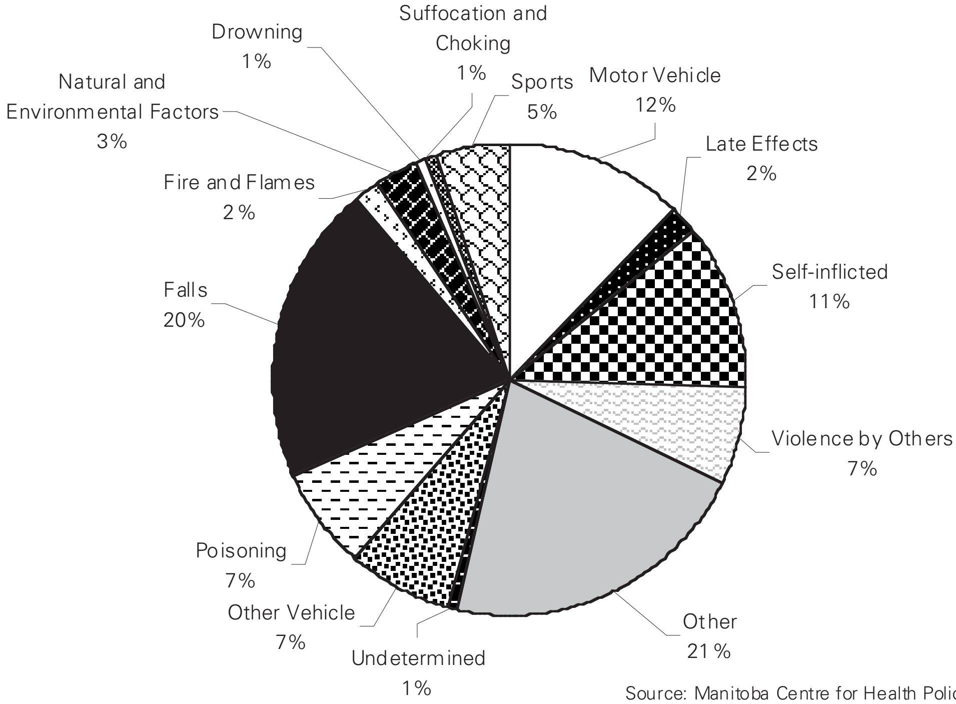
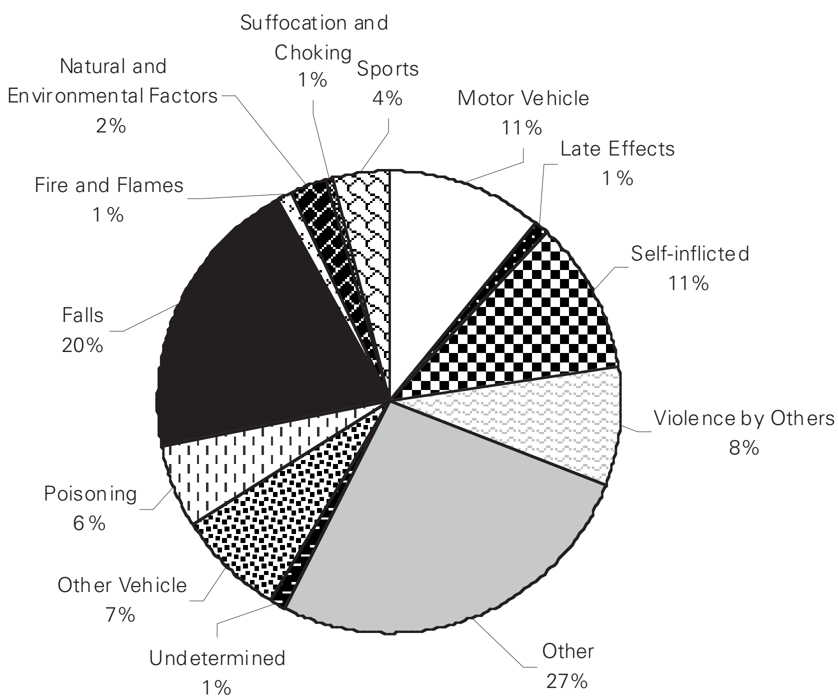
[33] The category "Other" includes: Injuries due to foreign bodies, struck by object, accident by machinery, overexertion, other and unspecified environment and accidental causes, unspecified fractures, and war operations.

Figure 5.25: Percent Injury Hospitalization by Cause of Injury Manitoba Children Aged 0-19 Years 1996/97-2000/01



Source: Manitoba Centre for Health Policy, 2008

Figure 5.26: Percent Injury Hospitalization by Cause of Injury Manitoba Children Aged 0-19 Years 2001/02-2005/06



Source: Manitoba Centre for Health Policy, 2008

Other work (Penfold et al.) has found that rates of **traumatic brain injury (TBI)** have dropped dramatically over the past 20 years. The two biggest causes of TBIs are falls and motor vehicle collisions. The decreases vary by age group with the largest decreases (over 75%) occurring for both males and females in the 0– to 4–year–old category (see Figures in Appendix). Mild TBIs (Relative Head Injury Severity Scale score of 1) have rates 10 to 50 times higher than moderate and severe TBIs across all age groups. Moderate and Severe TBI rates have been relatively stable for the past 25 years.

References

Safe Kids Canada. *Child and Youth Unintentional Injury: 1994–2003 10 Years in Review*. Available from URL: http://www.sickkids.ca/SKCForPartners/custom/SKW06NationalReportENG.pdf. Accessed on: January 5, 2008

Penfold RB, Clancy CA, Prior HJ, Pajer K, Yeates KO. Pediatric Traumatic Brain Injury in Manitoba: 1979–2004. Working paper.

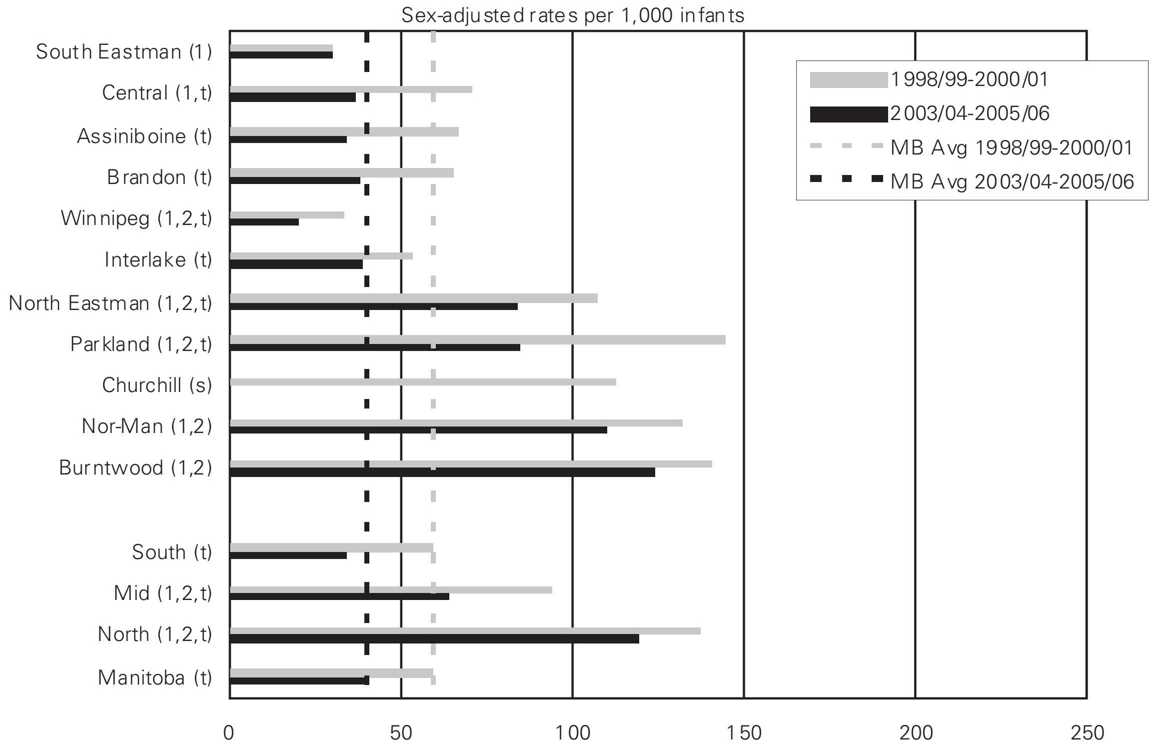
5.5 Hospitalizations for Lower Respiratory Tract Infections

Respiratory diseases are the leading cause of hospitalization in children 0 to 4 years of age, accounting for 28% of infant hospitalizations in 2005/06 and 41% of hospitalizations for children 1 to 4 years of age in the same year (see section 5.3 Inpatient Hospital Episode Rates). They also contribute substantially to mortality for children under 5 years of age (see sections 4.1 Infant Mortality and 4.2 Child Mortality). In this section, we look at the rate of children less than 5 years of age with at least one hospitalization for **a lower respiratory tract infection (LRTI)**. Rates were produced separately for infants and for children 1 to 4 years of age for two three–year periods: 1998/99–2000/01 and 2003/04–2005/06. The rates of LRTI tend to be much higher in infants compared to toddlers. The changes over time reported below for infants were much more dramatic than those found for the 1– to 4–year–olds; however, the regional patterns were similar for the two age groups, so only the results for the infants are reported in this section. Results of LRTI rates for children 1 to 4 years of age can be found in the Appendix.

Hospitalizations for LRTIs for Manitoba infants decreased significantly over the study period, going from 59.3/1,000 to 40.2/1,000 (Figure 5.27). A year by year analysis suggested that rates for LRTIs tend to go up and down with 2005/06 being a particularly low year, so further monitoring of this indicator will be required to determine whether the decreases reported here continue.[34] Several RHAs also experienced significant decreases in infant hospitalizations for LRTIs: Central (70.8/1,000 to 36.8/1,000), Assiniboine (66.4/1,000 to 34.2/1,000), Brandon (65.4/1,000 to 38.1/1,000), Winnipeg (33.3/1,000 to 20.2/1,000) Interlake (53.3/1,000 to 38.9/1,000), North Eastman (107.6/1,000 to 83.7/1,000), Parkland (144.9/1,000 to 84.7/1,000) and the collective North RHAs (137.6/1,000 to 119.5/1,000). The rates in Winnipeg were significantly lower in both time periods than the provincial average, whereas the rates in North Eastman, Parkland, Nor–Man (132.2/1,000, 110.1/1,000) and Burntwood (140.2/1,000, 124.1/1,000) were significantly higher in both time periods.

[34] Analysis of separate conditions that comprise the LRTIs indicated that decreases were particularly large for bronchitis and brochiolitis in 2005/06. It is possible that the introduction of the Influenza vaccine for infants in October of 2004 may have contributed to the reduction of influenza complications, such as bronchitis, in the following year. Further monitoring of this pattern is warranted.

Figure 5.27: Rate of Infants Aged <1 Year with at Least One Hospitalization for Lower Respiratory Tract Infection by RHA



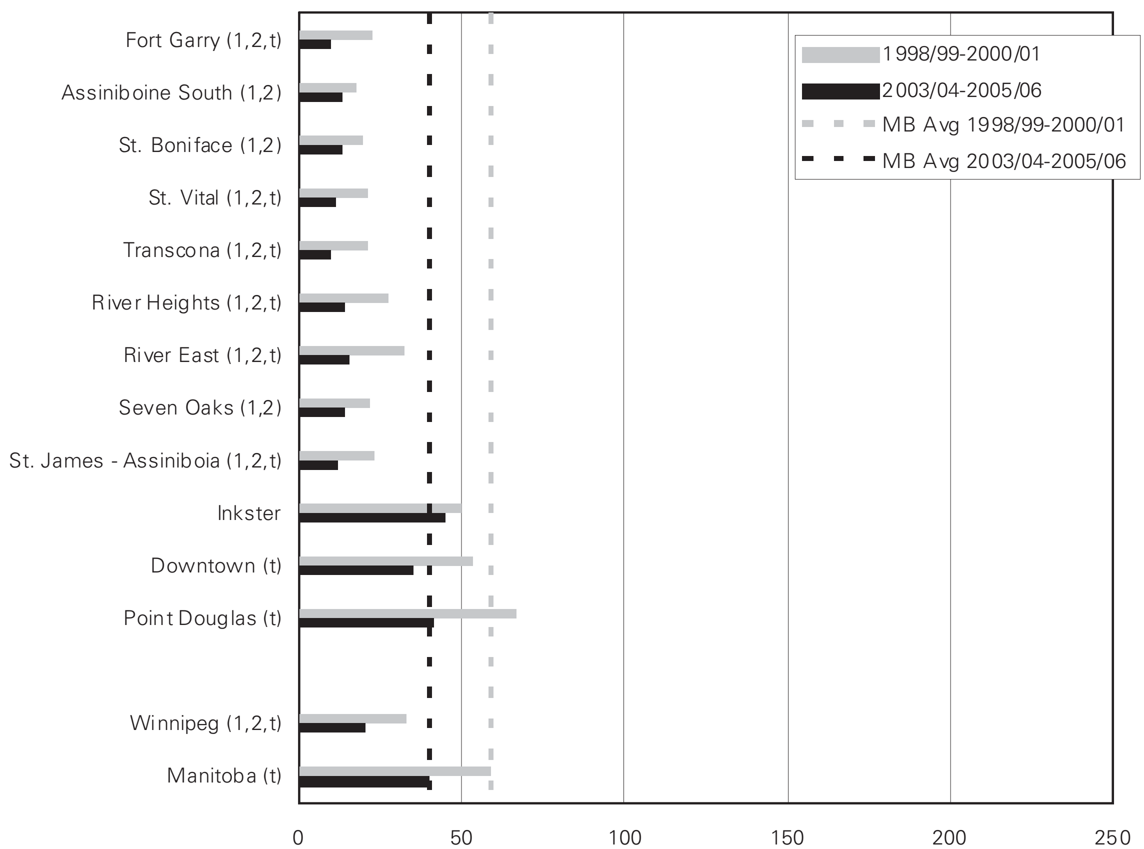
'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

Eight Winnipeg Community Areas demonstrated significant decreases over time in the rates of infant hospitalizations for LRTIs: Fort Garry (22.7/1,000 to 9.8/1,000), St. Vital (21.3/1,000 to 11.2/1,000), Transcona (21.0/1,000 to 9.7/1,000), River Heights (27.7/1,000 to 14.4/1,000), River East (32.6/1,000 to 15.8/1,000), St. James–Assiniboia (23.2/1,000 to 11.8/1,000), Downtown (53.2/1,000 to 35.2/1,000) and Point Douglas (66.6/1,000 to 41.5/1,000). Note that the rates of infant hospitalizations for LRTIs were substantially lower in the Winnipeg CAs compared to most of the RHAs: Downtown, Point Douglas and Inkster (50.2/1,000, 44.7/1,000) were the only Winnipeg CAs where the infant hospitalization rates for LRTIs were NOT significantly lower in both time periods than the provincial average.

Figure 5.28: Rate of Infants Aged <1 Year with at Least One Hospitalization for Lower Respiratory Tract Infection by Winnipeg Community Area

Sex-adjusted rates per 1,000 infants



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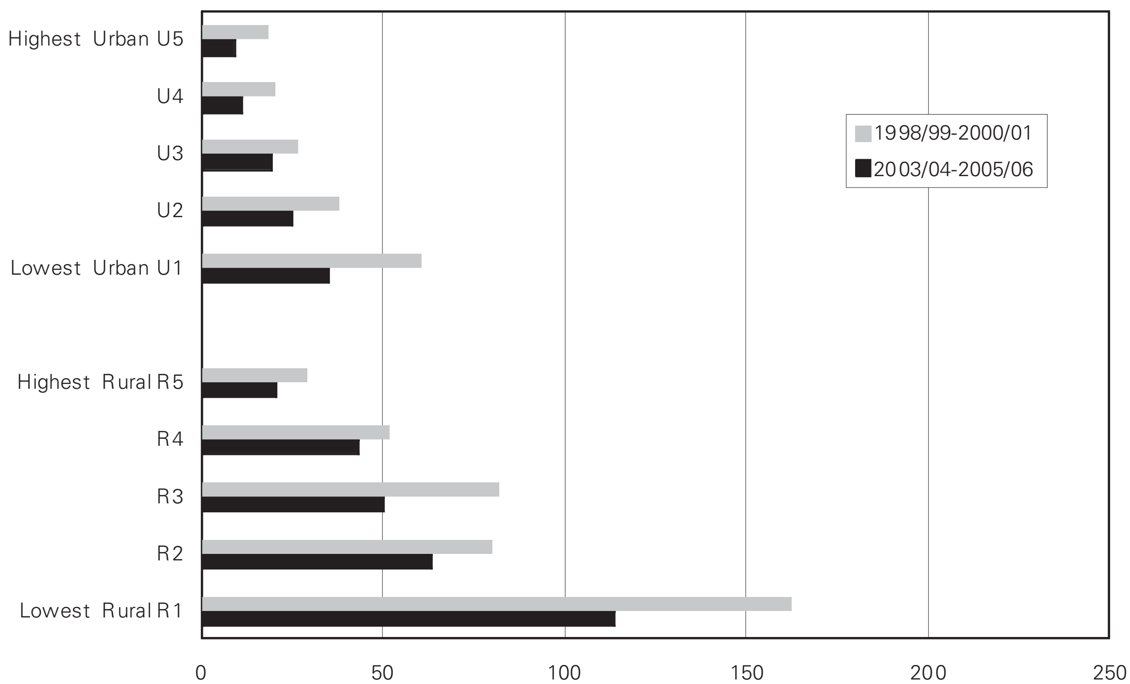
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

Infant hospitalizations for LRTI were significantly related to area–level income for both rural and urban areas in both time periods, with higher rates of LRTIs in lower income neighbourhoods. For example, in the second time period in urban areas, the infant hospitalization rate for LRTIs was 8.9/1,000 in the highest income quintile neighbourhoods compared to 34.7/1,000 in the lowest income quintile neighbourhoods. In rural areas, the gap between lowest and highest income quintile neighbourhoods was even greater. In time 2, the infant hospitalization rate for LRTIs in the highest income quintile neighbourhoods was 20.1/1,000 compared to 113.0/1,000 in the lowest income quintile neighbourhoods, close to a six–fold difference.

Figure 5.29: Rate of Infants Aged <1 Year with at Least One Hospitalization for Lower Respiratory Tract Infection by Income Quintile

Sex-adjusted rates per 1,000 infants



Linear Trend Test Results

Time 1: Rural: Significant (p<.001) Urban: Significant (p<.001)
Time 2: Rural: Significant (p<.001) Urban: Significant (p<.001)

Source: Manitoba Centre for Health Policy, 2008

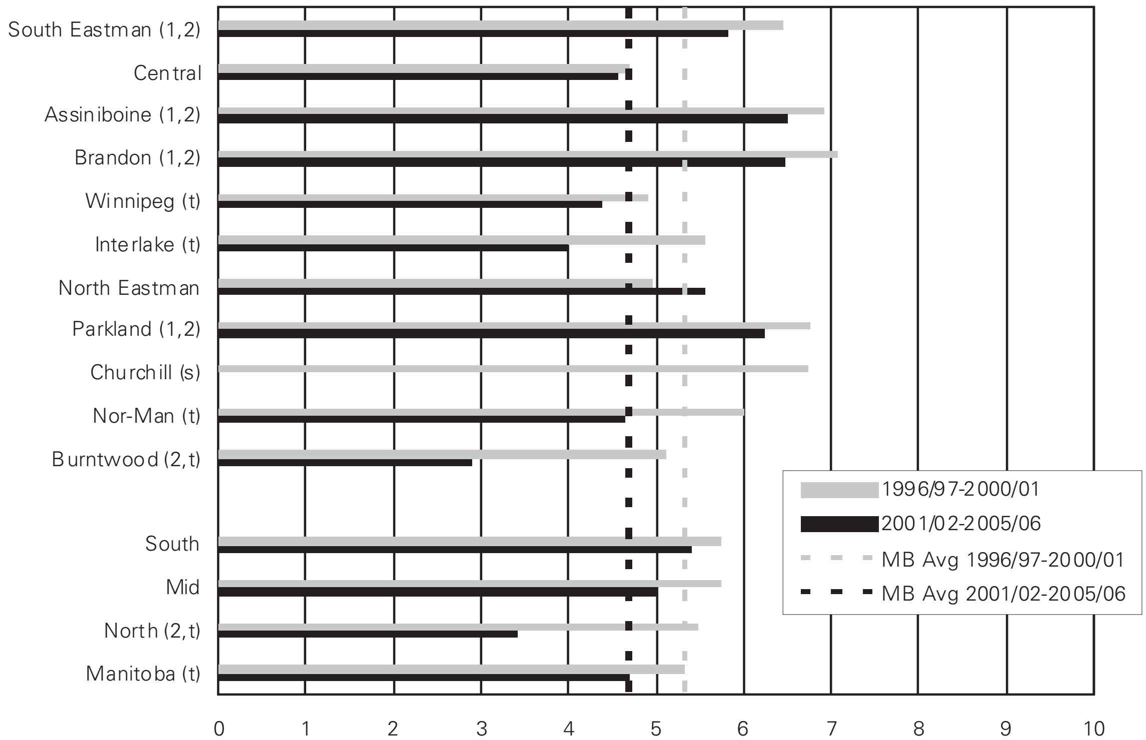
5.6 Tonsillectomy and Adenoidectomy

Regional variations in tonsillectomy rates have been raised as a quality of care concern in Manitoba (Black et al., 1996; Black et al., 1999; Brownell, 2002). Variations in surgical rates can suggest "clinical uncertainty" around indications for the surgical procedure in question. This uncertainty can mean that patients may unnecessarily undergo a surgical procedure with all of its attendant risks and with little benefit. After publication of clinical guidelines for tonsillectomy in 1995 in Manitoba, tonsillectomy rates dropped by over 25%, but by the 1998/99 fiscal year, rates for non–Winnipeg children had increased to pre–guideline levels and significant regional variation remained (Brownell, 2002).

In this report, we looked at rates of **tonsillectomy and/or adenoidectomy (T/A)** for children 0 to 14 years of age for two different five–year time periods: 1996/97–2000/01 and 2001/02–2005/06. Both inpatient and outpatient T/A procedures were captured in our analysis. Rates of T/A dropped significantly over the study period, from 5.3/1,000 to 4.7/1,000 (Figure 5.30). Children from four RHAs also experienced a decrease in rates of this procedure over the study period: Winnipeg (4.9/1,000 to 4.4/1,000), Interlake (5.6/1,000 to 4.0/1,000), Nor–Man (6.0/1,000 to 4.6/1,000) and Burntwood (5.1/1,000 to 2.9/1,000). Burntwood's rate in the second time period was significantly lower than the provincial average. South Eastman (6.4/1,000, 5.8/1,000), Assiniboine (6.9/1,000, 6.5/1,000), Brandon (7.1/1,000, 6.5/1,000) and Parkland (6.8/1,000, 6.2/1,000) children all experienced rates of T/A that were higher in both time periods than the provincial average. The significant regional variation suggests that there still may be clinical uncertainty with respect to this surgical procedure. It should be noted that previous research has indicated that a substantial proportion of the T/A procedures performed on non–Winnipeg children are performed in Winnipeg hospitals (Brownell, 2002).

Figure 5.30: Tonsillectomy and Adenoidectomy Rates by RHA

Age- and sex-adjusted rates per 1,000 children aged 0-14



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't' indicates change over time was statistically significant for that area
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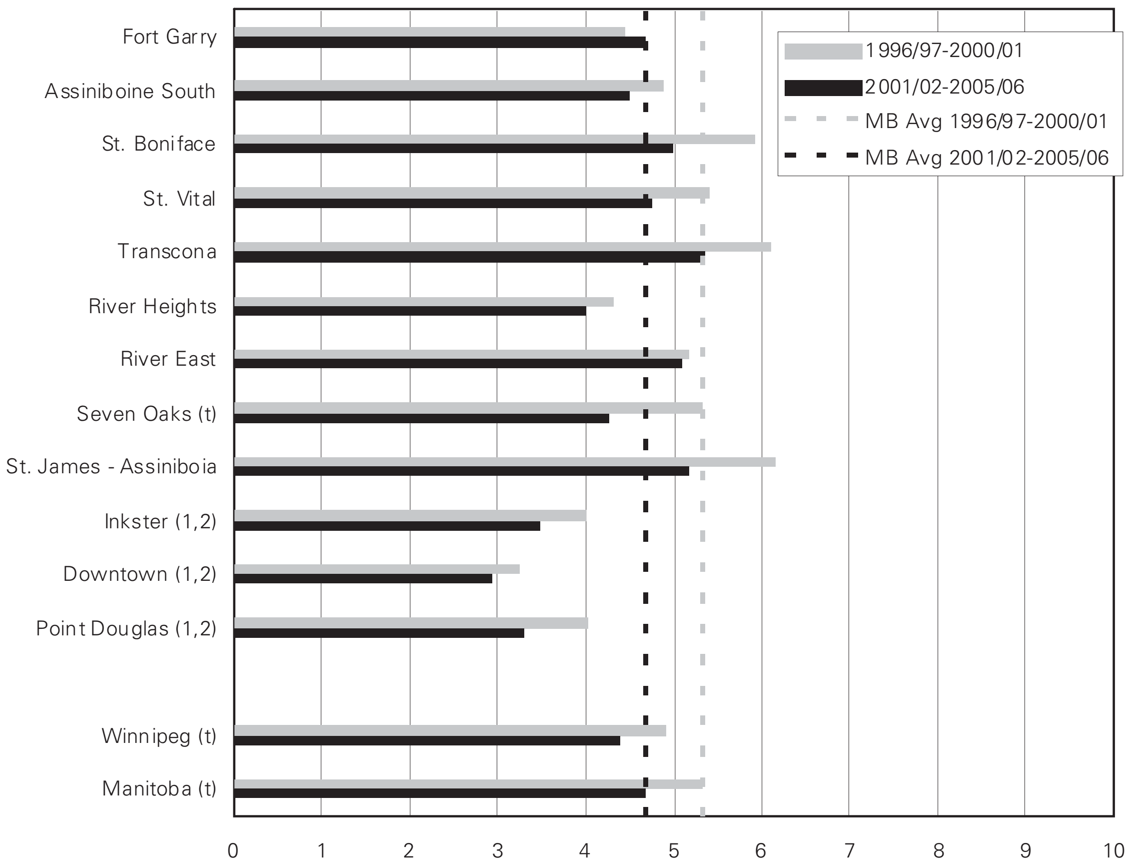
Source: Manitoba Centre for Health Policy, 2008

In the Winnipeg Community Areas, rates of T/A procedures decreased significantly over time only in Seven Oaks (5.3/1,000 to 4.3/1,000). Children in three CAs experienced significantly lower T/A rates in both time periods compared to the provincial average: Inkster (4.0/1,000, 3.5/1,000), Downtown (3.2/1,000, 2.9/1,000) and Point Douglas (4.0/1,000, 3.3/1,000).

Figure 5.31: Tonsillectomy and Adenoidectomy Rates by Winnipeg Community Area

Age- and sex-adjusted rates per 1,000 children aged 0-14



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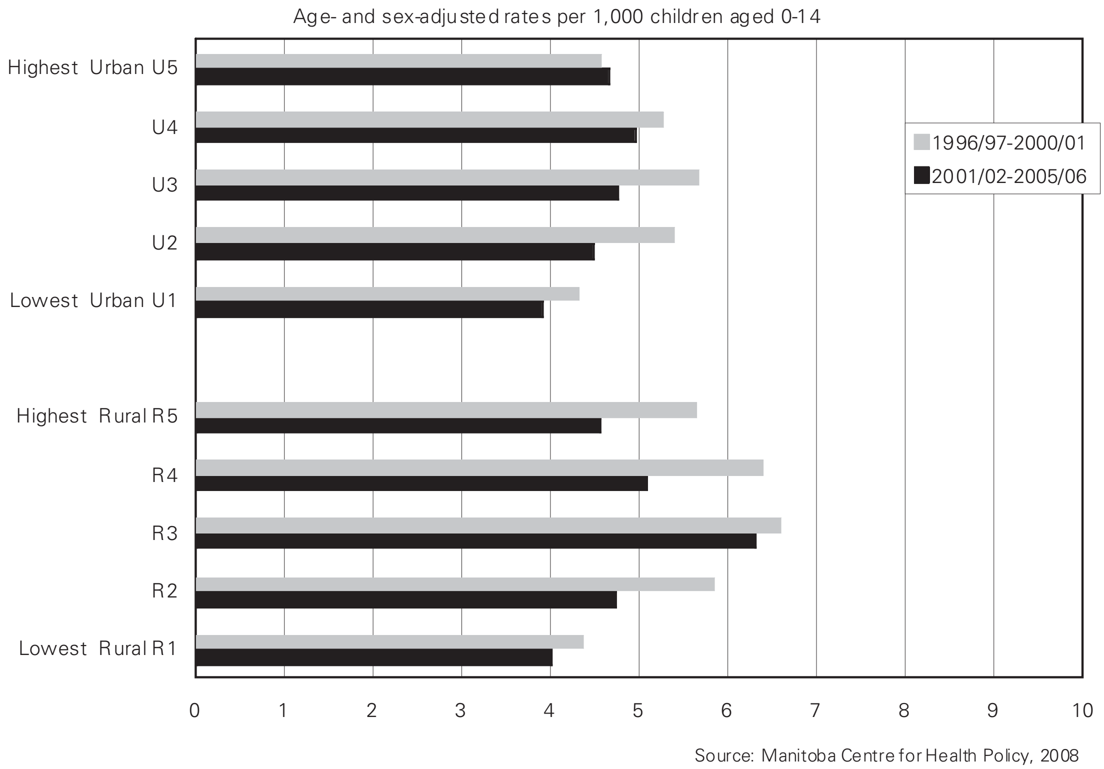
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

Patterns of T/A rates across area level income suggested a u–shaped pattern in both rural and urban areas in both time periods, so linear trend tests were not conducted.[35] Children living in the middle income quintile areas had the highest rates of T/A and children from the lowest and highest income quintiles had lower rates.

Figure 5.32: Tonsillectomy and Adenoidectomy Rates by Income Quintile



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Black C, Peterson S, Mansfield J, Thliveris M. Using population–based data to enhance clinical practice guideline development. *Med Care* 1999;7(Suppl 6):JS254–63.

Brownell M. Tonsillectomy rates for Manitoba children: Temporal and spatial variations. *Healthcare Manage Forum* 2002;15(Suppl 4):21–26.

[35] In the case of u–shaped trends, higher order (in this case quadratic) trends are more appropriate. Analysis of quadratic trends confirmed this pattern for rural areas in both time periods (p<.0001) and for urban areas in the first time period (p<.0001).

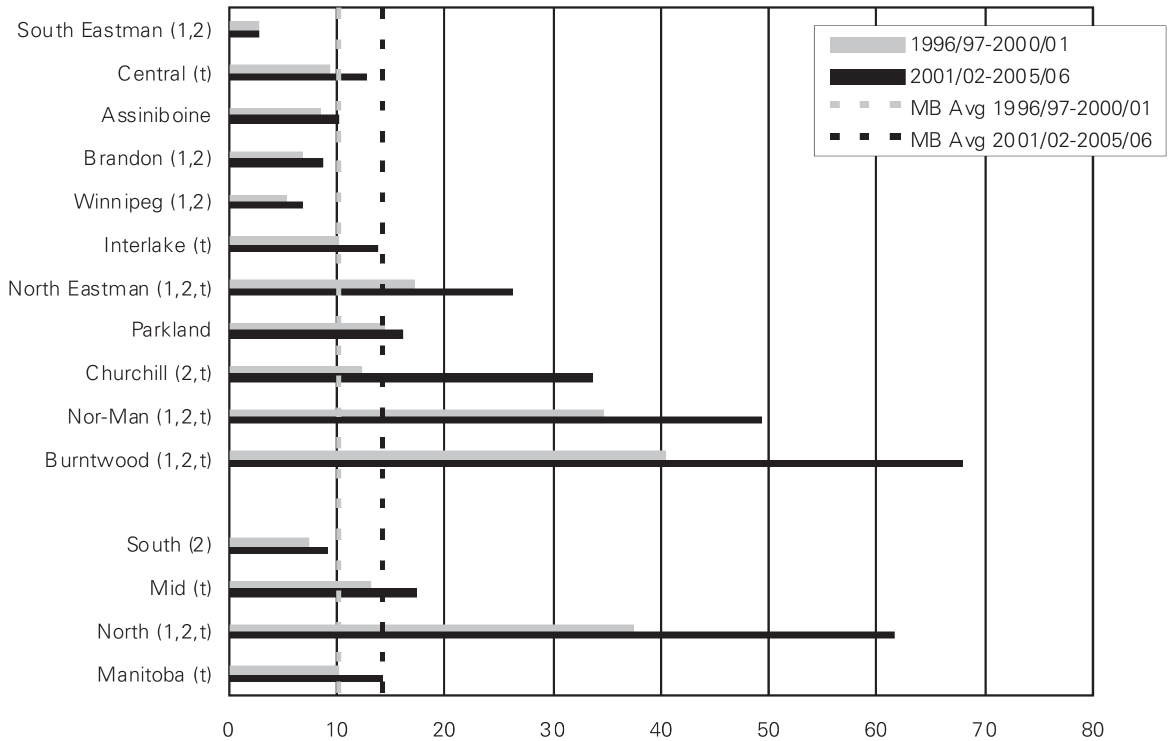
5.7 Dental Extractions

Early childhood caries (tooth decay), defined as the presence of decay in the primary teeth in children less than six years of age, can often progress into a more rampant subclassification of early childhood caries called severe early childhood caries. Children with severe early childhood caries frequently require pediatric dental surgery in the hospital, with the child under general anesthesia (Schroth and Smith, 2007). Healthy teeth are important for the child to eat and speak properly and to shape the face and jaw for adult teeth. In addition to affecting speech and nutrition, poor oral health can also cause the child pain and infections. Efforts to raise awareness about the importance of oral health in early childhood and to prevent early childhood caries are ongoing in Manitoba (Manitoba Collaborative Project for the Prevention of Early Childhood Tooth Decay, 2006; Schroth and Morey, 2007). In this section, we look at the extent of severe early childhood tooth decay by examining the rates of pediatric **dental extractions** performed in hospital under general anesthesia. We did not have access to records for any pediatric dental extractions performed outside of hospitals (e.g., in dentists' offices) and so the rates reported here may underestimate the extent of severe early childhood tooth decay. We focus on children from birth to age 5 years for two five–year time periods: 1996/97–2000/01 and 2001/02–2005/06.

The rate of pediatric dental extractions performed in hospitals increased in Manitoba over the study period, from 10.2/1,000 to 14.2/1,000 (Figure 5.33). In six of the 12 RHAs, pediatric dental extractions increased significantly over the study period: Central (9.4/1,000 to 12.8/1,000), Interlake (10.1/1,000 to 13.8/1,000), North Eastman (17.1/1,000 to 26.3/1,000), Churchill (12.3/1,000 to 33.7/1,000), Nor–Man (34.8/1,000 to 49.3/1,000) and Burntwood (40.5/1,000 to 68.0/1,000). North Eastman, Nor–Man and Burntwood all had rates of in–hospital pediatric dental extractions that were significantly higher than the provincial average in both time periods and the rate in Churchill in the second time period was also significantly higher than the provincial average. Children living in South Eastman (2.8/1,000 in both time periods), Brandon (6.7/1,000, 8.7/1,000) and Winnipeg (5.2/1,000, 6.8/1,000) had rates of in–hospital pediatric dental extractions that were significantly lower in both time periods compared to the Manitoba average.

Figure 5.33: Hospital-Based Dental Extractions Rates by RHA

Adjusted rates per 1,000 children aged 0-5 years



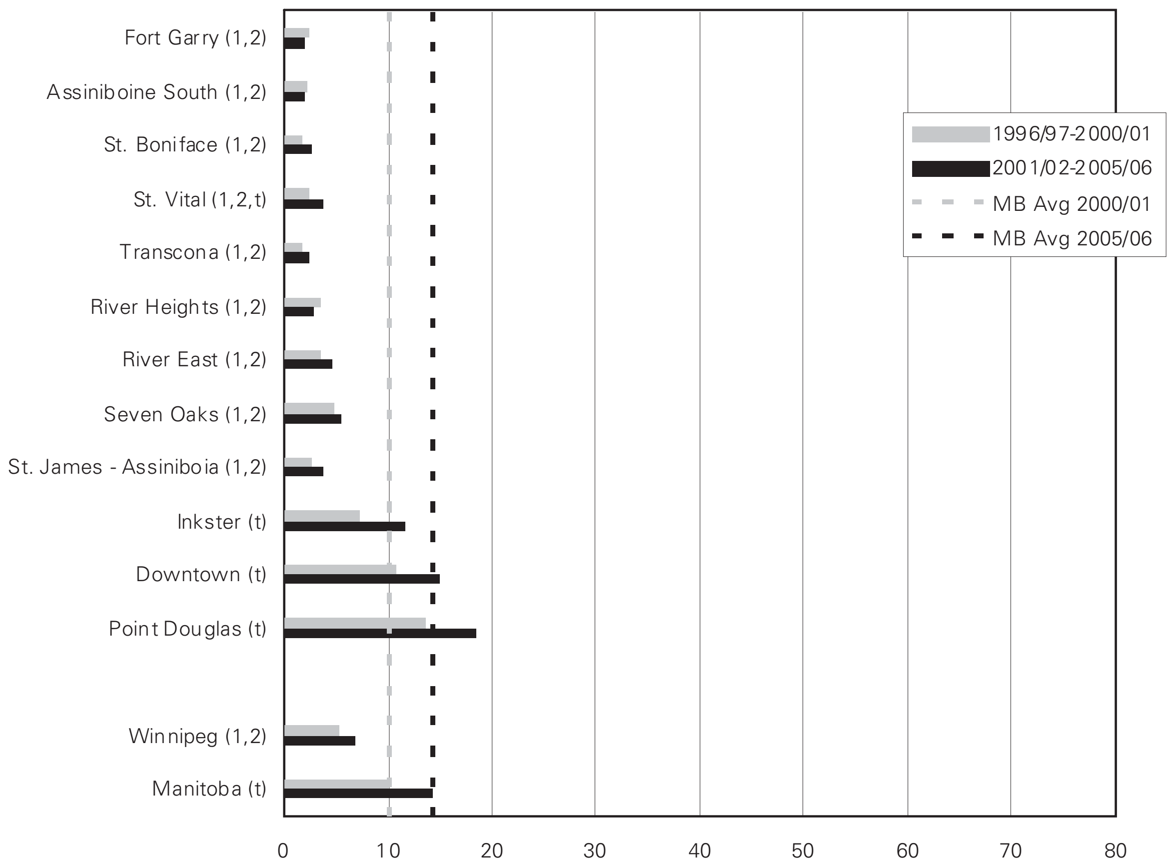
'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

Among the Winnipeg Community Areas, rates of in–hospital pediatric dental extractions tend to be much lower than those found outside of Winnipeg. Most of the Winnipeg CAs have significantly lower rates in both time periods compared to the Manitoba average. The exceptions include Inkster, Downtown and Point Douglas where rates of in–hospital pediatric dental extractions did not differ significantly from the Manitoba average. Rates of in–hospital pediatric dental extractions increased significantly over the study period in all three of these Winnipeg CAs: Inkster (7.2/1,000 to 11.7/1,000), Downtown (10.8/1,000 to 14.8/1,000) and Point Douglas (13.6/1,000 to 18.6/1,000). Rates also increased significantly in St. Vital (2.4/1,000 to 3.8/1,000).

Figure 5.34: Hospital-Based Dental Extractions Rates by Winnipeg Community Area

Adjusted rates per 1,000 children aged 0-5 years



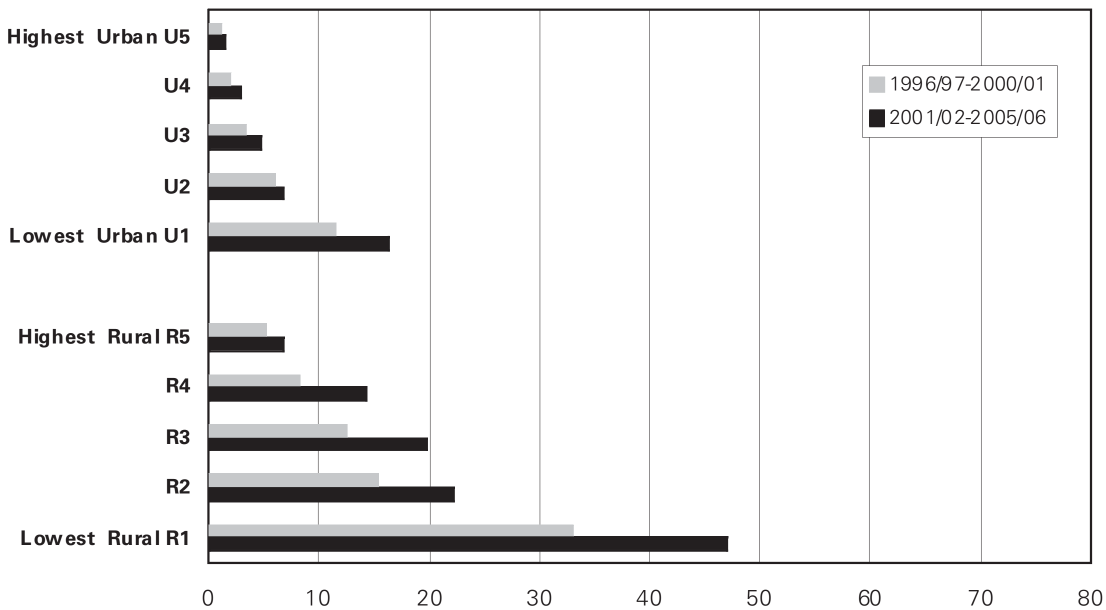
'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

There was a significant relationship between area–level income and rates of in–hospital pediatric dental extractions in both rural and urban areas in both time periods, with higher rates associated with lower area–level income. For example, in urban areas in 2001/02–2005/06, the rate of in–hospital pediatric dental extractions in the lowest income quintile neighbourhoods (16.3/1,000) was almost 11 times higher than the rate in the highest income quintile neighbourhoods (1.5/1,000). In rural areas in 2001/02–2005/06, the rate differed by seven–fold: 46.8/1,000 in the lowest income quintile areas compared to 6.7/1,000 in the highest income quintile areas. The income quintile graph also highlights the substantial differences in rates of in–hospital pediatric dental extractions between urban and rural areas.

Figure 5.35: Hospital-Based Dental Extractions Rates by Income Quintile

Adjusted rates per 1,000 children aged 0-5



Linear Trend Test Results

Time 1: Rural: Significant (p<.001) Urban: Significant (p<.001)
Time 2: Rural: Significant (p<.001) Urban: Significant (p<.001)

Source: Manitoba Centre for Health Policy, 2008

The peak age for in–hospital dental extractions in early childhood is 3 years of age with 33.1/1,000 in–hospital dental extractions in 2001/02–2005/06 occurring at this age, compared to 20.9/1,000 for 2–year–olds and 20.7/1,000 for 4–year–olds. A graph of the rates of in–hospital pediatric dental extractions by age can be found in the Appendix, along with rates by RHA district and Winnipeg Neighbourhood Clusters.

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5.8 Physician Visits

Physician visits, also called **ambulatory visits**, include virtually all contacts with physicians, including office visits, walk–in clinics, visits to outpatient departments and some emergency room visits (where data are recorded), and in northern/remote nursing stations. Physician visits that occur during an inpatient hospital stay, as well as most visits for prenatal care, are excluded. Most physicians in Manitoba are paid through fee–for–service, which means that they must submit a claim that includes the reason (diagnosis) for the visit. About 7% of Manitoba physicians are instead paid by salary, and submit evaluation claims for record–keeping purposes (Watson et al., 2004). However, the evaluation claims are not as complete as the fee–for service claims, since there is less incentive for physicians to fill out these forms.[36] Because there are more salaried physicians in northern remote areas, physician visit data from these areas may be less complete than in other areas. As well, many residents in northern and remote communities may receive their care from nurse practitioners and, until recently, these visits were not recorded through the **physician claims** system. So, most of these visits were not captured in this report.[37] For this indicator we looked at visits to general practitioners (GPs), Paediatricians, and "other" practitioners, which included Psychiatrists, Obstetricians and Gynaecologists, Medical Specialists, General Surgeons, Surgical Specialists, and Technical Specialists.

The physician visit rate in 2000/01 was 3.7 visits per child and in 2005/06, the rate was 3.3 visits per child, a statistically significant decrease (see Figure 5.36). Other research in Manitoba also found decreases in use of physician services between 1991/92 and 2000/01 for the entire population (Watson et al, 2004). Specifically for the child population, a decrease of over 25% in use of family physicians was found for children 0 to 5 years of age and an over 18% decrease for children 6 to 19 years (Watson et al., 2005). Physician visits for children 0 to 17 years also decreased between 1992/93 and 2003/04 in Ontario (Guttman et al., 2006). Temporal decreases in physician visits by children have been driven largely by stable rates of physician supply coupled with an increase in seniors' consumption of general practitioner resources (Watson et al., 2005).

Physician visits appear to have dropped somewhat in all RHAs between 2000/01 and 2005/06; the decreases were significant in Central (3.1 to 2.8 visits per child), Assiniboine (3.6 to 3.0 visits per child), Parkland (3.8 to 3.4 visits per child), Nor–Man (2.9 to 2.5 visits per child) and Burntwood (2.4 to 1.7 visits per child).[38] During the first time period, residents of Churchill (4.9 visits per child) had significantly higher physician visit rates than the Manitoba average, whereas Central had significantly lower rates in this time period. The rates in Nor–Man and Burntwood were significantly lower than the provincial average in both time periods. In the second time period, Brandon's rates (3.9 visits per child) were significantly higher than the provincial average. It should be kept in mind that physician visit rates for northern remote communities may undercount services received by nurse practitioners and salaried physicians.

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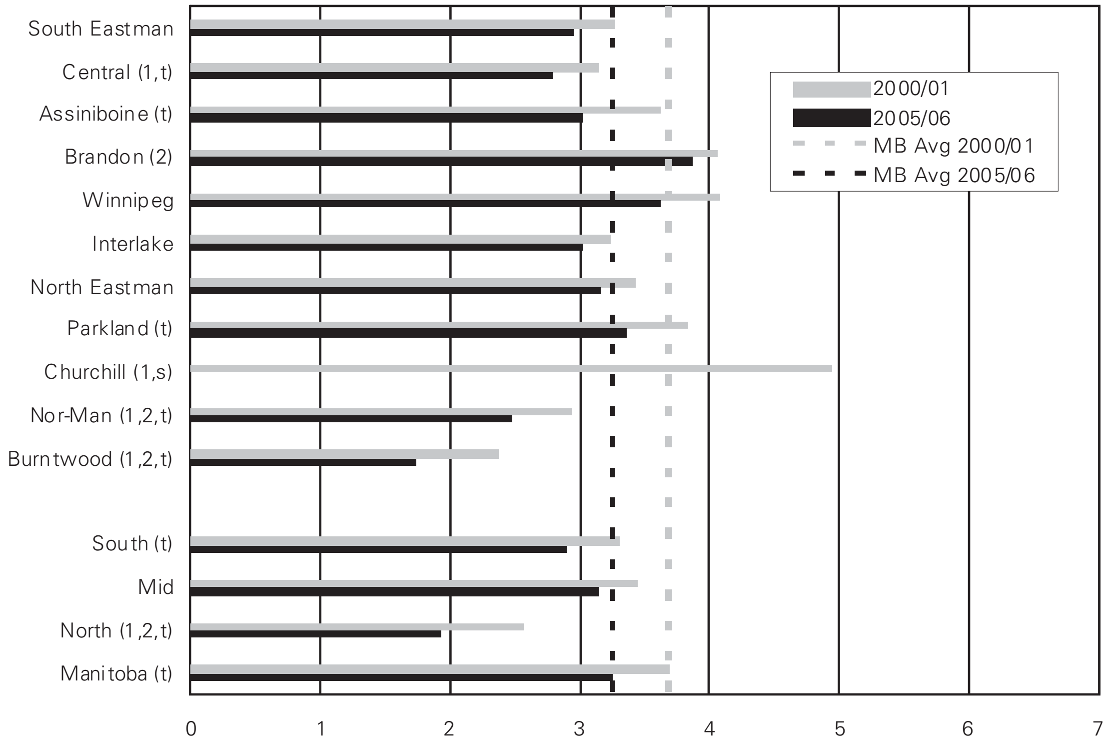
[36] Work at MCHP has found that, when all salaried physicians in the province are examined together, about two–thirds of visits to these physicians are documented in the claims data (Katz et al., forthcoming).

[37] According to Health Information Management, Manitoba Health and Health Living, since September 2005 nurse practitioners have been able to submit shadow billings through the medical claims system; however, uptake of this process was slow in the first year.

[38] Problems with inputting data from salaried physicians' evaluation claims resulted in very low physician visit rates for Churchill residents in the second time period. Rates are not reported for Churchill for this time period.

Figure 5.36: Physician Visit Rates by RHA

Age- and sex-adjusted annual visits per child aged 0-19



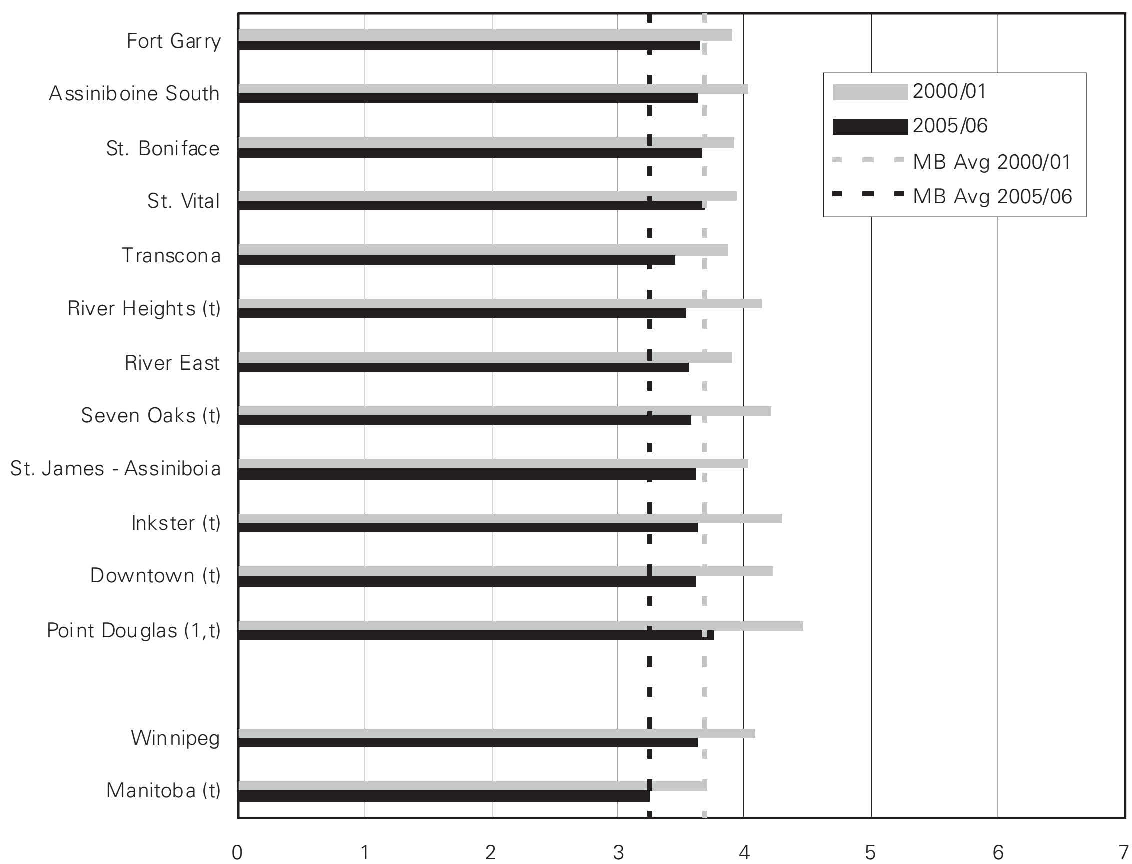
'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

In the Winnipeg Community Areas, rates of physician visits decreased significantly over time in River Heights (4.1 to 3.5 visits per child), Seven Oaks (4.2 to 3.6 visits per child), Inkster (4.3 to 3.6 visits per child), Downtown (4.2 to 3.6 visits per child) and Point Douglas (4.5 to 3.8 visits per child). Physician visit rates showed very little variation across the Winnipeg CAs in either of the study periods, with only Point Douglas having significantly higher rates of visits than the Manitoba average and only in the first time period.

Figure 5.37: Physician Visit Rates by Winnipeg Community Area

Age- and sex-adjusted annual visits per child aged 0-19



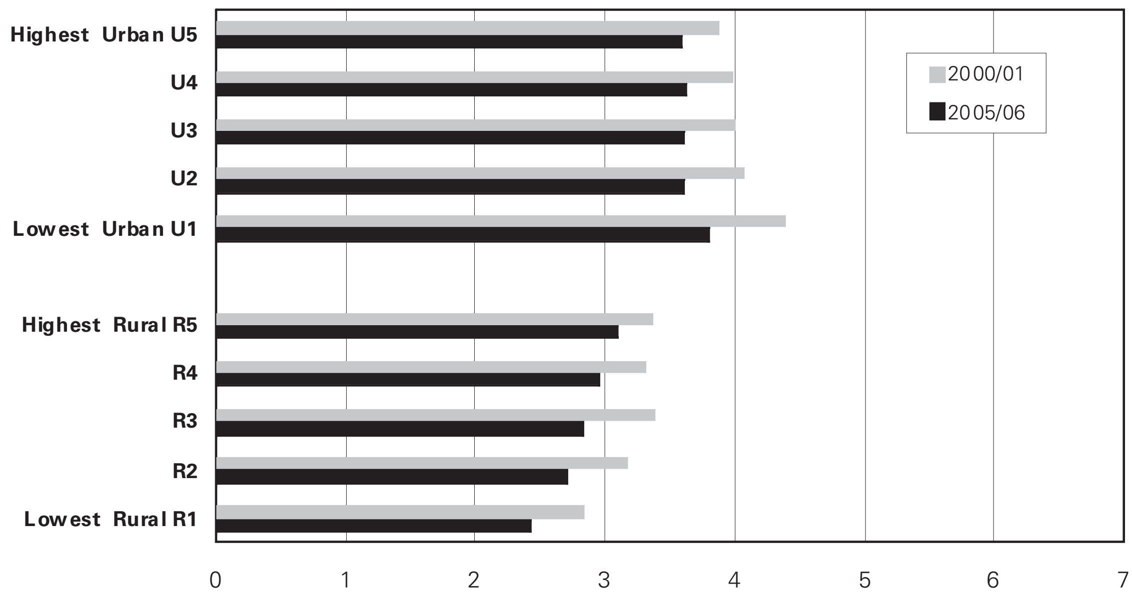
'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

Graphs showing physician visit rates by income quintile indicate that in rural areas, in both time periods, visit rates were significantly higher for children from higher compared to lower income areas. For example, in 2005/06 in the highest rural income quintile areas, children made an average of 3.1 visits to physicians, compared to 2.4 visits for children from the lowest rural income quintile areas. Keep in mind that some of this pattern may be due to undercounting of services received by children visiting nursing stations or receiving their care from salaried physicians in northern remote areas which tend to fall into the lowest income quintile areas. It could also reflect different patterns of care–seeking across the income quintile areas. No relationship between area–level income and physician visits rates was evident in either time period for children living in urban areas.

Figure 5.38: Physician Visit Rates by Income Quintile

Age- and sex-adjusted annual visits per child aged 0-19



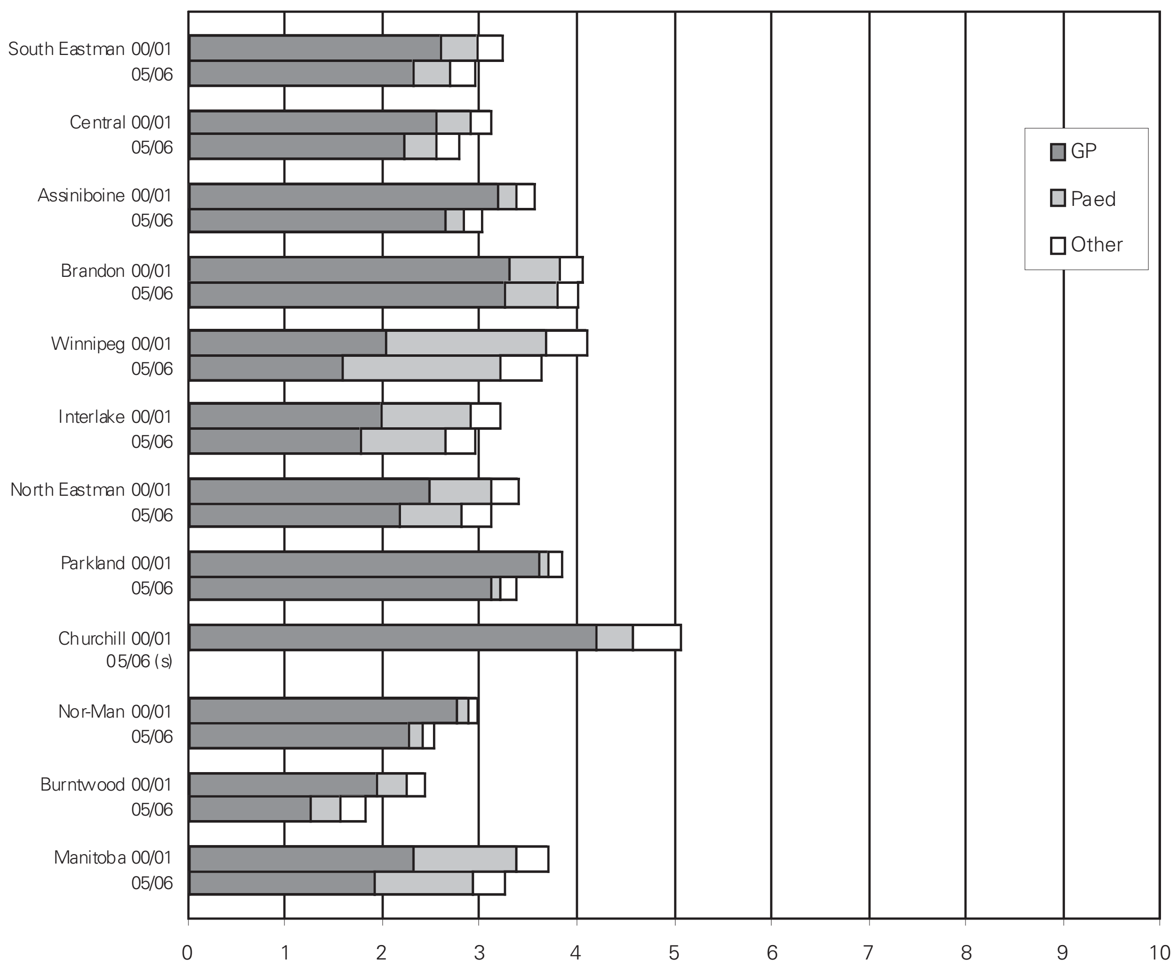
Linear Trend Test Results
Time 1: Rural: Significant (p<.01)
Time 2: Rural: Significant (p<.001)

Source: Manitoba Centre for Health Policy, 2008

The figure showing physician visit rates by physician specialty indicates that children living in Winnipeg are more likely to visit a paediatrician or other specialist, compared to children living outside of Winnipeg. RHAs where children may receive a portion of their care from Winnipeg practitioners, such as Interlake and North Eastman, also had higher rates of paediatrician visits than other RHAs.

Figure 5.39: Physician Visit Rates by Physician Specialty & RHA, 2000/01 and 2005/06

Crude annual number of visits by children aged 0-19 to General Practitioners, Paediatricians, or Other

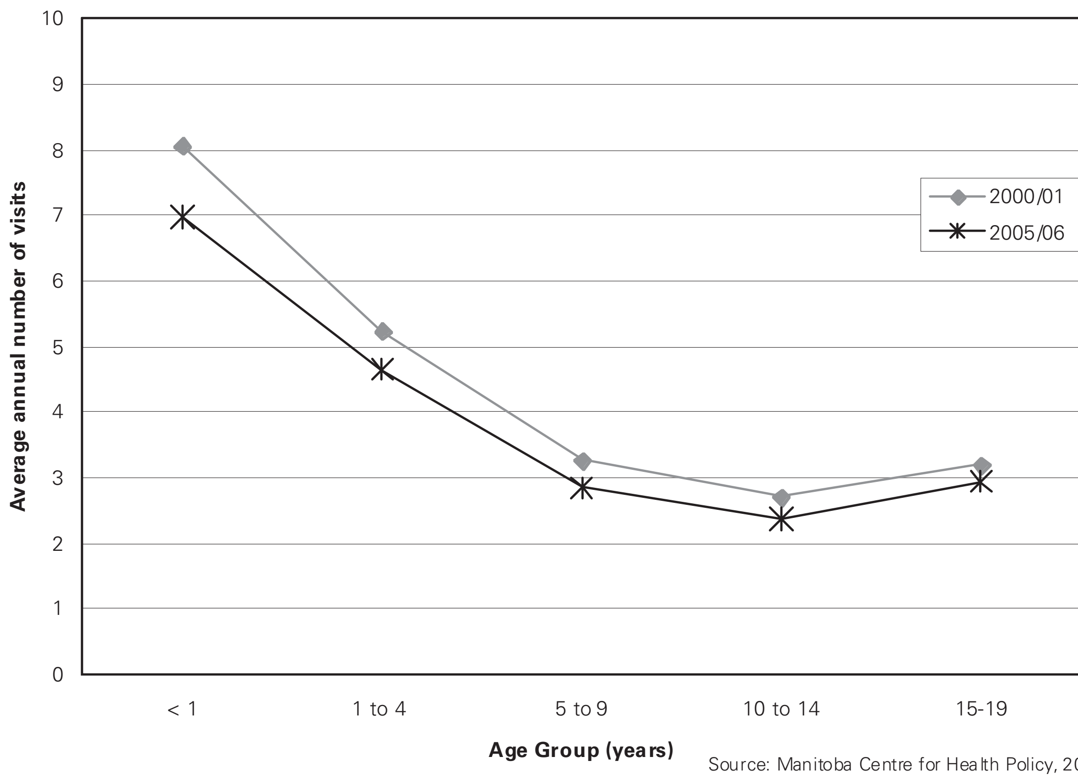


Source: Manitoba Centre for Health Policy, 2008

Although there is not a great deal of variation across regions in physician visit rates, these rates do vary considerably by age. Figure 5.40 shows that visit rates are highest in the first year of life, decreasing with each age category after that, until the 15– to 19–year–old category where they increase slightly. Looking across the two time periods, visits appear to have dropped the most for infants (almost 14%). The decreases were between 11% and 13% for the 1 to 4, 5 to 9 and 10 to 14 age groups, and about 8% for the 15 to 19 year age group. It is interesting to speculate whether there is a connection between decreased physician visits in young children and the decreases in immunization rates found in section 5.1. Figures showing physician visit rates by age and aggregate regions are provided in the Appendix.

Figure 5.40: Manitoba Physician Visit Rates for Children by Age Group

Crude average annual number of visits by children aged 0-19



Source: Manitoba Centre for Health Policy, 2008

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5.9 Continuity of Care

Continuity of care, which is sometimes referred to as having a "medical home," refers to the receipt of primary care from the same provider as opposed to multiple providers. Continuity allows a physician to know the history of the child and his/her family, allows the family to develop a level of comfort with the physician, and is thought to result in better care (Brousseau et al., 2004; Christakis et al., 1999; Christakis et al., 2001; Inkelas et al., 2004). For this report, we looked at all children with at least three physician visits in each time period[39] and considered there to be continuity of care if 50% of their visits were to the same provider over the time period. Two two–year time periods were examined: 1999/2000–2000/01 and 2004/05–2005/06.

An important issue with respect to continuity of care is the fact that we can't tell if children went to a group practice or clinic—if it is truly a 'group practice' and providers share patients, then a child may have good continuity even if seeing different providers. Wherever children may be receiving their care from a group of physicians practicing together, continuity of care may be underestimated.

In the first time period, 53.7% of Manitoba children made at least half of their physician visits to the same provider, and this percentage increased significantly in the second time period to 56.2% (Figure 5.41). Children living in Assiniboine (45.7% to 50.0%), Winnipeg (57.8% to 62.1%) and Interlake (53.0% to 60.1%) RHAs also experienced increases in continuity of care over the time period, whereas children living in South Eastman (49.0% to 46.4%), Central (47.6% to 43.0%) and Brandon (39.9% to 37.8%) experienced decreases.[40] Children living in Winnipeg had higher rates of continuity of care in both time periods, compared to the provincial average, whereas several RHAs had lower rates of continuity of care in both time periods compared to the provincial average: South Eastman, Central, Assiniboine, Brandon, Parkland (50.4%, 48.9%) and Burntwood (40.2%, 41.0%). Children living in Churchill and Interlake had significantly higher rates of continuity of care in one time period compared to the provincial average (Churchill 86.7% in time 1; Interlake 60.1% in time 2).

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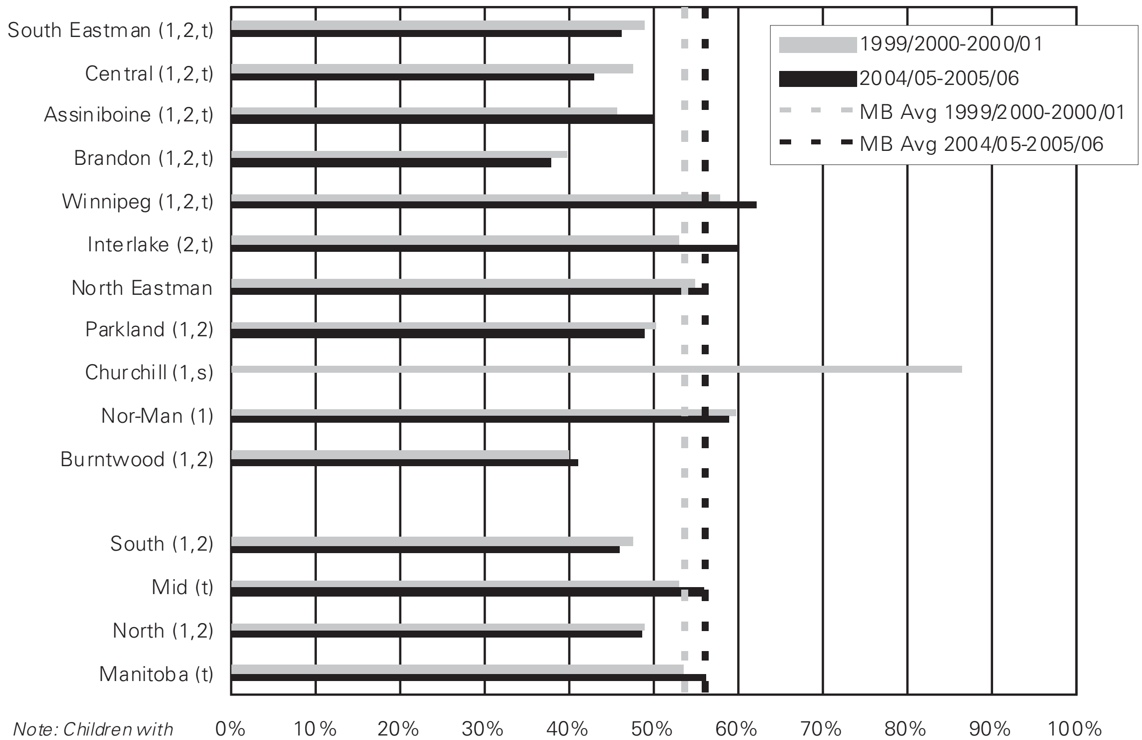
[39] Approximately three–quarters of the child population made at least three visits to physicians over the study period: 22.7% of the child population in 1999/2000–2000/01 made fewer than three visits over the first two–year time period and so were excluded from the analysis; 26.6% of the child population in 2004/05–2005/06 made fewer than three visits over the second two–year time period and so were excluded from the analysis. Analyses by region and income quintile found that the children excluded due to fewer than three visits were not over–represented in any particular RHA or income area. They did tend to be older (over 60% were 10 years or over, and less than 14% were under 5 years).
[40] We have suppressed data from Churchill again in the second time period (see Section 5.8 Physician Visits) due to incomplete physician visit data for this year.

Figure 5.41: Continuity of Care Rates by RHA

Adjusted proportion of children aged 0-19 with at least 50% of visits to the same physician



Note: Children with less than three physician visits were excluded from the analysis.

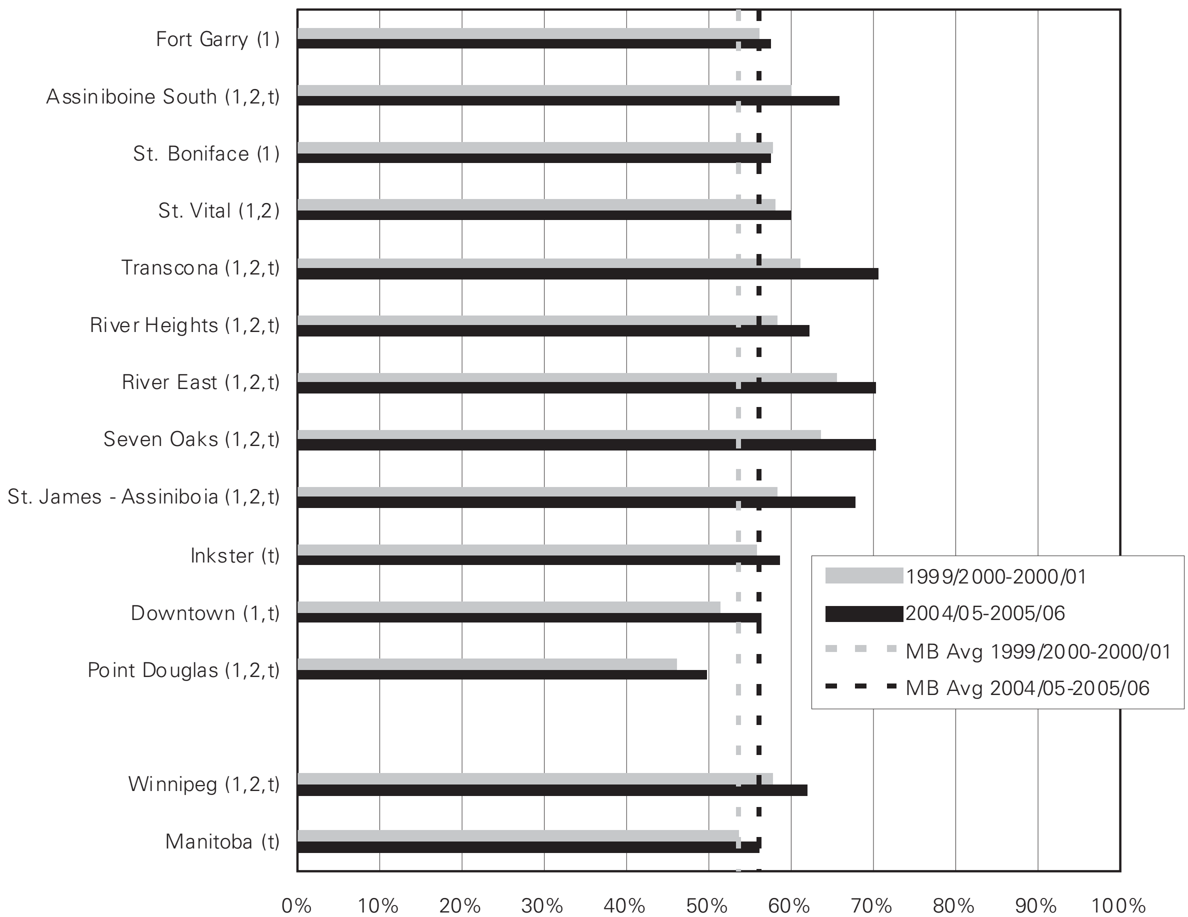
'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

Winnipeg Community Areas experiencing increases in continuity of care included Assiniboine South (60.2% to 65.8%), Transcona (61.1% to 70.7%), River Heights (58.3% to 62.3%), River East (65.7% to 70.4%), Seven Oaks (63.8% to 70.4%), St. James–Assiniboia (58.4% to 67.8%), Inkster (55.8% to 58.5%), Downtown (51.4% to 56.6%) and Point Douglas (46.3% to 49.9%). The majority of Winnipeg CAs had higher rates of continuity of care than the provincial average in either both or one of the time periods. The exceptions were Downtown, where the rate was significantly lower in the first time period, and Point Douglas, where the rates of continuity of care were significantly lower than the provincial average in both time periods. Rates of continuity of care for children living in Inkster did not differ from the Manitoba average in either time period.

Figure 5.42: Continuity of Care Rates by Winnipeg Community Area

Adjusted proportion of children aged 0-19 with at least 50% of visits to the same physician



Note: Children with less than three physician visits were excluded from the analysis.

'1' indicates area's rate was statistically different from Manitoba average in first time period
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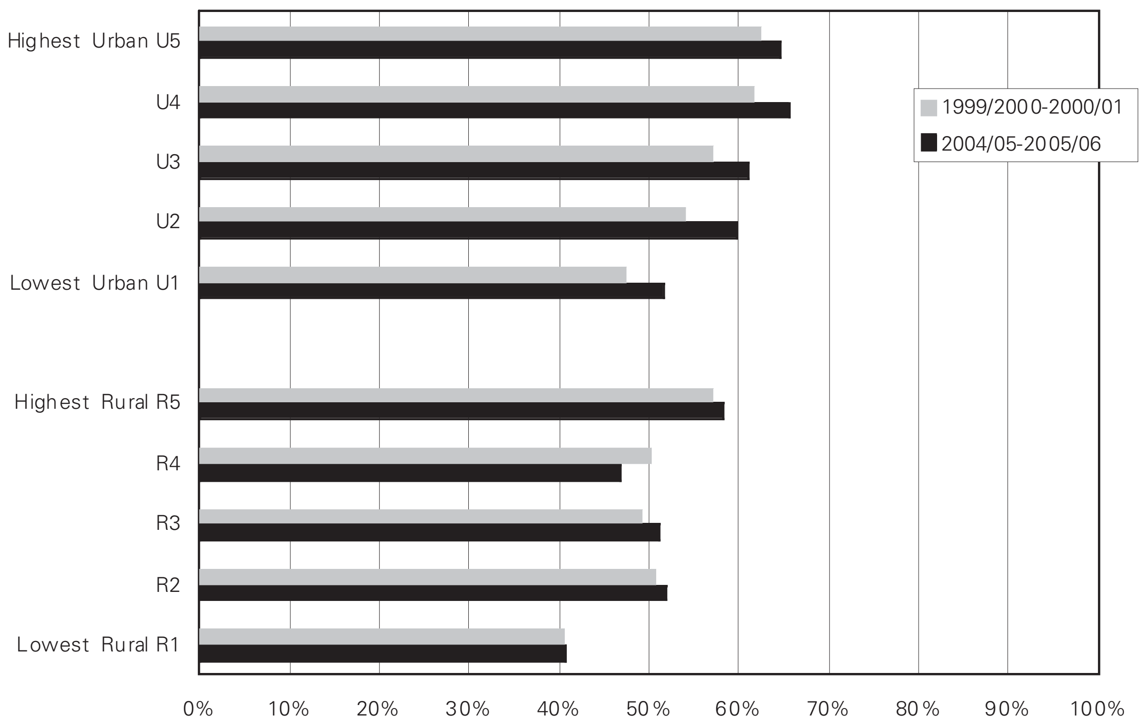
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

Continuity of care was significantly related to area–level income for both rural and urban areas in both time periods. Children from higher income areas had higher rates of continuity of care than children living in lower income areas. For example, in 2005/06 in rural areas, 58.2% of children from the highest income quintile areas saw the same provider for at least half of their care, compared to only 40.7% of the children from the lowest income quintile areas. In urban areas in 2005/06, 64.6% of children from the highest income quintile neighbourhoods saw the same provider for at least half of their physician visits, compared to only 51.5% for the children from the lowest income quintile neighbourhoods. These disparities are of concern considering that children in lower income areas generally have higher health care needs and could potentially benefit from greater continuity of care.

Figure 5.43: Continuity of Care Rates by Income Quintile

Adjusted proportion of children aged 0-19 with at least 50% of visits to the same physician



Note: Children with less than three physician visits were excluded from the analysis.

Linear Trend Test Results

Time 1: Rural: Significant (p<.001) Urban: Significant (p<.001)

Time 2: Rural: Significant (p<.001) Urban: Significant (p<.001)

Source: Manitoba Centre for Health Policy, 2008

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CHAPTER 6: USE OF PRESCRIPTION MEDICATIONS

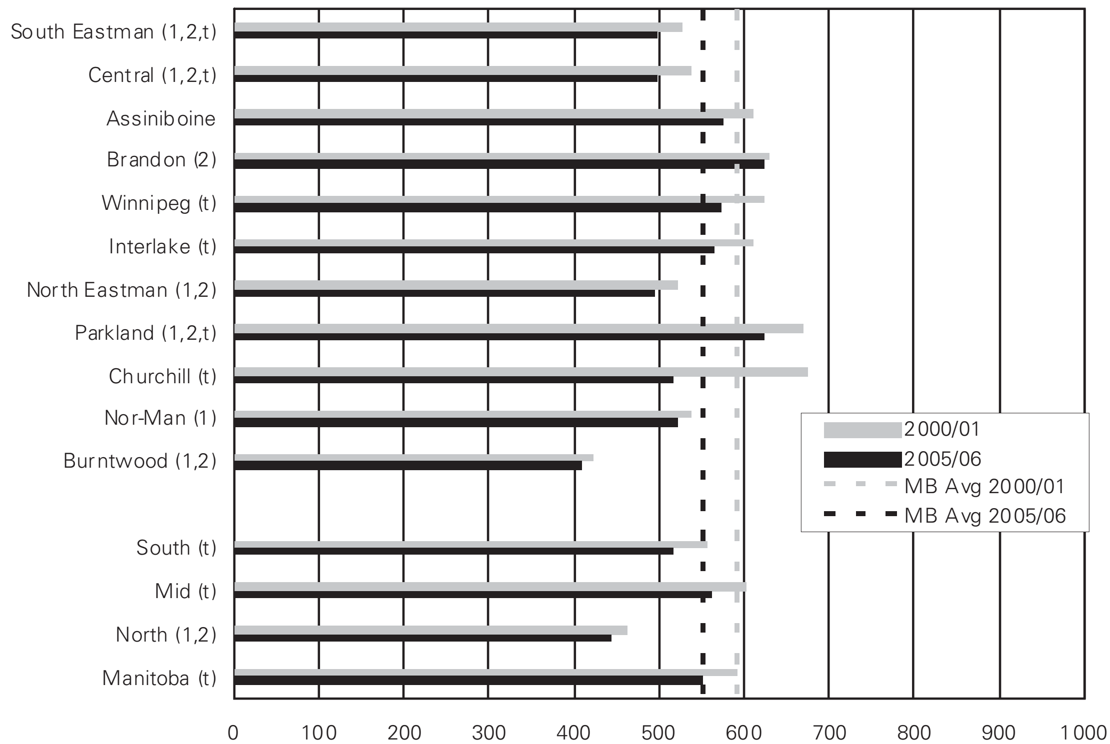
6.1 Children With at Least One Prescription

In the next several sections we look at rates of use of prescription medications for children in Manitoba. The information in these sections comes from the Drug Programs Information Network (DPIN) database. We examine a number of different classes of prescription medications that are prescribed to children. A listing of the specific medications included for each of these classes can be found in the Appendix. It should be kept in mind that some prescription medications dispensed in remote communities will be dispensed through nursing stations and will not be captured in our analyses. This will have the greatest impact on rates in regions where there are remote First Nations communities, particularly regions in northern Manitoba. Prior to November 2004, about 20% of the prescriptions dispensed to registered First Nations residents were not captured in the prescription medication database, comprising about 1% of all prescriptions dispensed outside of hospitals (Metge et al., 1999). Thus, prescription medication rates for children living in northern regions of the province may be underestimated, particularly in the first time period. After November 2004, all prescription medications dispensed in nursing stations were captured in the DPIN database. It should also be kept in mind that medications that are purchased without a prescription (over–the–counter medications) will not be captured in our analyses of prescription medication use. As well, medications provided to patients through physician samples, generally for oral antibiotics, will not be captured here.

In this section, we report on rates of prescriptions for any type of medication. Rates of children aged 0 to 19 years with at least one prescription are provided for two one–year periods: 2000/01 and 2005/06. Over half of the children in Manitoba are prescribed at least one prescription over the course of a year, however the rate has decreased over the study period: in 2000/01, 591.8/1,000 (or 59% of) children received at least one prescription which fell to 551.0/1,000 (or 55%) in 2005/06 (Figure 6.1). For six of the 11 RHAs rates of children with at least one prescription decreased significantly over time: South Eastman (528.5/1,000 to 497.3/1,000), Central (537.5/1,000 to 497.0/1,000), Winnipeg (623.2/1,000 to 572.5/1,000), Interlake (611.0/1,000 to 564.3/1,000), Parkland (670.4/1,000 to 625.5/1,000) and Churchill (674.6/1,000 to 516.8/1,000). Parkland had significantly higher rates in both time periods compared to the provincial average, whereas South Eastman, Central, North Eastman (521.8/1,000, 494.4/1,000) and Burntwood (424.0/1,000, 408.9/1,000) had significantly lower rates of children with at least one prescription in both time periods.

Figure 6.1: Rate of Children With at Least One Prescription by RHA

Age- and sex-adjusted rates per 1,000 children aged 0-19



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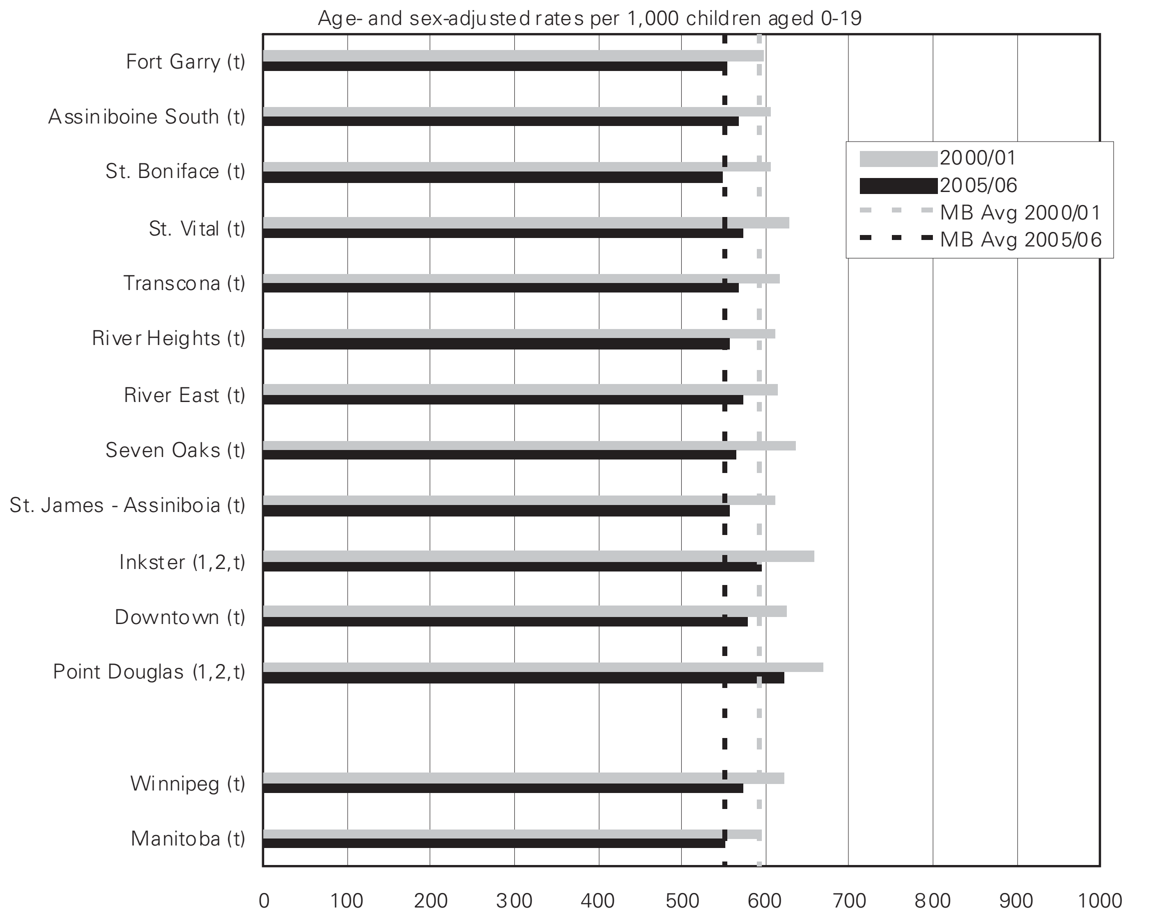
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

Rates of children with at least one prescription for any medication decreased significantly over time in all 12 of the Winnipeg Community Areas. Rates were significantly higher than the provincial average in both time periods in both Inkster (656.9/1,000, 596.3/1,000) and Point Douglas (668.0/1,000, 622.8/1,000).

Figure 6.2: Rate of Children With at Least One Prescription by Winnipeg Community Area



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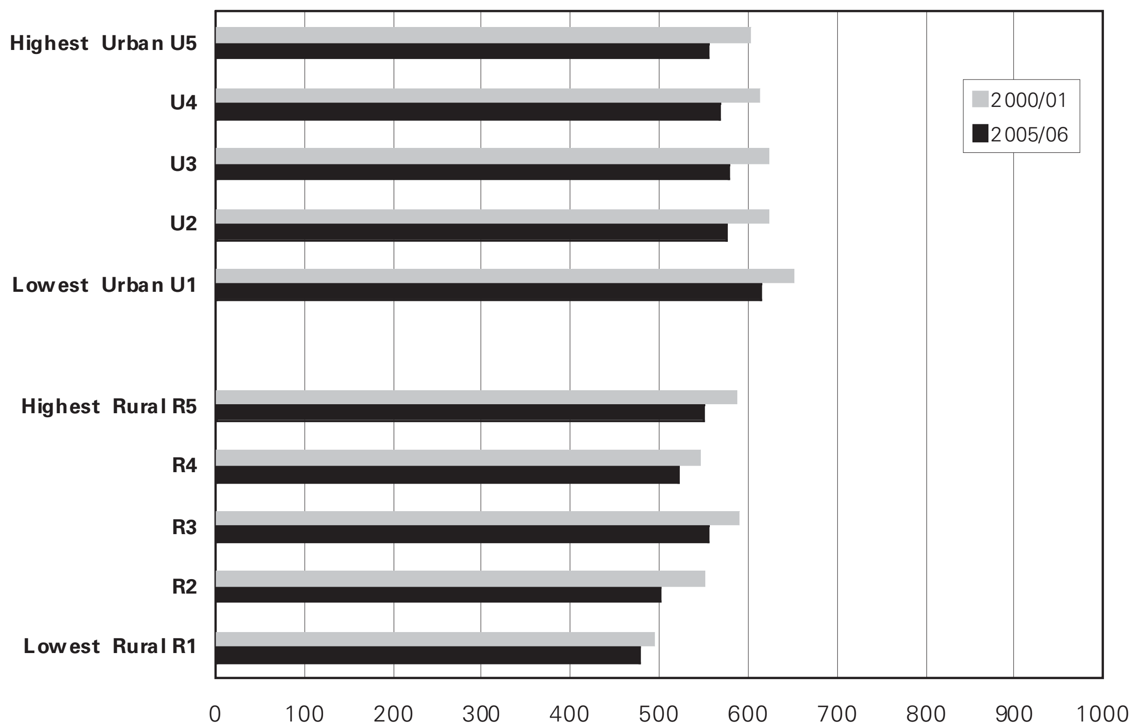
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

In rural areas, in both time periods, there was a significant relationship between area–level income and rates of children with at least one prescription, with rates of prescriptions decreasing as area–level income decreased. For example, in 2005/06, the rate for children from the highest rural income quintile areas was 548.6/1,000 compared to 475.4/1,000 for children from the lowest income quintile areas. In urban areas, there was also a significant relationship between area–level income and having at least one prescription in both time periods, however the direction was different from that found for rural areas; in urban areas, prescription rates increased as area–level income decreased. For example, in 2005/06, the rate of children with at least one prescription was 611.8/1,000 in the lowest income quintile neighbourhoods compared to 554.5/1,000 in the highest income quintile neighbourhoods. Of note in Figure 6.3, rates of children with at least one prescription decreased for all urban and rural income quintiles, but the decreases were smallest in the lowest urban and rural income quintile areas.

Figure 6.3: Rate of Children With at Least One Prescription by Income Quintile

Age- and sex-adjusted rates per 1,000 children aged 0-19



Linear Trend Test Results

Time 1: Rural: Significant (p<.001) Urban: Significant (p<.01)

Time 2: Rural: Significant (p<.001) Urban: Significant (p<.01)

Source: Manitoba Centre for Health Policy, 2008

There is some variation in rates of at least one prescription across age groups, with slightly higher rates in younger (1– to 4– years of age) than older children (see Appendix for graph of crude rates of children with at least one prescription by age group). As will be seen in subsequent sections discussing prescription medications, patterns across age groups vary according to the medications prescribed.

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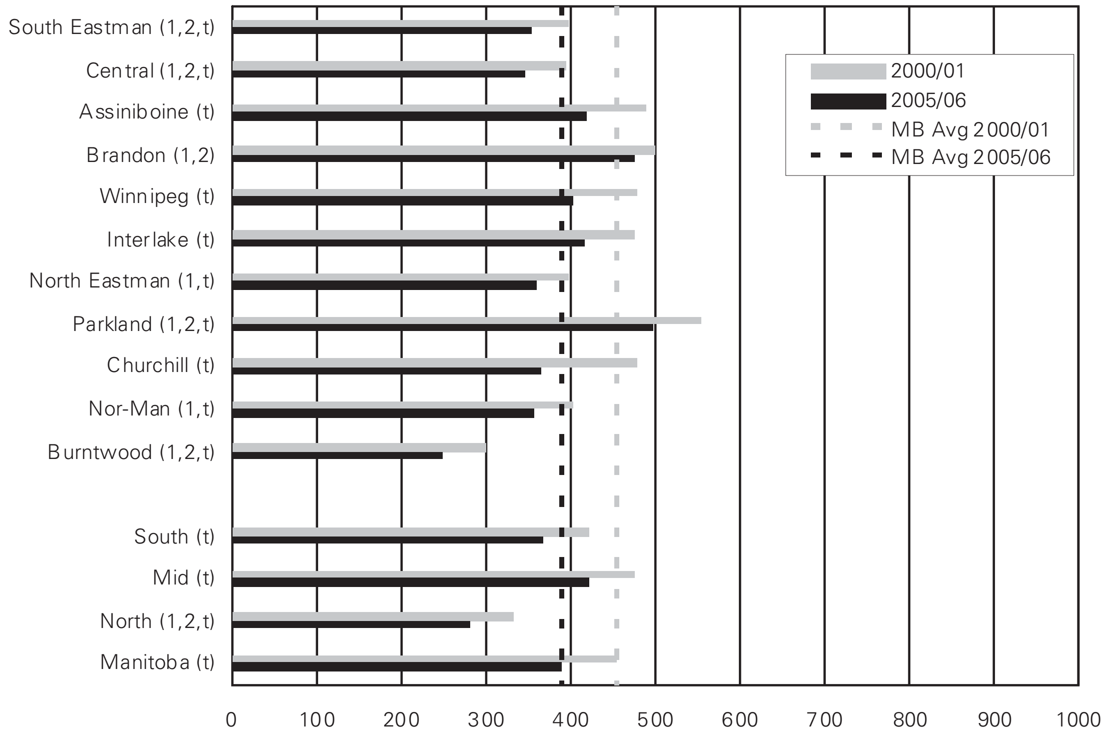
6.2 Antibiotic Prescriptions

There has been concern in recent years about the over–prescribing of antibiotics and the potential relationship of these practices to antibiotic resistance in children (Chung et al., 2007; Kozyrskyj et al., 2004a; Marra et al., 2006). In this section, we look at antibiotic use in two ways. First, we examine rates of children with at least one antibiotic prescription per 1,000 children. Secondly, we look at the average number of antibiotic prescriptions per 1,000 children who were prescribed these medications. For each of these analyses we looked at two one–year time periods: 2000/01 and 2005/06.

The rates of Manitoba children with one or more prescriptions for antibiotics decreased significantly over the study period, from 453.5/1,000 in 2000/01 to 389.9/1,000 in 2005/06 (Figure 6.4). In all RHAs except for Brandon, there were also statistically significant decreases in the rates of children with antibiotic prescriptions. In Brandon (499.9/1,000 and 474.1/1,000) and Parkland (554.3/1,000 and 495.8/1,000), the rates of children with antibiotic prescriptions were significantly higher in both time periods compared to the provincial average, whereas in South Eastman (398.3/1,000 and 354.0/1,000), Central (395.2/1,000 and 346.5/1,000) and Burntwood (300.5/1,000 and 249.1/1,000), the rates were significantly lower in both time periods. It should be kept in the mind that to the extent that antibiotics are dispensed through nursing stations in remote areas, undercounting of rates of antibiotic prescriptions may occur in areas served by these facilities, which would particularly affect the rates for children living in the North in the first time period.

Figure 6.4: Rate of Children With at Least One Antibiotic Prescription by RHA

Age- and sex-adjusted rates per 1,000 children ages 0-19



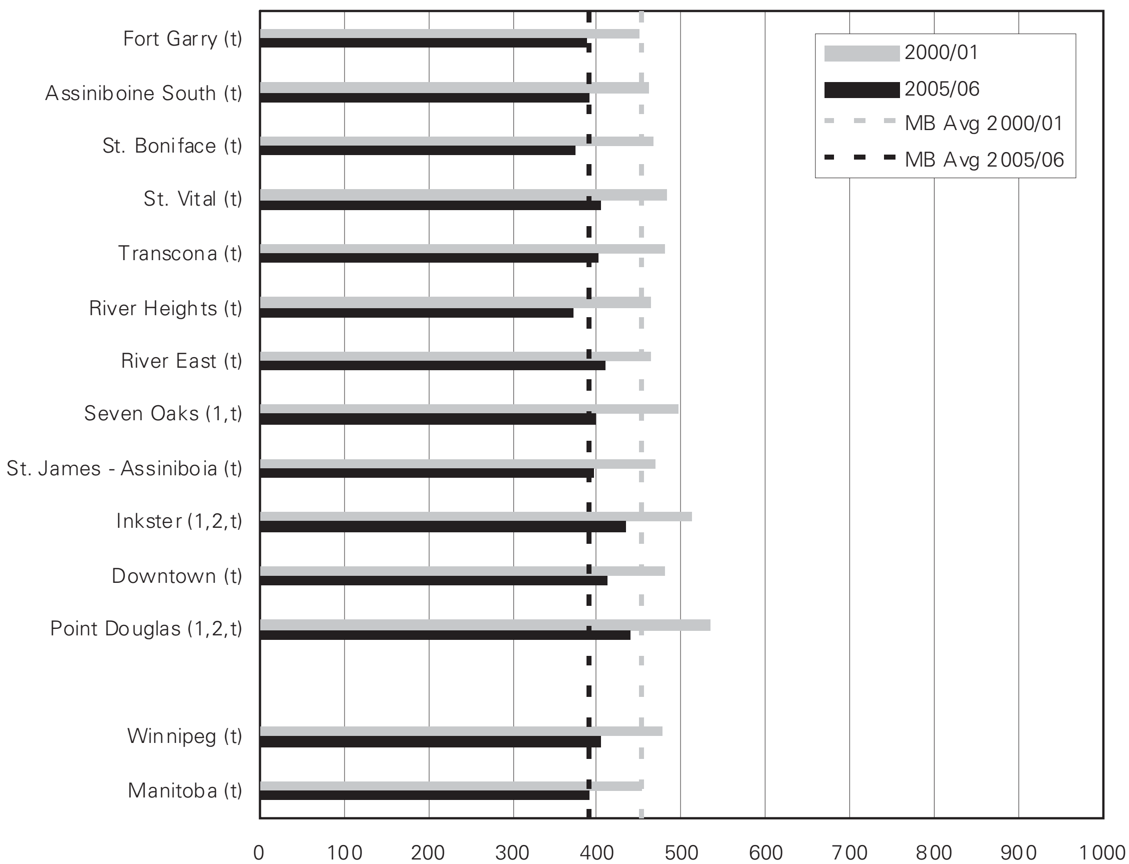
'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

Rates of children with at least one antibiotic prescription also decreased significantly for each of the Winnipeg Community Areas over the study period. Two Winnipeg CAs had significantly higher rates of children with at least one prescription for an antibiotic than the provincial average in both time periods—Inkster (512.9/1,000, 435.0/1,000) and Point Douglas (533.5/1,000, 440.0/1,000).

Figure 6.5: Rate of Children With at Least One Antibiotic Prescription by Winnipeg Community Area

Age- and sex-adjusted rates per 1,000 children ages 0-19



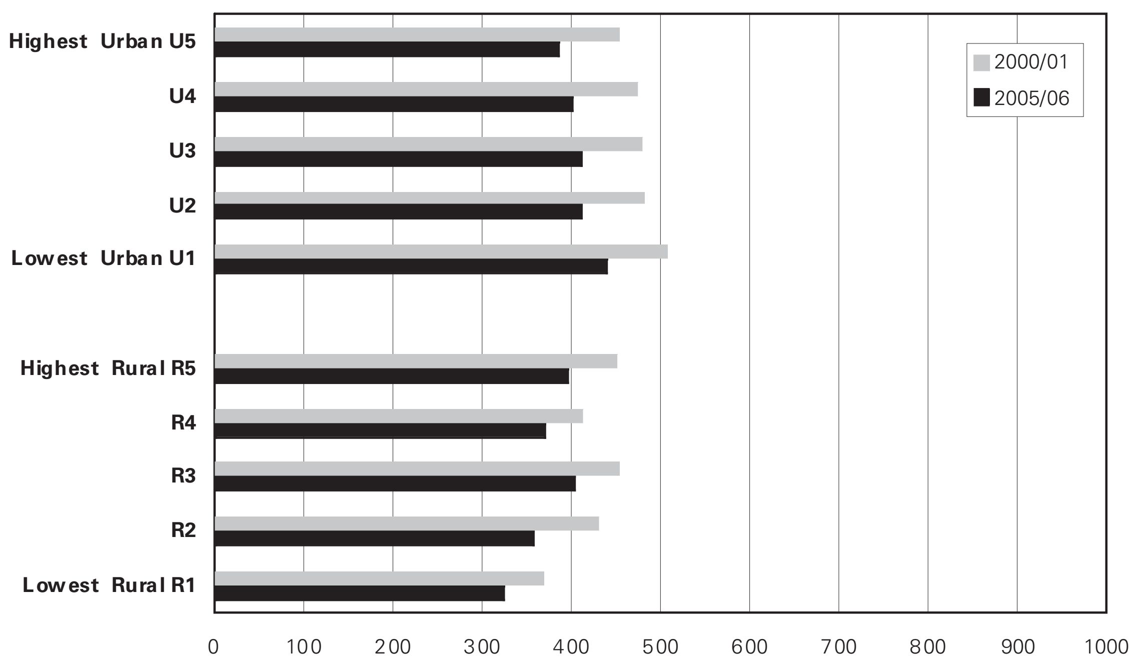
'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

The rate of children with at least one antibiotic prescription was significantly related to area–level income, but the pattern of this relationship differed depending on rural or urban residence. In rural areas, for both time periods, the rates of children with antibiotic prescriptions were higher in areas with higher area–level income. For example, in the first time period, the rate for children from the lowest income quintile areas was 369.5/1,000 compared to 449.9/1,000 for children from the highest income quintile areas. Rates for children from all rural income quintile areas decreased by the second time period, but the pattern of results remained the same. It should be kept in mind that undercounting of antibiotic prescriptions may have occurred in northern remote areas served by nursing stations which would have the greatest impact on the rates for the lower income quintile areas in the first time period. In urban areas, in both time periods, the rates of children with antibiotic prescriptions were higher in the lower income quintile neighbourhoods compared to the higher income quintile neighbourhoods. For example, in the second time period, 438.4/1,000 children in the lowest urban income quintile neighbourhoods were prescribed antibiotics, compared to 385.2/1,000 in the highest income quintile neighbourhoods. As was the case in rural areas, rates of children with at least one antibiotic prescription decreased in all urban income quintile areas. Whether the decrease in rates of children prescribed antibiotics is indicative of more appropriate prescribing practices in more recent years, or due to some other factor, warrants further investigation. Preliminary analyses suggest that the proportion of prescriptions dispensed for viral respiratory tract infections, which may be considered inappropriate (Kozyrskyj et al., 2004b), remained relatively stable across the study period (see Appendix).

Figure 6.6: Rate of Children With at Least One Antibiotic Prescription by Income Quintile

Age- and sex-adjusted rates per 1,000 children ages 0-19



Linear Trend Test Results

Time 1: Rural: Significant (p<.001) Urban: Significant (p<.01)

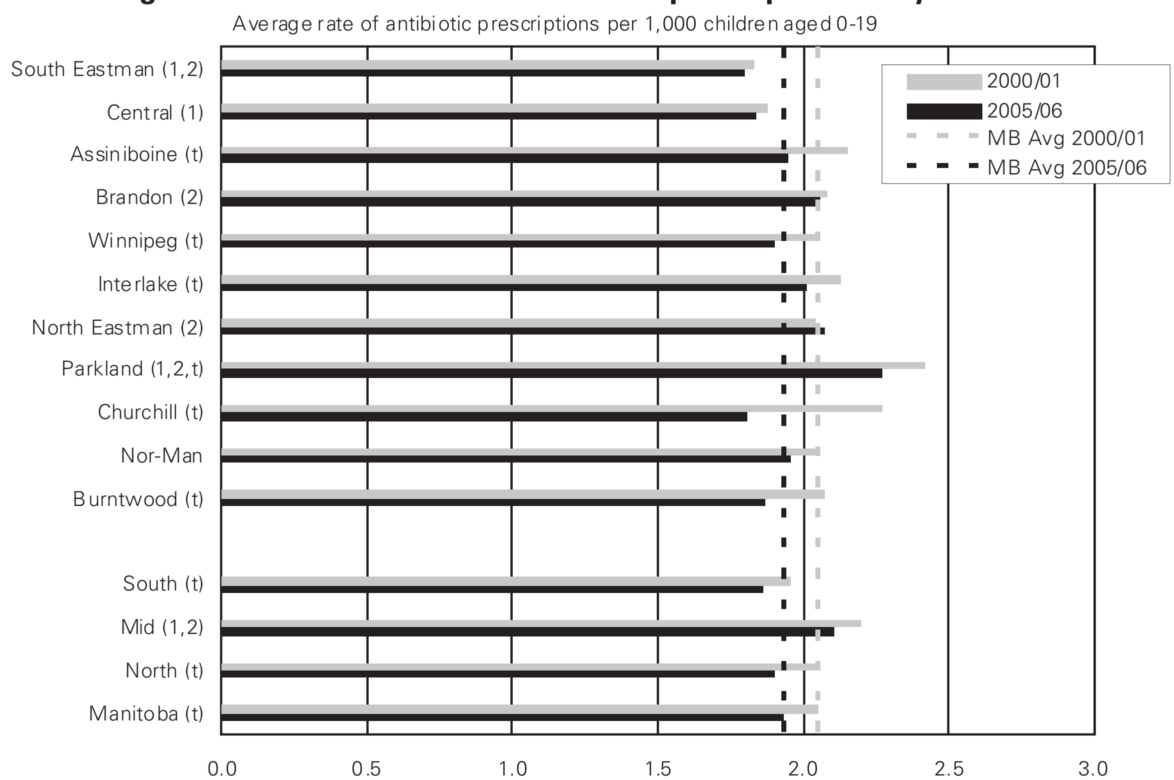
Time 2: Rural: Significant (p<.001) Urban: Significant (p<.001)

Source: Manitoba Centre for Health Policy, 2008

Antibiotic prescriptions tend to vary by age group, with children in the 1– to 4 year–old group having the highest rates of one or more antibiotic prescriptions (522.9/1,000 in time 2) and children in the 10– to 14–year–old group having the lowest rates (309.7/1,000 in time 2). A graph showing rates of children with at least one antibiotic prescription by age group can be found in the Appendix.

For children who were prescribed antibiotics, we also looked at the average number of antibiotic prescriptions they received in the two time periods. The average number of antibiotic prescriptions per user decreased significantly in Manitoba, from 2.05 in 2000/01 to 1.93 in 2005/06. The average number of antibiotics prescribed per user decreased significantly over the study period in Assiniboine (2.15 to 1.95), Winnipeg (2.05 to 1.90), Interlake (2.13 to 2.02), Parkland (2.42 to 2.27), Churchill (2.27 to 1.81) and Burntwood (2.07 to 1.87). The number of antibiotic prescriptions per user was significantly lower than the provincial average in both time periods in South Eastman (1.83, 1.80) and significantly higher than the provincial average in both time periods in Parkland.

Figure 6.7: Number of Antibiotic Prescriptions per User by RHA



'1' indicates area's rate was statistically different from Manitoba average in first time period
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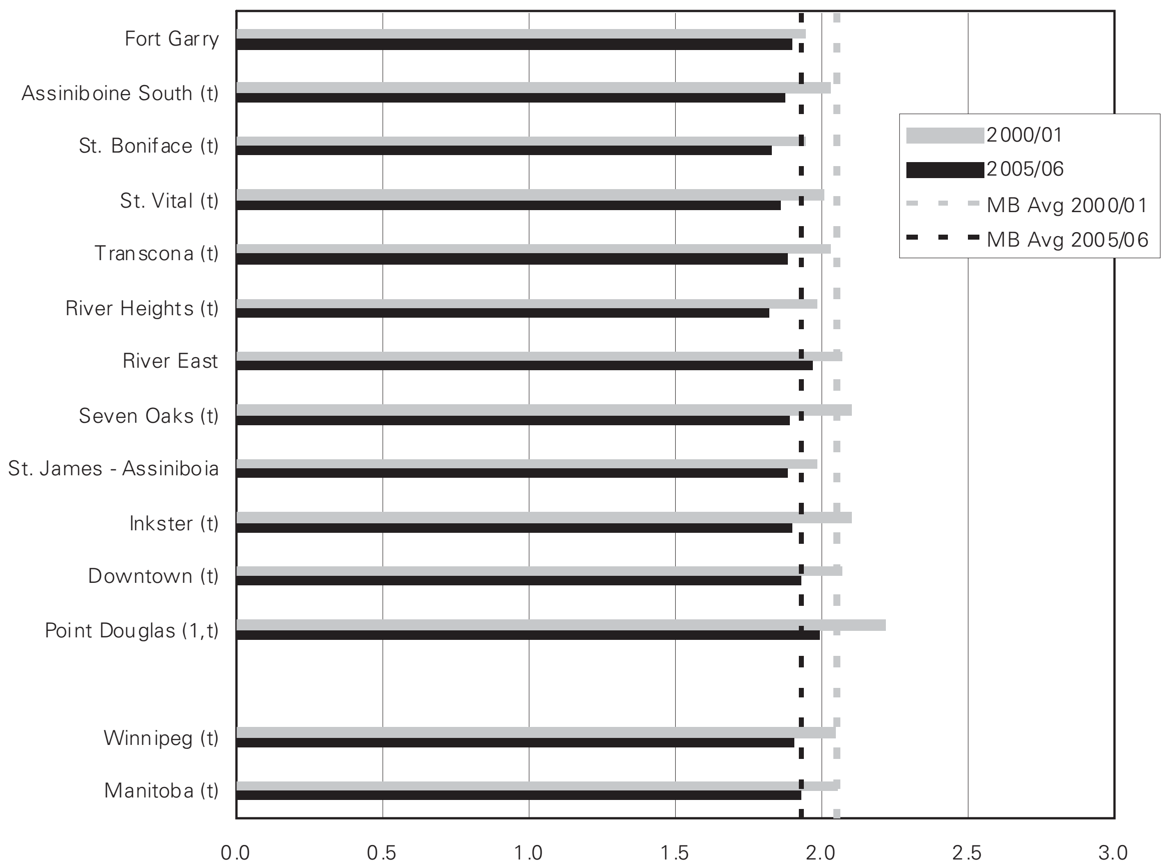
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

In the Winnipeg Community Areas, the number of antibiotic prescriptions per user dropped significantly over time in 9 of the 12 areas (all but Fort Garry, River East and St. James–Assiniboia). The number of antibiotic prescriptions per user in Point Douglas was significantly higher in the first time period (2.22/1,000) than the provincial average. There were no other significant differences for the Winnipeg CAs.

Figure 6.8: Number of Antibiotic Prescriptions per User by Winnipeg Community Area

Average rate of antibiotic prescriptions per 1,000 children aged 0-19



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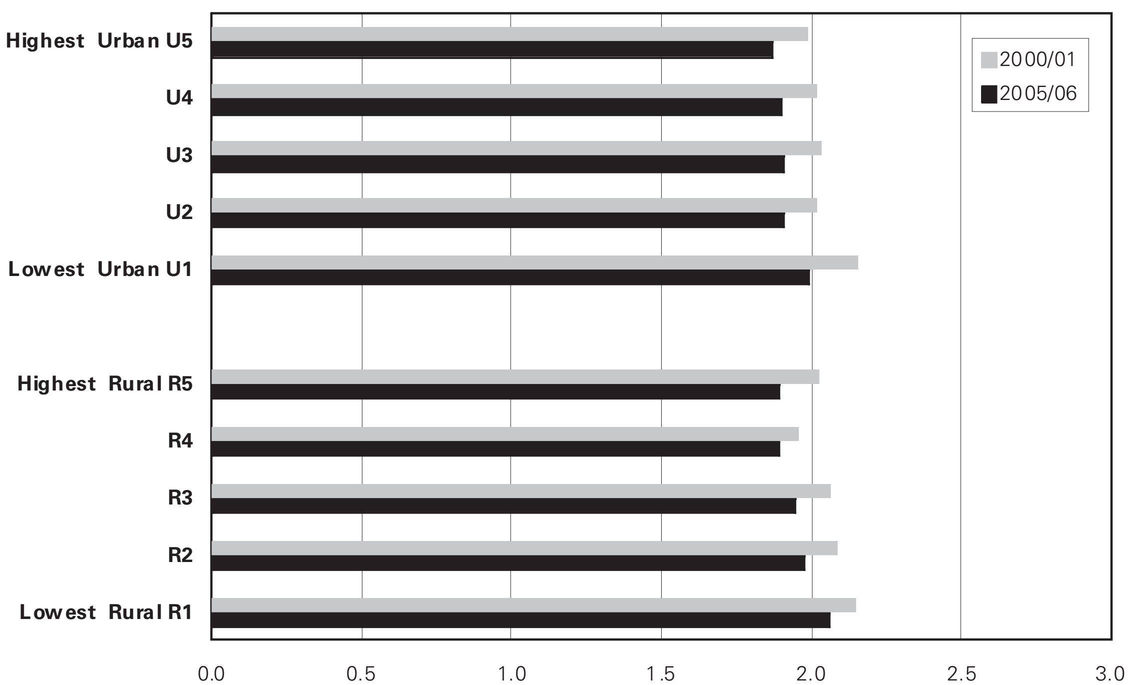
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

There was a significant relationship between area–level income and number of antibiotic prescriptions per user in rural areas for both time periods, and in urban areas in the first time period. In these cases, children from lower income areas tended to have higher average numbers of antibiotic prescriptions per user. For example, in the first time period, urban children from the lowest income quintile neighbourhoods who were prescribed antibiotics had an average of 2.16 prescriptions compared to 1.99 prescriptions for children from the highest income quintile neighbourhoods. In rural areas in the second time period, children from the lowest income quintile areas who were prescribed antibiotics had an average of 2.06 prescriptions per child compared to 1.89 prescriptions for children from the highest income quintile areas.

Figure 6.9: Number of Antibiotic Prescriptions per User by Income Quintile

Average rate of antibiotic prescriptions per 1,000 children aged 0-19



Linear Trend Test Results

Time 1: Rural: Significant (p<.001) Urban: Significant (p<.01)

Time 2: Rural: Significant (p<.001)

Source: Manitoba Centre for Health Policy, 2008

Children aged 1 to 4 years had the highest average number of antibiotic prescriptions per user (2.31 in time 2) whereas 10– to 14–year–olds had the lowest average number of prescriptions (1.65 in time 2). Crude rates of the average number of antibiotic prescriptions per user broken down by age group can be found in the Appendix.

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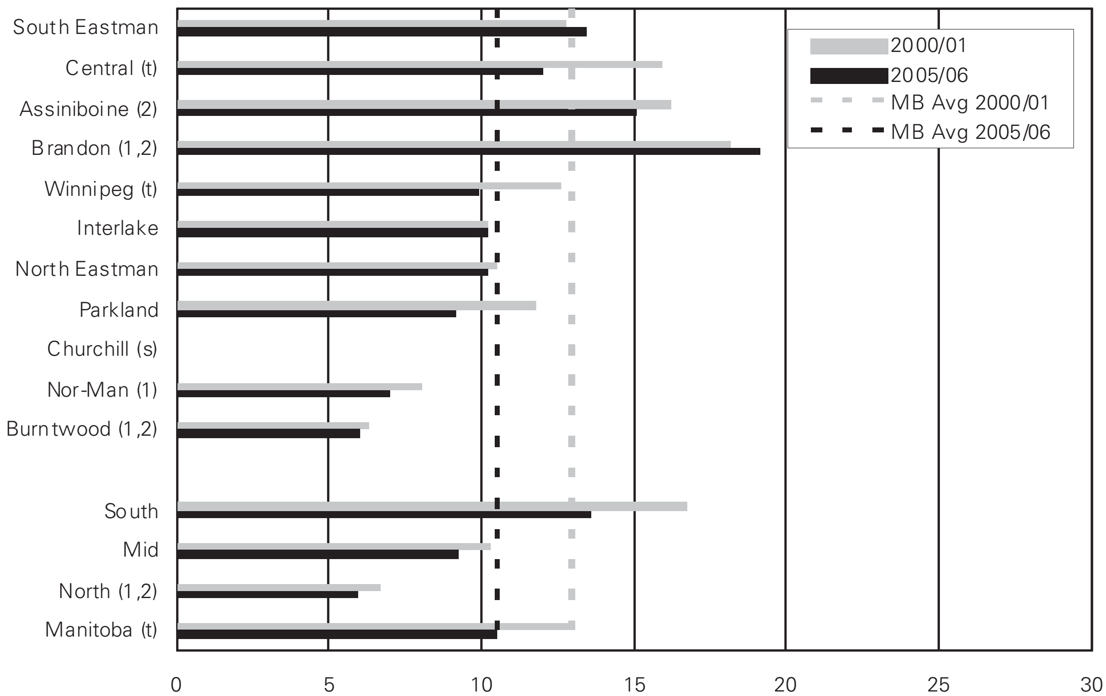
6.3 Antidepressant Prescriptions

Use of **antidepressant medications** has increased substantially in Canada since the early 1990s, and research suggests that these medications are often used to treat conditions other than depression (Beck et al., 2005). Concern has been expressed about the over–use of these medications, particularly the use of **Selective Serotonin Reuptake Inhibitors** (**SSRIs**), and the potential increased risk of suicide associated with their use (Fergusson et al., 2005). Indeed, in light of these concerns, particularly for adolescents, in October 2004, the Food and Drug Administration in the U.S. ordered drug producers to put a "black box" warning on all labels of antidepressants that were used with children and youths warning of the increased risk of suicidality associated with taking these medications (U.S. Food and Drug Administration, 2004). It should be noted that there is some controversy regarding whether SSRI use increases or decreases the risk of suicide risk in adolescents (Nutt et al., 2003; Gibbons et al., 2007; Katz et al., 2008). In this section, we examine the use of antidepressant medications in Manitoba children, looking at overall antidepressant prescription rates (including SSRIs) for children 0–19 years of age, as well as, prescriptions for SSRIs in Manitoba youths 10 to 19 years of age.

For antidepressant prescriptions, we compared two one–year periods: 2000/01 and 2005/06. The rate of Manitoba children 0 to 19 years of age with at least one prescription for an antidepressant decreased significantly over the study period, from 13.0/1,000 to 10.9/1,000 (Figure 6.10). The rates of children with one or more prescriptions for antidepressants decreased significantly over the time period for residents of Central (15.9/1,000 to 12.0/1,000) and Winnipeg (12.6/1,000 to 9.9/1,000). In Brandon, the rates of children with one or more prescriptions for antidepressants was significantly higher in both time periods (18.2/1,000, 19.1/1,000) compared to the provincial average; whereas in Burntwood (6.3/1,000, 6.0/1,000), the rates were significantly lower in both time periods. In the second time period, Assiniboine had significantly higher rates of children with at least one antidepressant prescription (15.1/1,000) compared to the provincial average. It should be kept in mind that, to the extent that antidepressants were dispensed from nursing stations, this may have led to undercounting in the North in the first time period.

Figure 6.10: Rate of Children With at Least One Antidepressant Prescription by RHA

Age- and sex- adjusted rates per 1,000 children ages 0-19 in 2000/01 and 2005/06



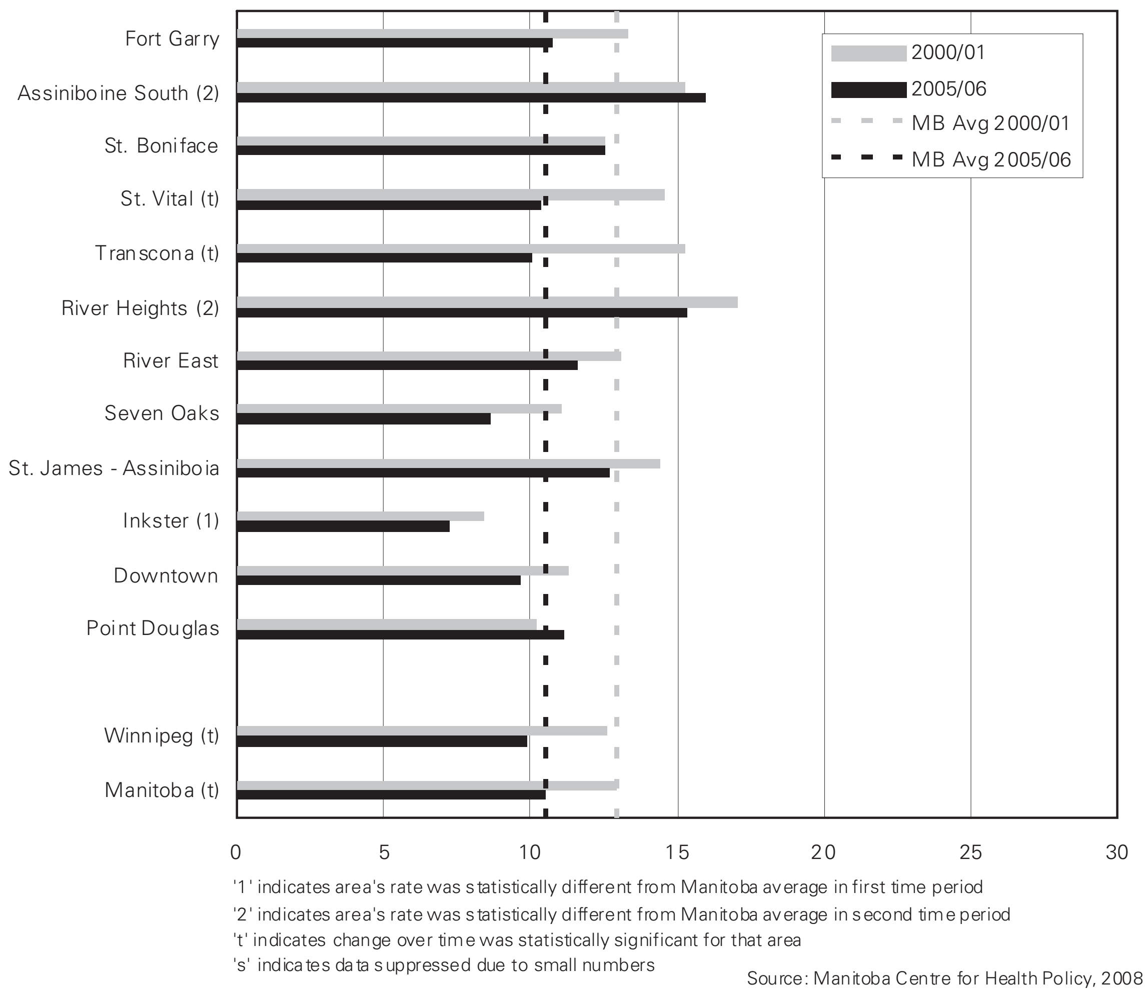
'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

In Winnipeg Community Areas, rates of children with at least one prescription for an antidepressant decreased significantly over time for St. Vital (14.6/1,000 to 10.3/1,000) and Transcona (15.3/1,000 to 10.1/1,000). Rates of children with antidepressant prescriptions were significantly higher than the provincial average in the second time period in both Assiniboine South (15.9/1,000) and River Heights (15.3/1,000).

Figure 6.11: Rate of Children With at Least One Antidepressant Prescription by Winnipeg Community Area

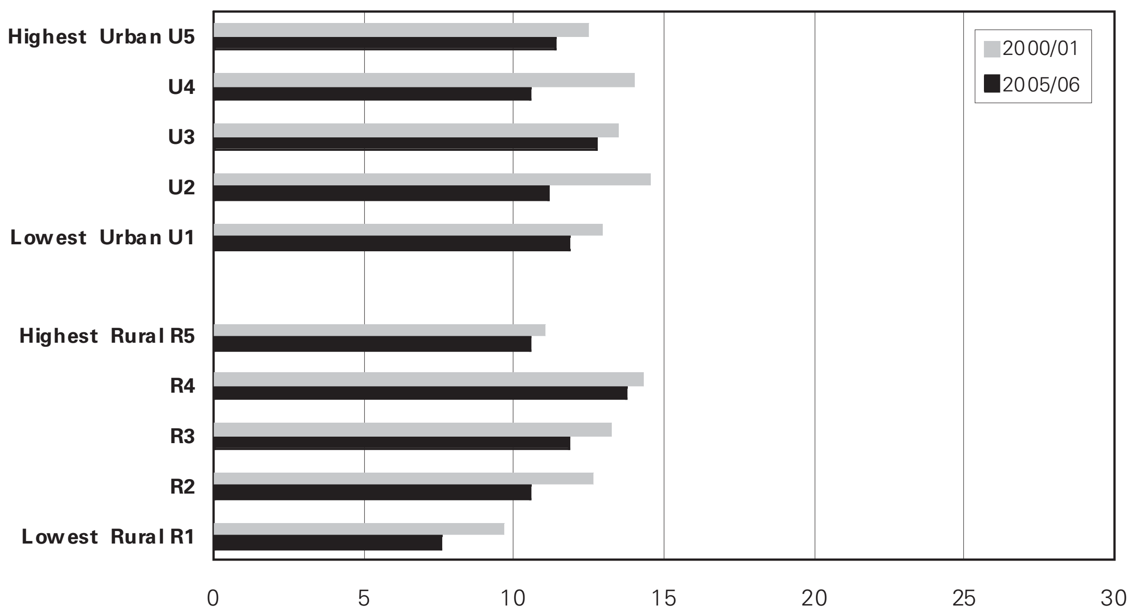
Age- and sex-adjusted rates per 1,000 children ages 0-19 in 2000/01 and 2005/06



There was only one significant association between area–level income and antidepressant prescription rates: for rural children in the second time period, the rates of children with at least one antidepressant prescription tended to be lower for areas with lower income levels. For example, in the highest rural income quintile areas, the antidepressant prescription rates was 10.5/1,000, and 13.7/1,000 in the second highest rural income areas, compared to 7.5/1,000 in the lowest income quintile areas.

Figure 6.12: Rate of Children With at Least One Antidepressant Prescription by Income Quintile

Age- and sex- adjusted rates per 1,000 children ages 0-19 in 2000/01 and 2005/06



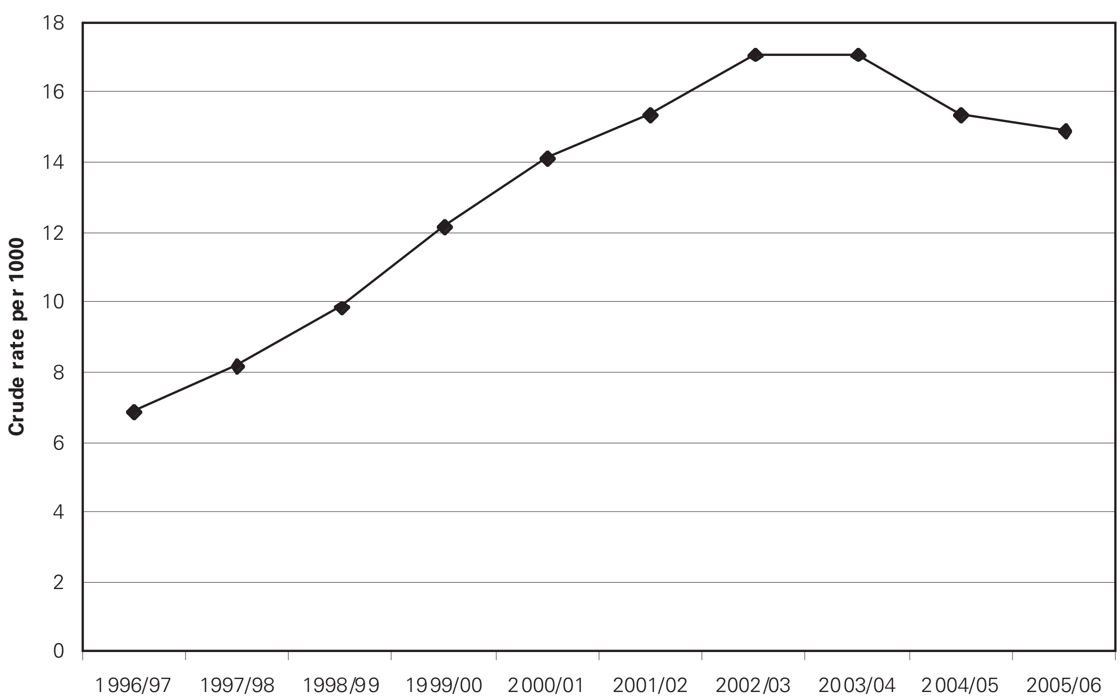
Linear Trend Test Results
Time 2: Rural: Significant (p<.01)

Source: Manitoba Centre for Health Policy, 2008

Rates of antidepressant prescriptions are higher for females than for males. For example, in 2005/06, the rate for girls was 16.4/1,000 whereas the rate for boys was 9.9/1,000 (see Appendix for crude rates of antidepressant prescriptions by sex).

Our preliminary analysis of SSRI use found no significant change in the rate of youths with prescriptions for these medications when we compared 2000/01 and 2005/06. Given the black box warnings issued in 2004, and earlier warnings in 2003 about the potential association between SSRI use and adolescent suicide risk, we had expected a significant decrease in the rates. We were advised that dramatic increases in the use of SSRIs continued right up to the time of the warnings, so choosing 2000/01 as a pre–warning year would not necessarily capture the decreases in SSRI prescription rates that occurred in response to the "black box" warning (Dr. Laurence Katz, 2007 personal communication). Analysis of crude rates of youths with at least one SSRI prescription confirmed that rates peaked in the 2002/03 and 2003/04 fiscal years (17.1/1,000 in both years) and decreased after that (see Figure 6.13). For this reason, the analysis of SSRI prescriptions which follows compares rates for 2002/03 and 2005/06.

Figure 6.13: Crude Rate of Children With at Least One SSRI Prescription by Fiscal Year

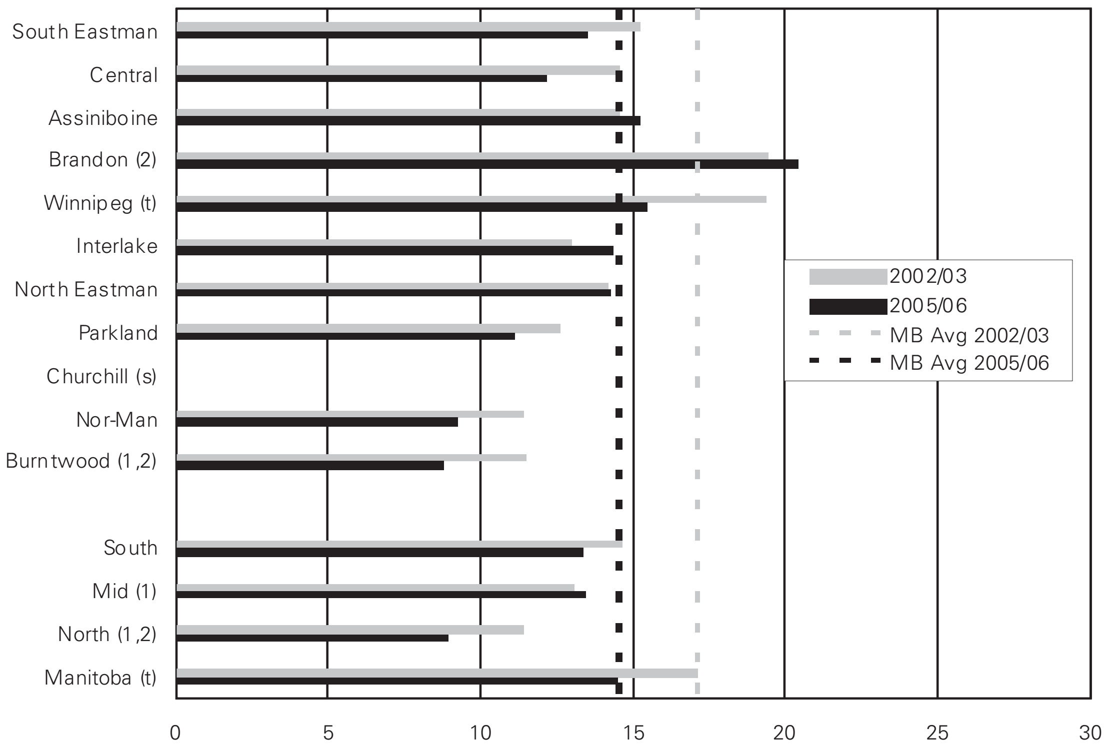


Source: Manitoba Centre for Health Policy, 2008

The rate of Manitoba youths with SSRI prescriptions decreased significantly between 2002/03 and 2005/06, from 17.1/1,000 to 14.5/1,000. Although the rates of SSRI prescriptions appeared to decrease over time for several of the RHAs, the decrease in rates was only statistically significant in Winnipeg (19.4/1,000 to 15.5/1,000). Brandon had a significantly higher rate of youths with at least one SSRI prescription in the second time period (20.4/1,000) when compared to the provincial average, whereas the rates in Burntwood were significantly lower in both time periods (11.5/1,000, 8.8/1,000).

Figure 6.14: Rate of Children With at Least One SSRI Prescription by RHA

Age- and sex-adjusted rates per 1,000 children aged 10-19



'1' indicates area's rate was statistically different from Manitoba average in first time period
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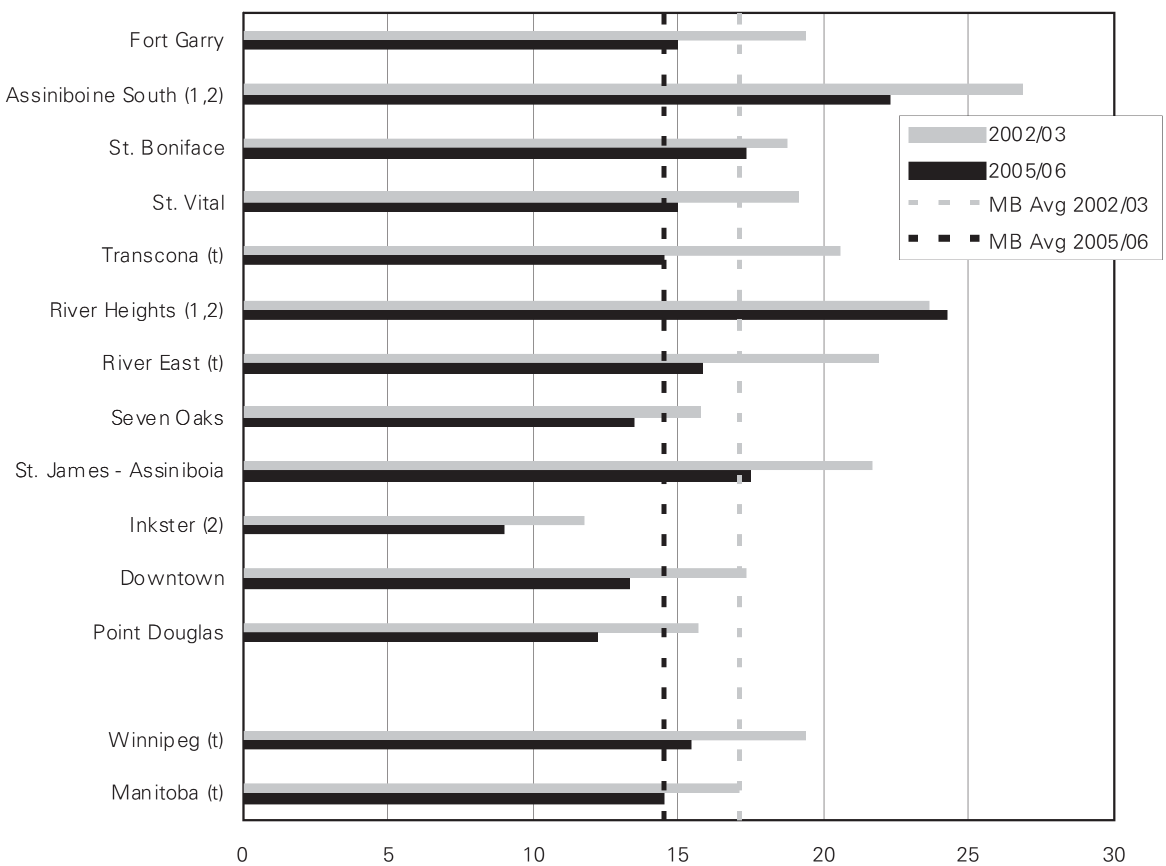
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

In the Winnipeg Community Areas, rates of youths with at least one prescription for an SSRI decreased significantly over time in Transcona (20.6/1,000 to 14.5/1,000) and River East (21.9/1,000 to 15.8/1,000). Rates of SSRI prescriptions were significantly higher than the provincial average in both time periods in Assiniboine South (26.8/1,000, 22.3/1,000) and River Heights (23.7/1,000, 24.3/1,000), and significantly lower than the Manitoba average in Inkster (9.0/1,000) in time 2.

Figure 6.15: Rate of Children With at Least One SSRI Prescription by Winnipeg Community Area

Age- and sex-adjusted rates per 1,000 children aged 10-19

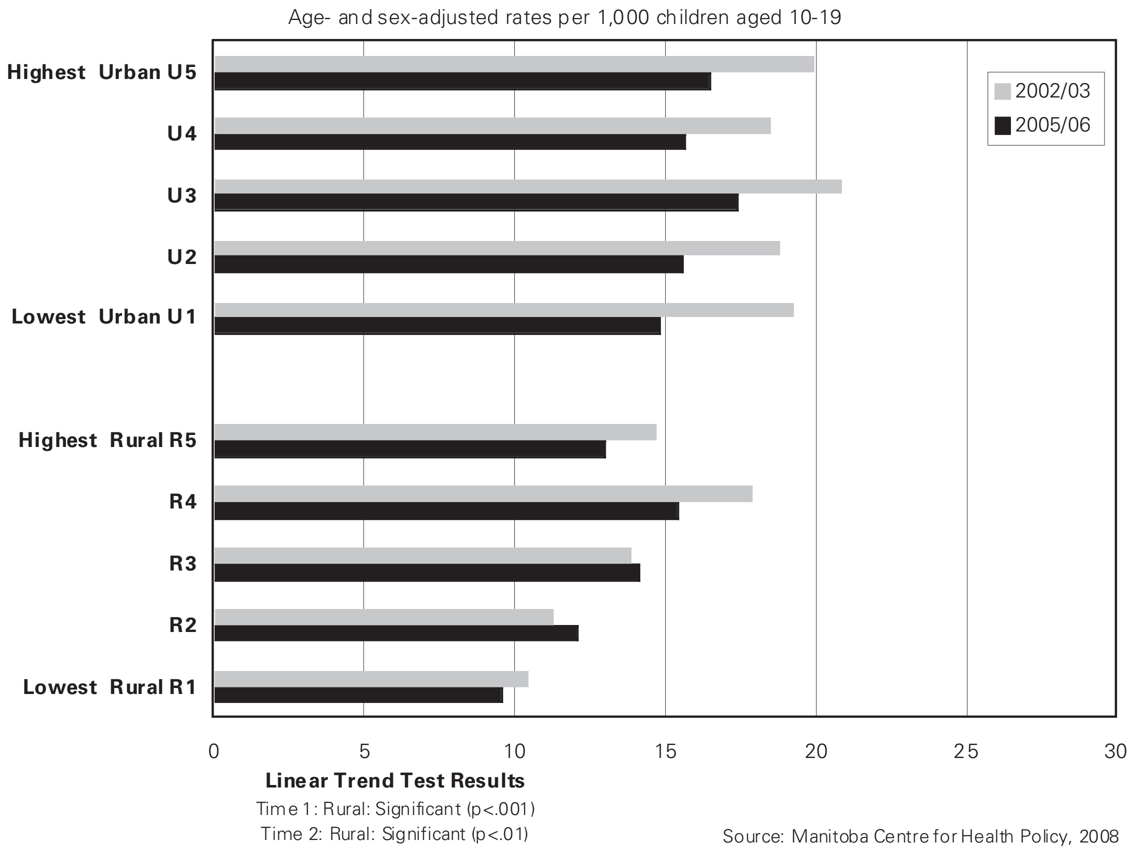


'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

In rural areas, there was a significant trend in SSRI prescription rates across area–level income in both time periods, with higher income associated with higher prescription rates. For example, in 2005/06, the rate of youths with at least one SSRI prescription in the highest rural income quintile areas was 12.9/1,000, and the rate in the second highest income quintile areas was 15.4/1,000, compared to 9.6/1,000 in the lowest rural income quintile areas. In urban areas, there was no significant relationship between area–level income and SSRI prescriptions in either 2002/03 or 2005/06.

Figure 6.16: Rate of Children With at Least One SSRI Prescription by Income Quintile



As was the case with antidepressant prescriptions, rates of at least one prescription for an SSRI were higher in females than males. The crude rate for females was almost twice as high as that for males in both years: in 2002/03, the rate for females was 22.2/1,000 compared to 12.2/1,000 for males; in 2005/06, the rate for females was 19.7/1,000 compared to 10.3/1,000 for males (see Appendix for graph of crude rate of SSRI prescriptions by sex).

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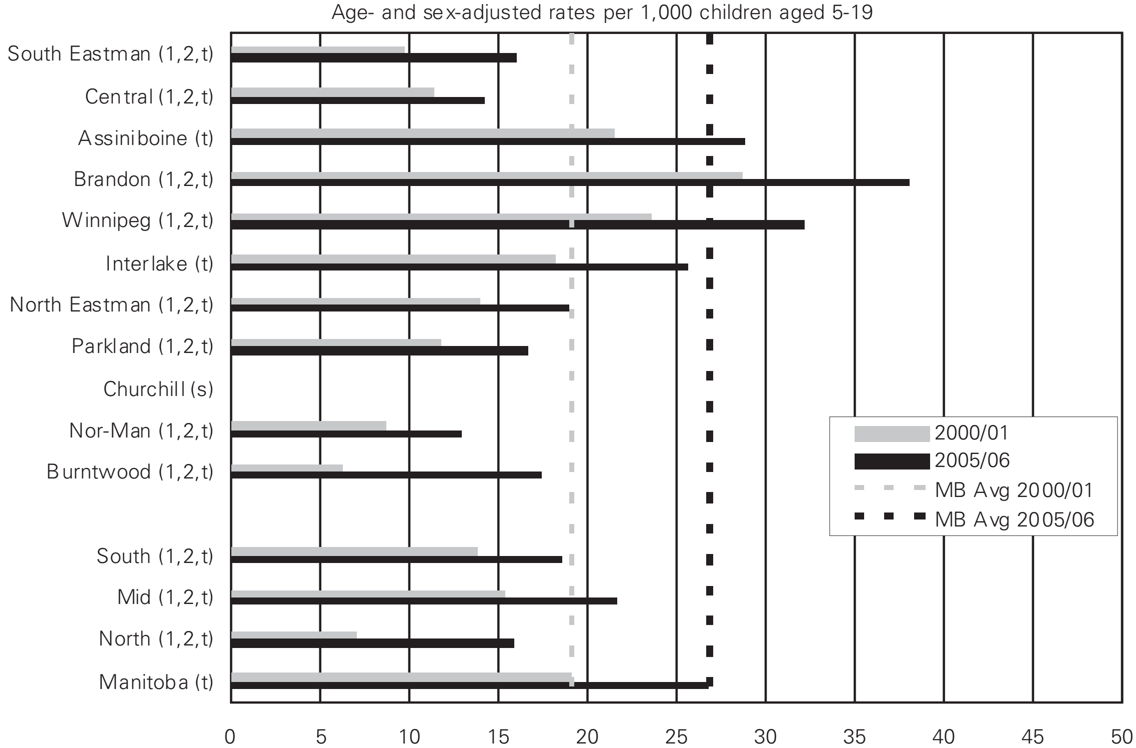
6.4 Psychostimulant Prescriptions

Psychostimulant medications are used to treat **attention–deficit/hyperactivity disorder** (**ADHD**) in children. The rate of psychostimulant prescriptions increased dramatically throughout the 1990s (Berbatis et al., 2002; Miller et al., 2001; Olfson et al., 2003). In this section, we look at the rate of children aged 5 to 19 years who had at least one prescription for a psychostimulant in two one–year time periods: 2000/01 and 2005/06.

The rate of Manitoba children with at least one psychostimulant prescription increased significantly over the study period, from 19.1/1,000 in 2000/01 to 26.8 in 2005/06. Statistically significant increases in rates of 5– to 19–year–old children with psychostimulant prescriptions were found in all of the RHAs (adjusted rates could not be calculated for Churchill in the model). Rates of psychostimulant prescriptions were higher than the provincial average in both time periods in Brandon (28.7/1,000, 38.0/1,000) and Winnipeg (23.6/1,000, 32.2/1,000). Several RHAs had significantly lower rates of children with psychostimulant prescriptions in both time periods, compared to the provincial average: South Eastman (9.8/1,000, 16.1/1,000), Central (11.3/1,000, 14.3/1,000), North Eastman (14.0/1,000, 19.0/1,000), Nor–Man (8.7/1,000, 12.9/1,000) and Burntwood (6.3/1,000, 17.4/1,000). It should be kept in mind that to the extent that psychostimulants were dispensed through nursing stations, rates reported for RHAs in the North may be an underestimate of the actual rates of psychostimulant prescriptions for children, particularly in the first time period.

Figure 6.17: Rate of Children With at Least One Psychostimulant Prescription by RHA

Age- and sex-adjusted rates per 1,000 children aged 5-19



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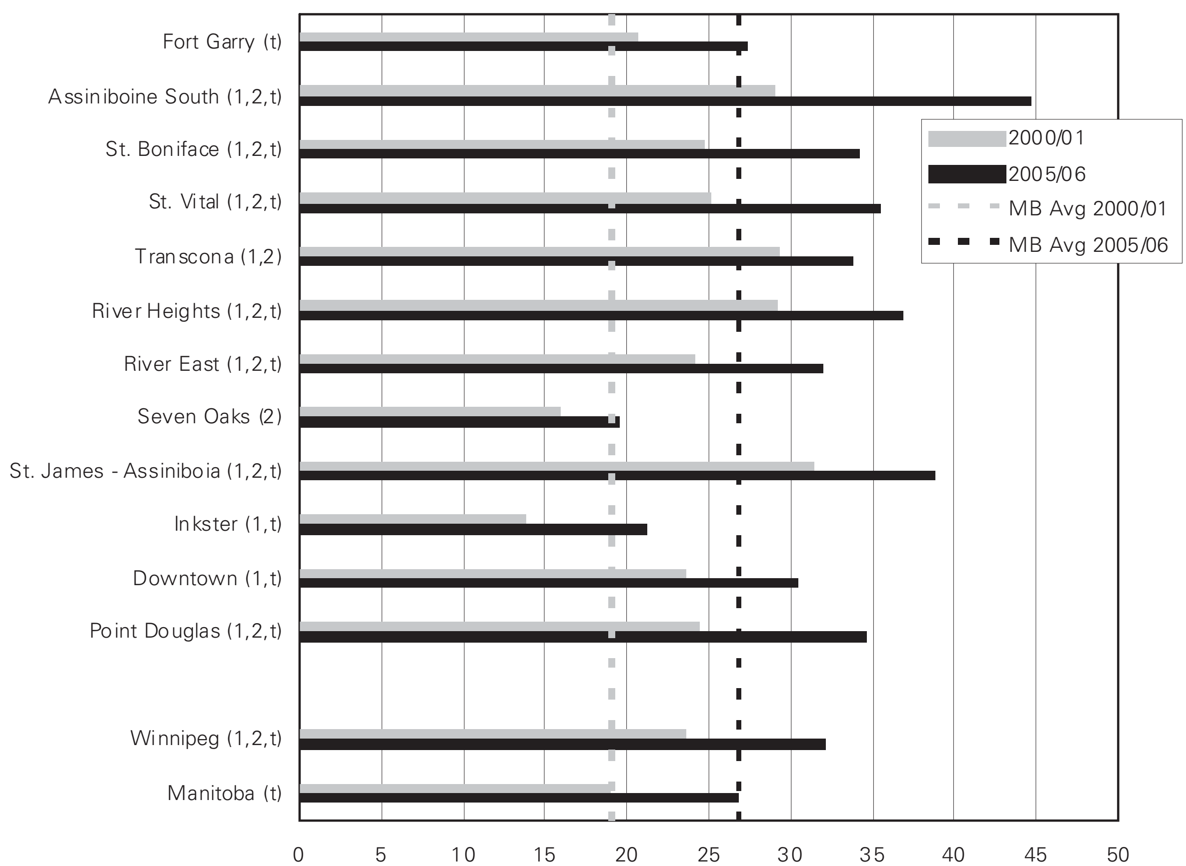
Source: Manitoba Centre for Health Policy, 2008

In the Winnipeg Community Areas, rates of children with at least one prescription for psychostimulants increased significantly over the study period in all areas except Transcona and Seven Oaks. Rates of psychostimulant prescriptions were higher than the provincial average in both time periods in Assiniboine South (29.0/1,000, 44.7/1,000), St. Boniface (24.7/1,000, 34.2/1,000), St. Vital (25.1/1,000, 35.5/1,000), Transcona (29.3/1,000, 33.8/1,000), River Heights (29.2/1,000, 36.9/1,000), River East (24.2/1,000, 32.0/1,000), St. James–Assiniboia (31.4/1,000, 38.8/1,000) and Point Douglas (24.5/1,000, 34.6/1,000). In Seven Oaks, the rate of children with at least one prescription for a psychostimulant was significantly lower (19.5/1,000) than the provincial average in the second time period.

Figure 6.18: Rate of Children With at Least One Psychostimulant Prescription by Winnipeg Community Area

Age- and sex-adjusted rates per 1,000 children aged 5-19



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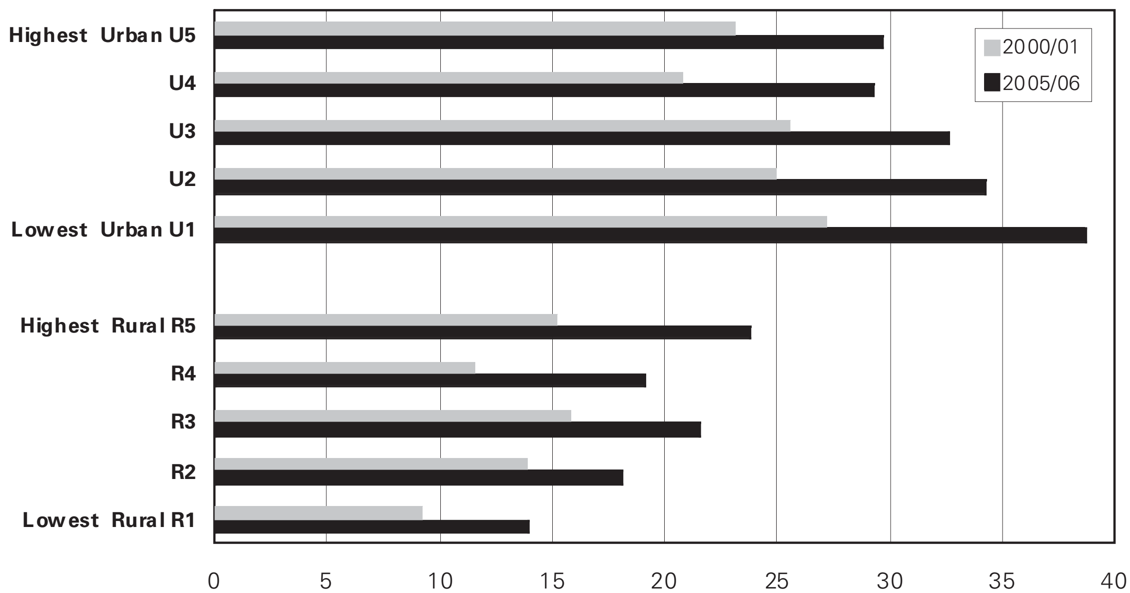
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

Significant relationships between area–level income and rates of 5– to 19–year–old children with at least one prescription for a psychostimulant were found in both time periods in both rural and urban areas; however, the trends were different in rural and urban areas. In the rural areas, psychostimulant prescriptions tended to be higher in areas with higher incomes. For example, in 2005/06, the rate of psychostimulant prescriptions was 13.9/1,000 for children from the lowest income quintile areas, compared to 23.7/1,000 for children from the highest income quintile areas. In the urban areas, rates of psychostimulant prescriptions increased as area–level income decreased, so that children from the lowest income areas had the highest prescription rates. For example, in 2005/06, the rate of psychostimulant prescriptions was 29.6/1,000 for children from the highest income quintile neighbourhoods, compared to 38.7/1,000 for children from the lowest income quintile neighbourhoods.

Figure 6.19: Rate of Children With at Least One Psychostimulant Prescription by Income Quintile

Age- and sex-adjusted rates per 1,000 children aged 5-19



Linear Trend Test Results

Time 1: Rural: Significant ($p<.001$) Urban: Significant ($p<.01$)
Time 2: Rural: Significant ($p<.001$) Urban: Significant ($p<.001$)

Source: Manitoba Centre for Health Policy, 2008

Males have much higher rates of psychostimulant prescriptions than females. In 2005/06 the rate for boys was over three times higher than the rate for girls—39.1/1,000 for boys compared to 11.7/1,000 for girls. Psychostimulant prescription rates also vary across age with the highest rates found for children in the 8– to 10– and 11– to 14–year–old groups (36.7/1,000 and 36.9/1,000 respectively). Graphs of crude rates of children with one or more prescriptions for psychostimulants by sex and by age can be found in the Appendix.

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Olfson M, Gameroff MJ, Marcus SC, Jensen PS. National trends in the treatment of attention deficit hyperactivity disorder. *Am J Psychiatry* 2003;160:1071–77.

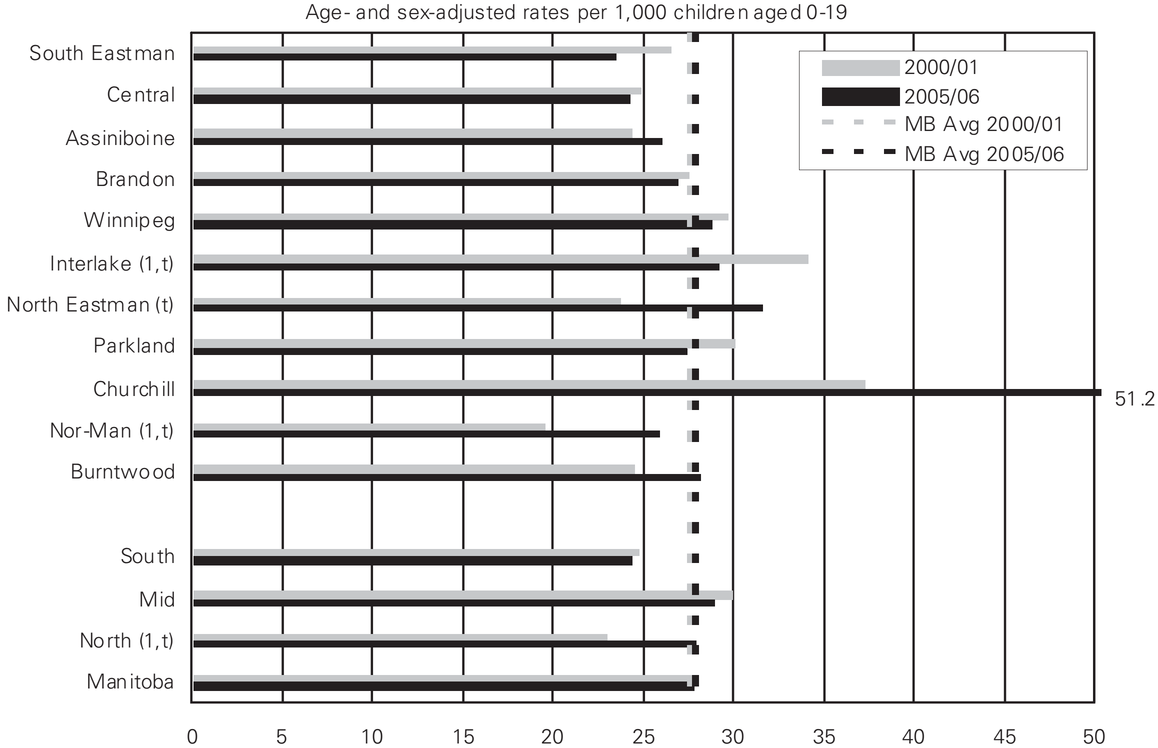
6.5 Narcotic Analgesic Prescriptions

Narcotic analgesic medications are used to control or relieve pain. In this section, we looked at prescriptions for these medications. Rates of children with one or more prescriptions for narcotic analgesics were calculated for two one–year time periods: 2000/01 and 2005/06.

The rates of Manitoba children with prescriptions for narcotic analgesics was similar in both time periods—27.6/1,000 in 2000/01 and 27.8/1,000 in 2005/06. Rates of children with narcotic analgesic prescriptions increased over time in both North Eastman (23.8/1,000 to 31.7/1,000) and Nor–Man (19.5/1,000 to 25.9/1,000), whereas rates decreased significantly over time in Interlake (34.2/1,000 to 29.2/1,000). Children in Interlake had higher rates of narcotic analgesic prescriptions compared to the provincial average in time 1 whereas children in Nor–Man had significantly lower rates in time 1. No other significant differences were found.

Figure 6.20: Rate of Children With at Least One Narcotic Analgesic Prescription by RHA

Age- and sex-adjusted rates per 1,000 children aged 0-19



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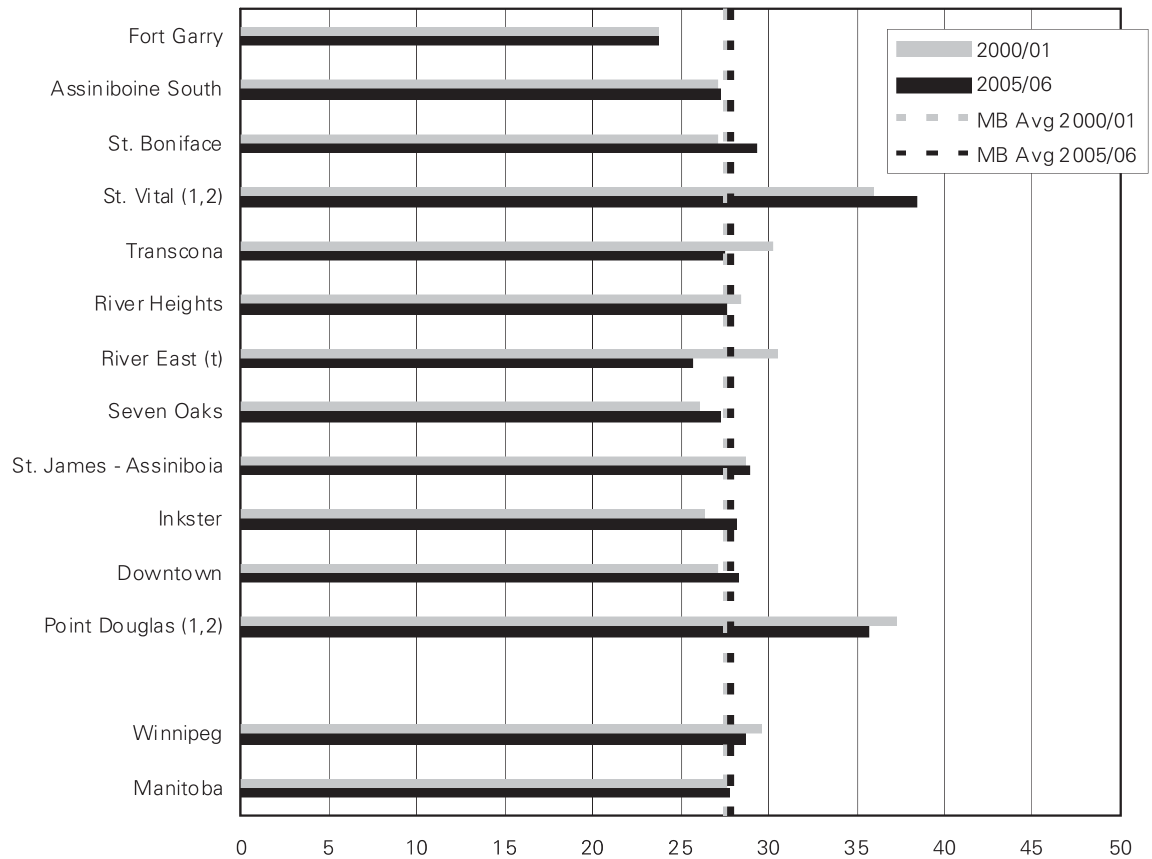
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

In the Winnipeg Community Areas, prescriptions for narcotic analgesics decreased significantly over the time period for children living in River East (30.5/1,000 to 25.7/1,000). Significantly higher rates of narcotic analgesic prescriptions compared to the provincial average were found in both time periods for St. Vital (36.0/1,000, 38.5/1,000) and Point Douglas (37.3/1,000, 35.7/1,000).

Figure 6.21: Rate of Children With at Least One Narcotic Analgesic Prescription by Winnipeg Community Area

Age- and sex-adjusted rates per 1,000 children aged 0-19



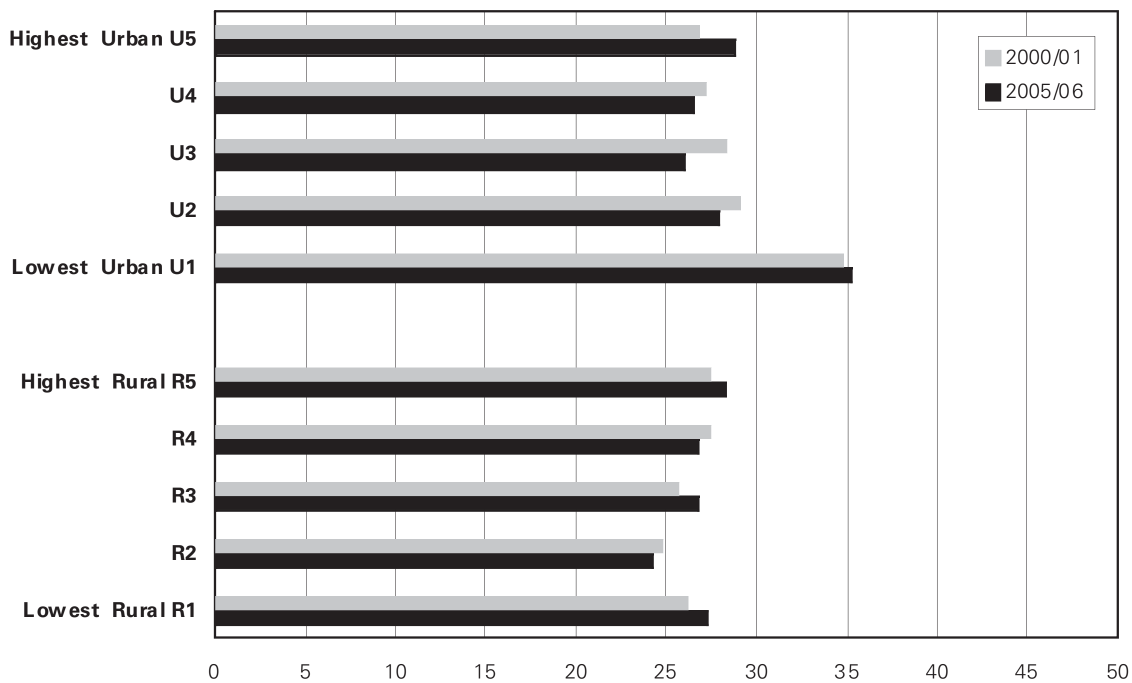
'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

For rural areas there were no significant associations between area–level income and rate of children with narcotic analgesic prescriptions. In urban areas, the relationship between area–level income and narcotic analgesic prescriptions was significant in both time periods, with rates of children with at least one prescription for narcotic analgesics increasing as area–level income decreased. For example, in 2005/06 in the highest urban income quintile neighbourhoods the rate of children with narcotic analgesic prescriptions was 28.8/1,000 compared to 35.1/1,000 in the lowest income quintile neighbourhoods.

Figure 6.22: Rate of Children With at Least One Narcotic Analgesic Prescription by Income Quintile

Age- and sex-adjusted rates per 1,000 children ages 0-19



Linear Trend Test Results

Time 1: Urban: Significant (p<.001)

Time 2: Urban: Significant (p<.01)

Source: Manitoba Centre for Health Policy, 2008

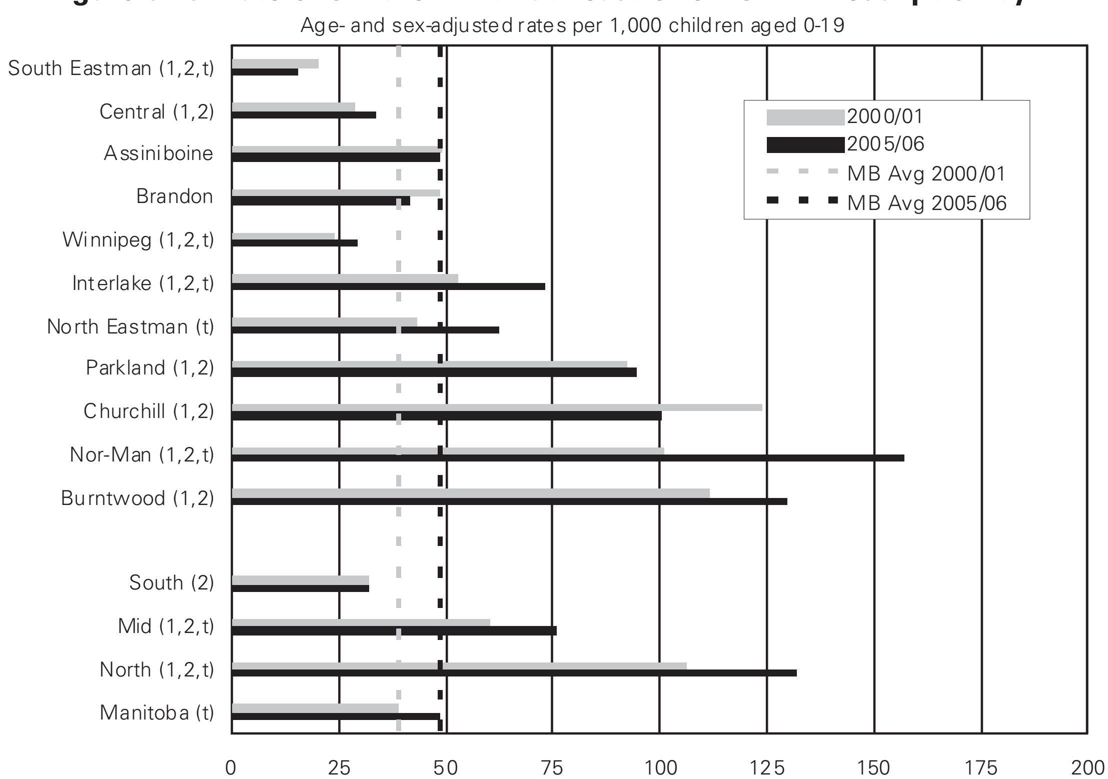
Girls were more likely to have prescriptions for narcotic analgesics than boys in both time periods. In 2000/01, 30.6/1,000 girls had at least one narcotic analgesic prescription compared to 24.8/1,000 boys. In 2005/06, the rates were 30.5/1,000 for girls and 27.7/1,000 for boys. Narcotic analgesic prescriptions are considerably higher for adolescents compared to younger children with the 15– to 19–year–olds having the highest rates, 86.6/1,000 in time 2 compared to 17.5/1,000 for 10– to 14–year–olds, and even lower rates for younger children. Graphs with crude rates by sex and age group can be found in the Appendix.

6.6 NSAID Prescriptions

Non–steroidal anti–inflammatory drugs (**NSAIDS**) are medications that are used to reduce pain, inflammation and fever. In this section, we examine the rates of children 0 to 19 years of age with at least one prescription for an NSAID. Rates are calculated for two one–year time periods: 2000/01 and 2005/06. It should be kept in mind that over–the–counter NSAIDs (such as ibuprofen and ASA), that are not obtained through a prescription, will not be captured here.

In Manitoba, the rate of children with NSAID prescriptions increased over the study period, from 39.0/1,000 in 2000/01 to 48.8/1,000 in 2005/06. NSAID prescription rates increased significantly over the study period in Winnipeg (23.8/1,000 to 29.2/1,000), Interlake (52.6/1,000 to 73.4/1,000), North Eastman (43.3/1,000 to 62.5/1,000) and Nor–Man (101.3/1,000 to 157.2/1,000), whereas the rates decreased significantly in South Eastman (20.2/1,000 to 15.3/1,000). The rates of children with NSAID prescriptions were significantly lower than the provincial average in both time periods in South Eastman, Central (29.0/1,000, 33.9/1,000) and Winnipeg, whereas the rates were significantly higher in both time periods in Interlake, Parkland (92.2/1,000, 94.6/1,000), Churchill (124.0/1,000, 100.4/1,000), Nor–Man and Burntwood (111.7/1,000, 129.7/1,000).

Figure 6.23: Rate of Children With at Least One NSAID Prescription by RHA



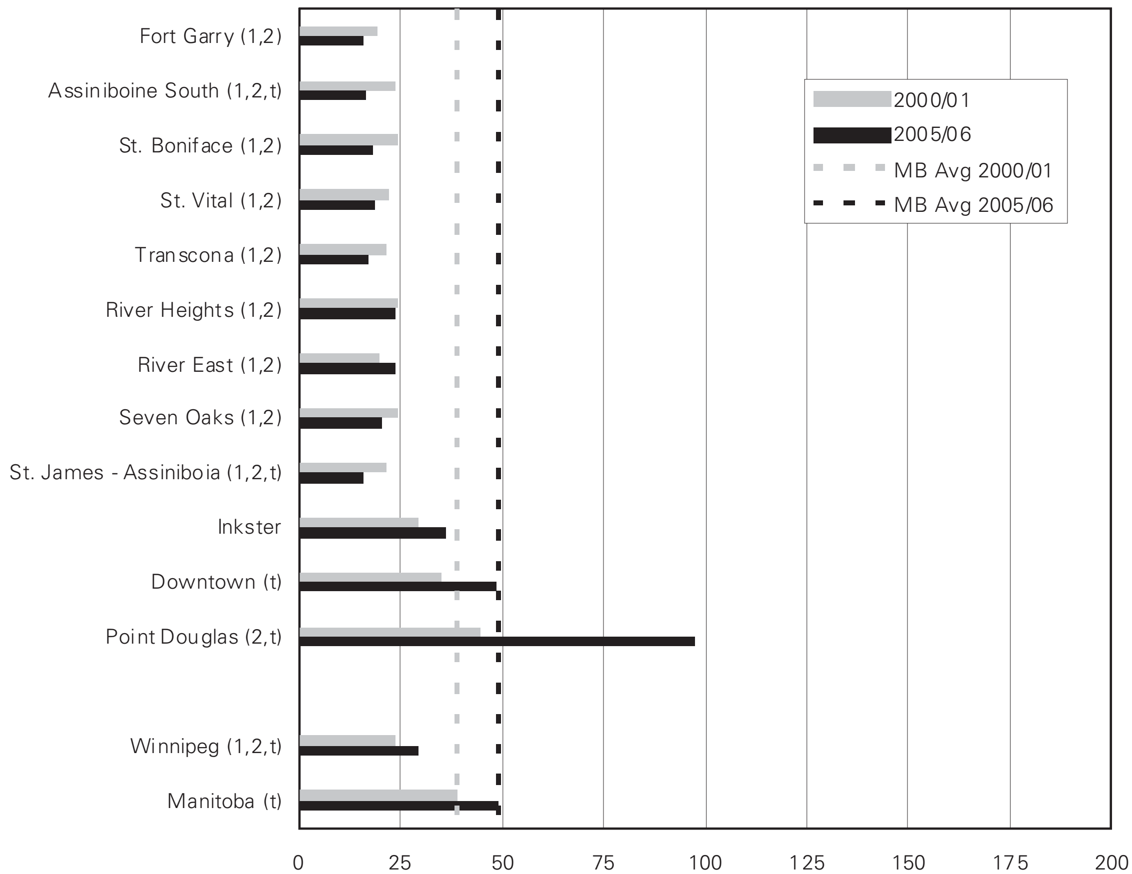
'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

The only Winnipeg Community Areas where rates of NSAID prescriptions increased were Downtown (34.9/1,000 to 48.7/1,000) and Point Douglas (44.8/1,000 to 97.6/1,000); Point Douglas was also the only Winnipeg CA where the rate was significantly higher than the provincial average, in time 2. In fact, Point Douglas, Downtown and Inkster were the only Winnnipeg CAs where the rates of children with NSAID prescriptions were not significantly lower than the provincial average in both time periods. Rates of children with prescriptions for NSAIDs decreased significantly over time in Assiniboine South (24.0/1,000 to 16.5/1,000) and St. James–Assiniboia (21.7/1,000 to 16.0/1,000).

Figure 6.24: Rate of Children With at Least One NSAID Prescription by Winnipeg Community Area

Age- and sex-adjusted rates per 1,000 children aged 0-19



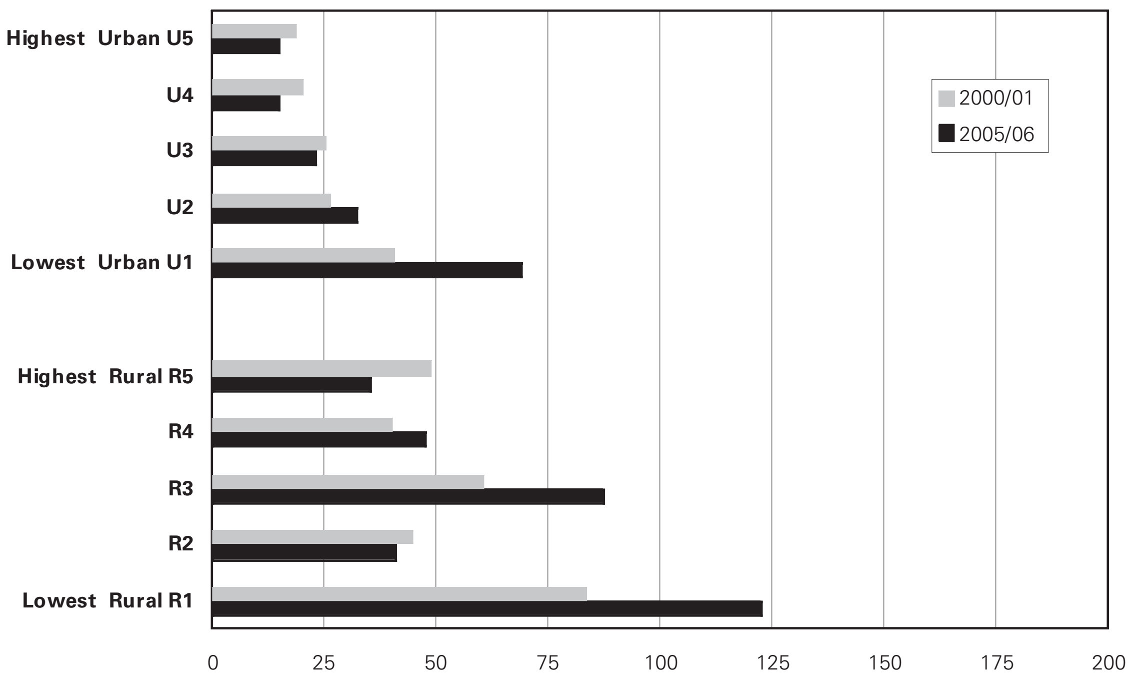
'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

In both rural and urban areas in both time periods, there was a significant relationship between area–level income and rate of children with NSAID prescriptions. NSAID prescription rates increased as area–level income decreased. And in both urban and rural areas, the gradient became steeper over time, with greater disparities in rates between lower and higher income quintiles. In rural areas in 2005/06, the rate of children with NSAID prescriptions was three–and–half times higher in the lowest compared to the highest income quintile areas (122.4/1,000 for the lowest quintile, 34.9/1,000 for the highest quintile). In urban areas in 2005/06, the rate of children with NSAID prescriptions was over four times higher in the lowest compared to the highest income quintile neighbourhoods (68.8/1,000 for the lowest quintile compared to 14.9/1,000 for the highest quintile).

Figure 6.25: Rate of Children With at Least One NSAID Prescription by Income Quintile

Age- and sex-adjusted rates per 1,000 children aged 0-19



Linear Trend Test Results

Time 1: Rural: Significant (p<.001) Urban: Significant (p<.001)
Time 2: Rural: Significant (p<.001) Urban: Significant (p<.001)
Rural time change: Significant (p<.001)
Urban time change: Significant (p<.001)

Source: Manitoba Centre for Health Policy, 2008

NSAID prescription rates are higher in females than males—with girls having a rate of 44.7/1,000, in 2005/06, compared to the rate for boys of 31.5/1,000. NSAID prescription rates are also considerably higher for older teens than for other age groups; the rate for 15– to 19–year–olds in 2005/06 was 76.1/1,000 compared to 28.8/1,000 for 10– to 14–year–olds. Graphs with crude rates of children with at least one NSAID prescription broken down by age group and sex can be found in the Appendix.

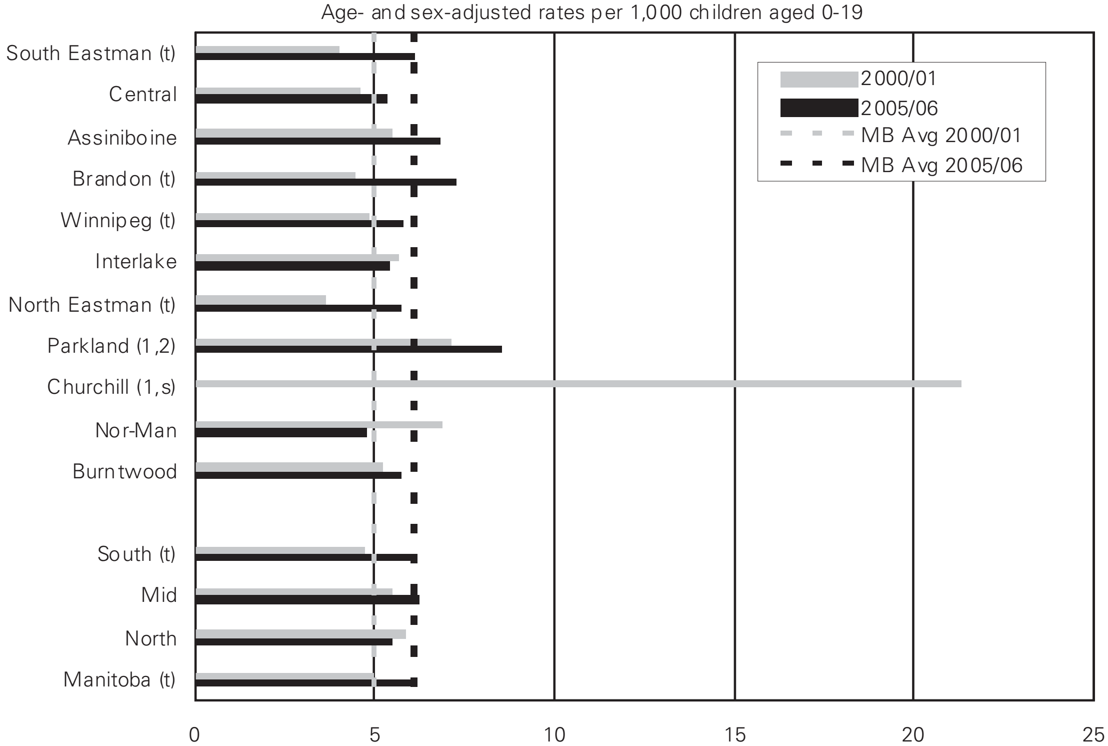
6.7 Anxiolytic Prescriptions

Anxiolytic medications are used to treat anxiety disorders and their symptoms which are among the most common psychological conditions in childhood (US Department of Health and Human Services, 2003). In this section, we looked at prescriptions for medications used to treat anxiety and insomnia, including benzodiazepines, zopiclone, chloral hydrate and buspirone (a full listing of the medications can be found in the Appendix). Rates of children with at least one prescription for an anxiolytic medication were examined in two one–year periods: 2000/01 and 2005/06.

In 2000/01, the Manitoba rate of children with at least one anxiolytic prescription was 5.0/1,000, and this increased significantly in 2005/06 to 6.1/1,000. Rates of children with anxiolytic prescriptions increased significantly over the study period in South Eastman (4.0/1,000 to 6.1/1,000), Brandon (4.5/1,000 to 7.3/1,000), Winnipeg (4.8/1,000 to 5.8/1,000) and North Eastman (3.7/1,000 to 5.7/1,000). Rates of anxiolytic prescriptions were significantly higher than the provincial average in both time periods in Parkland (7.2/1,000, 8.5/1,000). In the first time period, Churchill had a significantly higher rate of anxiolytic prescriptions (21.3/1,000) compared to the Manitoba average.

Figure 6.26: Rate of Children With at Least One Anxiolytic Prescription by RHA

Age- and sex-adjusted rates per 1,000 children aged 0-19

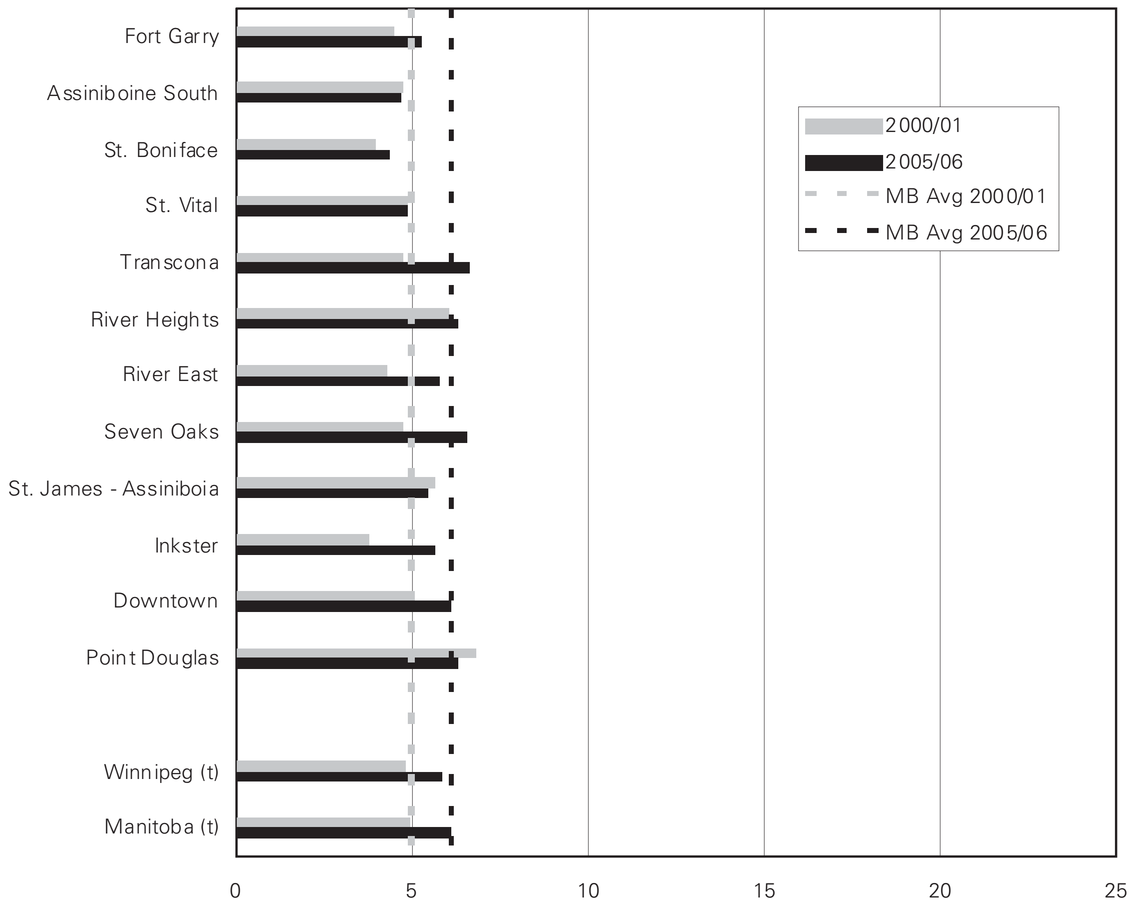


'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, There were no significant differences across Winnipeg Community Areas compared to the provincial average, nor were there any significant changes over time in rates of children with one or more prescriptions for anxiolytics.

Figure 6.27: Rate of Children With at Least One Anxiolytic Prescription by Winnipeg Community Area

Age- and sex-adjusted rates per 1,000 children aged 0-19



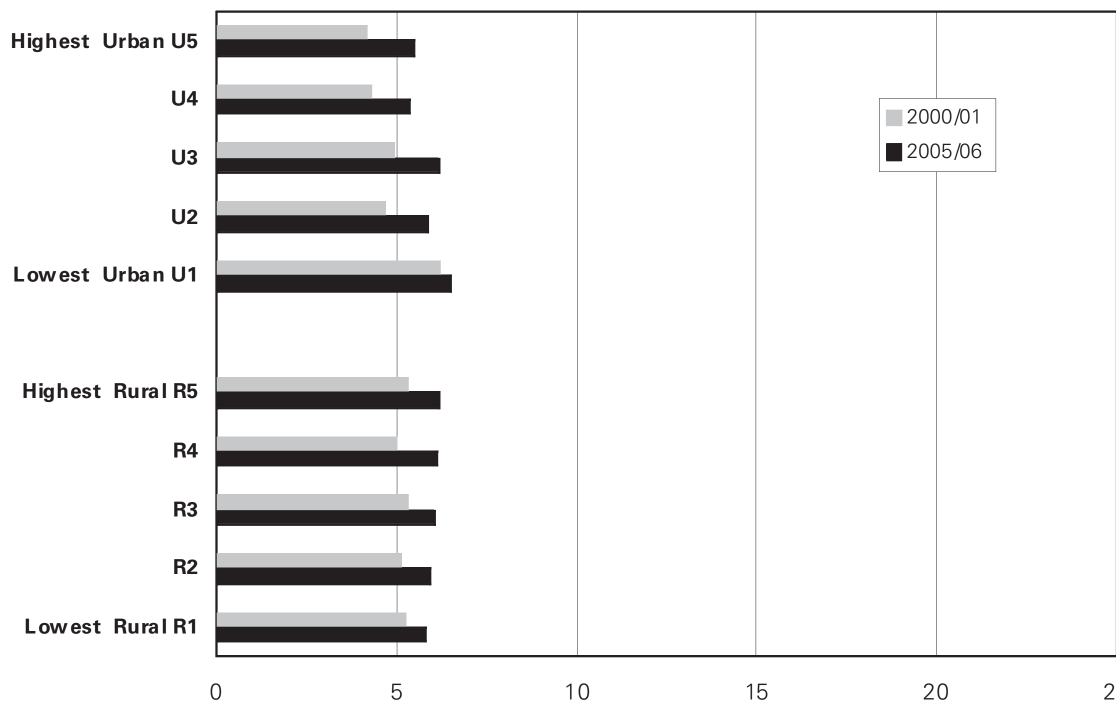
'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

The only significant association between area–level income and anxiolytic prescriptions was found in time 1 for urban children, with rates of children with at least one anxiolytic prescription increasing as area–level income decreased. For example, in 2000/01, the rate of children with at least one anxiolytic prescription in the highest income quintile neighbourhoods was 4.2/1,000 compared to 6.2/1,000 for children from the lowest income quintile neighbourhoods.

Figure 6.28: Rate of Children With at Least One Anxiolytic Prescription by Income Quintile

Age- and sex-adjusted rates per 1,000 children aged 0-19



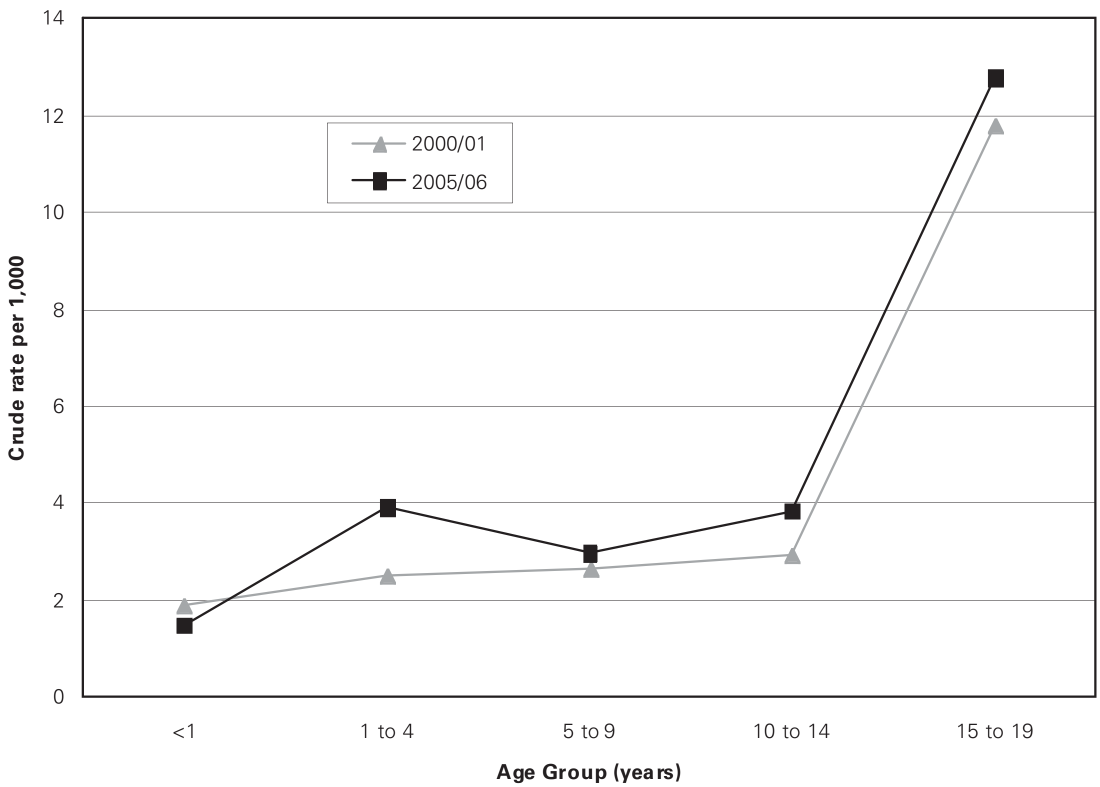
Linear Trend Test Results
Time 1: Urban: Significant (p<.01)

Source: Manitoba Centre for Health Policy, 2008

Females tend to have higher rates of anxiolytic prescriptions than males. In 2005/06, the rate of girls with at least one anxiolytic prescription was 7.0/1,000 compared to 5.0/1,000 for boys. And anxiolytic prescription rates tend to be considerably higher for older adolescents compared to other age groups. In 2005/06, the rate of youths with at least one anxiolytic prescription was 12.8/1,000 for 15– to 19–year–olds compared to 3.8/1,000 for 10– to 14–year–olds.

Figure 6.29: Rate of Children With at Least One Anxiolytic Prescription by Age Group

Crude rates per 1,000 children ages 0-19 in 2000/01 and 2005/06



Source: Manitoba Centre for Health Policy, 2008

References

US Department of Health and Human Services. *Children's Mental Health Facts Children and Adolescents with Anxiety Disorders.* Available from URL: http://mentalhealth.samhsa.gov/publications/allpubs/CA–0007/default.asp. Accessed on: May 6, 2008.

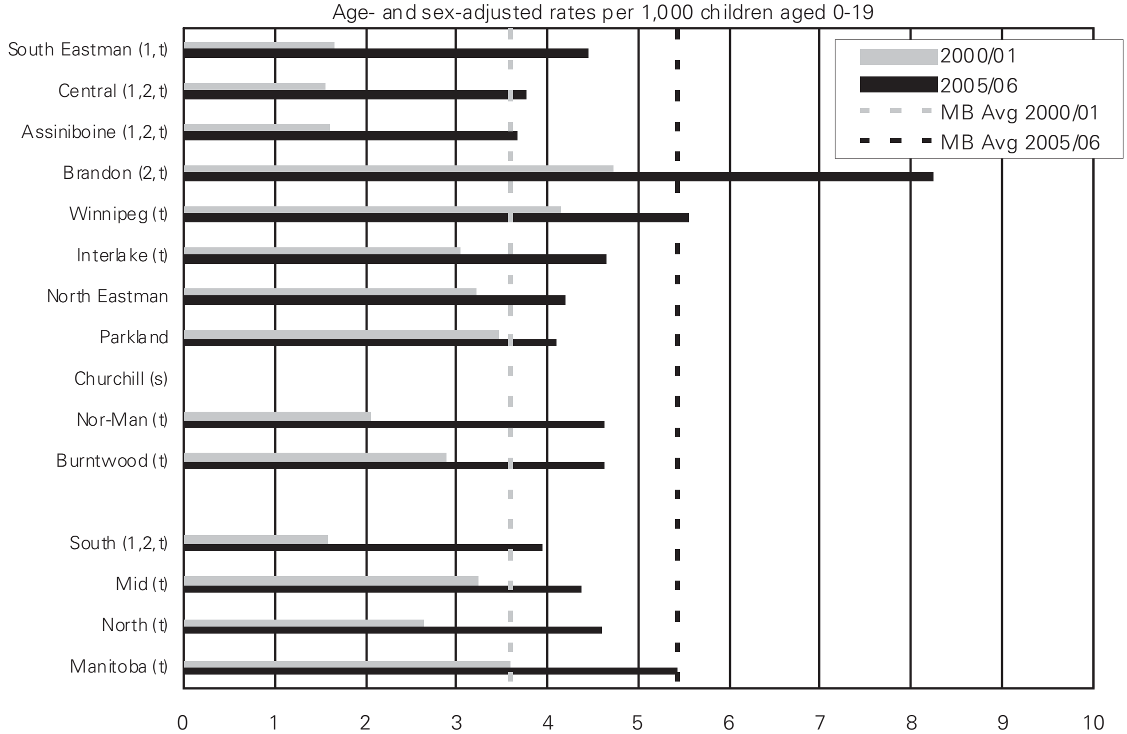
6.8 Antipsychotic Prescriptions

Antipsychotic medications have traditionally been used to treat children with psychoses or Tourette Syndrome and, in some cases, to lessen severe self–injurious or aggressive behaviours which can be associated with autism and mental retardation (Cooper et al., 2004). Research from the U.S. suggests that rates of antipsychotic prescriptions for children have increased dramatically in recent years, driven by use of these medications to treat ADHD, conduct disorder and affective disorders (Cooper et al., 2004). In this section, we examined rates of children aged 0 to 19 years with at least one prescription for an antipsychotic medication in two one–year time periods: 2000/01 and 2005/06.

The rates of children receiving antipsychotic prescriptions increased significantly in Manitoba over the study period, from 3.6/1,000 in 2000/01 to 5.4/1,000 in 2005/06. Significant increases in rates were also observed in South Eastman (1.6/1,000 to 4.5/1,000), Central (1.6/1,000 to 3.8/1,000), Assiniboine (1.6/1,000, 3.7/1,000), Brandon (4.7/1,000 to 8.2/1,000), Winnipeg (4.1/1,000 to 5.6/1,000), Interlake (3.0/1,000 to 4.7/1,000), Nor–Man (2.1/1,000 to 4.6/1,000) and Burntwood (2.9/1,000 to 4.6/1,000). Rates in both Central and Assiniboine were significantly lower in both time periods compared to the provincial average, whereas the rate in Brandon was significantly higher than the provincial average in the second time period.

Figure 6.30: Rate of Children With at Least One Antipsychotic Prescription by RHA

Age- and sex-adjusted rates per 1,000 children aged 0-19



'1' indicates area's rate was statistically different from Manitoba average in first time period
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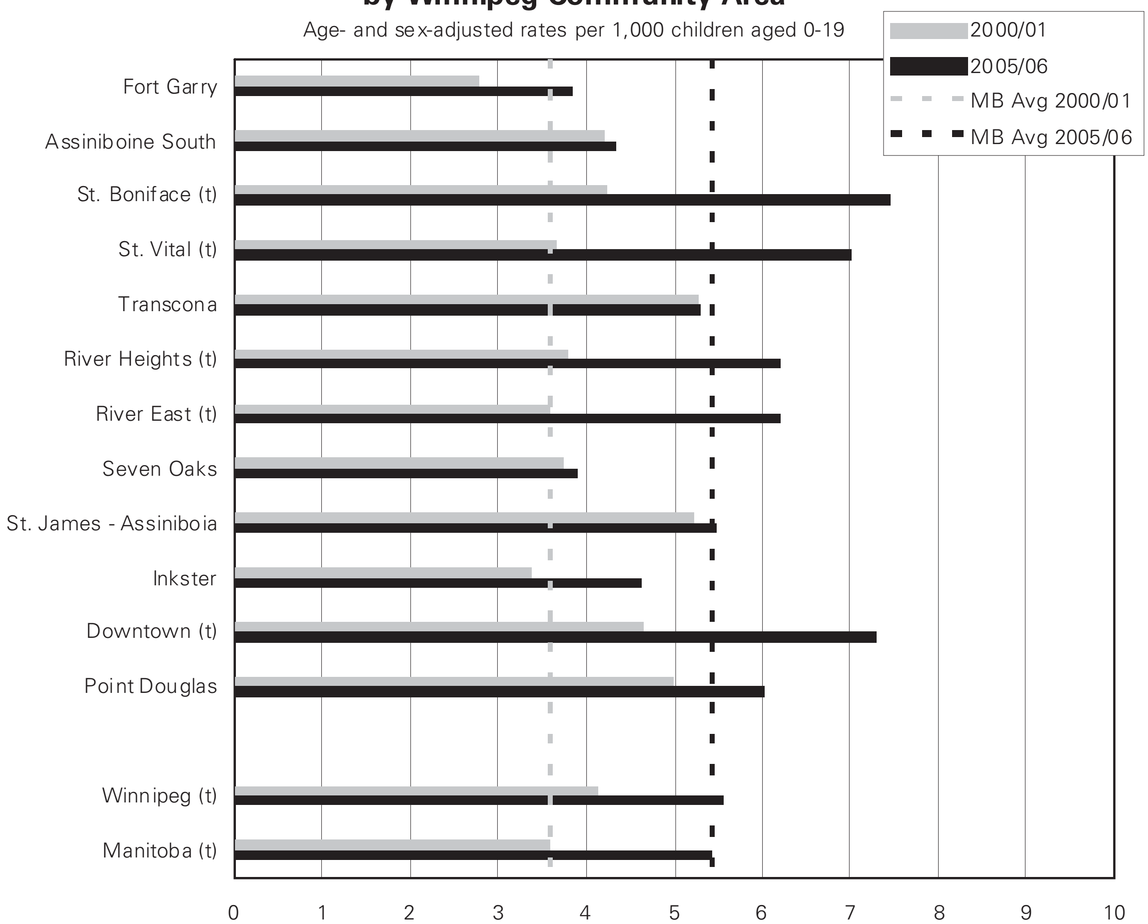
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

For the Winnipeg Community Areas, rates of antipsychotic prescriptions increased significantly over the study period in St. Boniface (4.2/1,000 to 7.5/1,000), St. Vital (3.7/1,000 to 7.0/1,000), River Heights (3.8/1,000 to 6.2/1,000), River East (3.6/1,000 to 6.2/1,000) and Downtown (4/6/1,000 to 7.3/1,000). There were no significant differences in antipsychotic prescription rates between Winnipeg CAs and the provincial average in either time period.

Figure 6.31: Rate of Children With at Least One Antipsychotic Prescription by Winnipeg Community Area

Age- and sex-adjusted rates per 1,000 children aged 0-19



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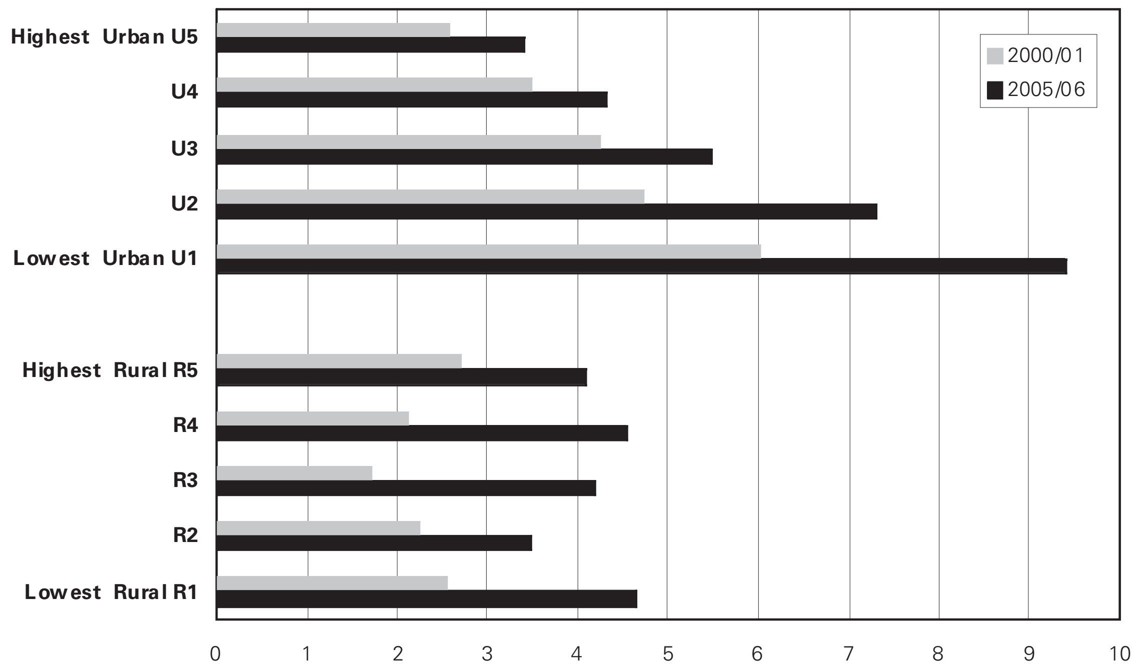
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

For children living in rural areas, no relationship was found between rates of antipsychotic medications and area–level income in either time period. For children living in urban areas, there was a significant trend across income quintiles in both time periods, with higher rates of children with at least one antipsychotic prescription associated with lower area–level income. For example, in 2005/06, the rate of antipsychotic prescriptions was 3.4/1,000 in the highest income quintile neighbourhoods compared to 9.4/1,000 for children from the lowest income quintile neighbourhoods.

Figure 6.32: Rate of Children With at Least One Antipsychotic Prescription by Income Quintile

Age- and sex-adjusted rates per 1,000 children aged 0-19



Linear Trend Test Results
Time 1: Urban: Significant (p<.001)
Time 2: Urban: Significant (p<.001)

Source: Manitoba Centre for Health Policy, 2008

Rates of children with at least one prescription for antipsychotics were higher in adolescents than in younger children. In 2005/06, the rate for 15– to 19–year–olds was 8.4/1,000, similar to the rate for 10– to 14–year–olds at 8.9/1,000. For 5– to 9–year–olds, the rate was 4.8/1,000 and for children 1 to 4 years of age the rate was 0.45/1,000 (see Appendix for graph of crude rates of antipsychotic prescriptions by age group).

References

Cooper W, Hickson G, Fuchs C, Arbogast P, Ray W. New users of antipsychotic medications among children enrolled in TennCare. *Arch Pediatr Adolesc* 2004;158(8):753–759.

Chapter 7: Childhood Chronic Conditions

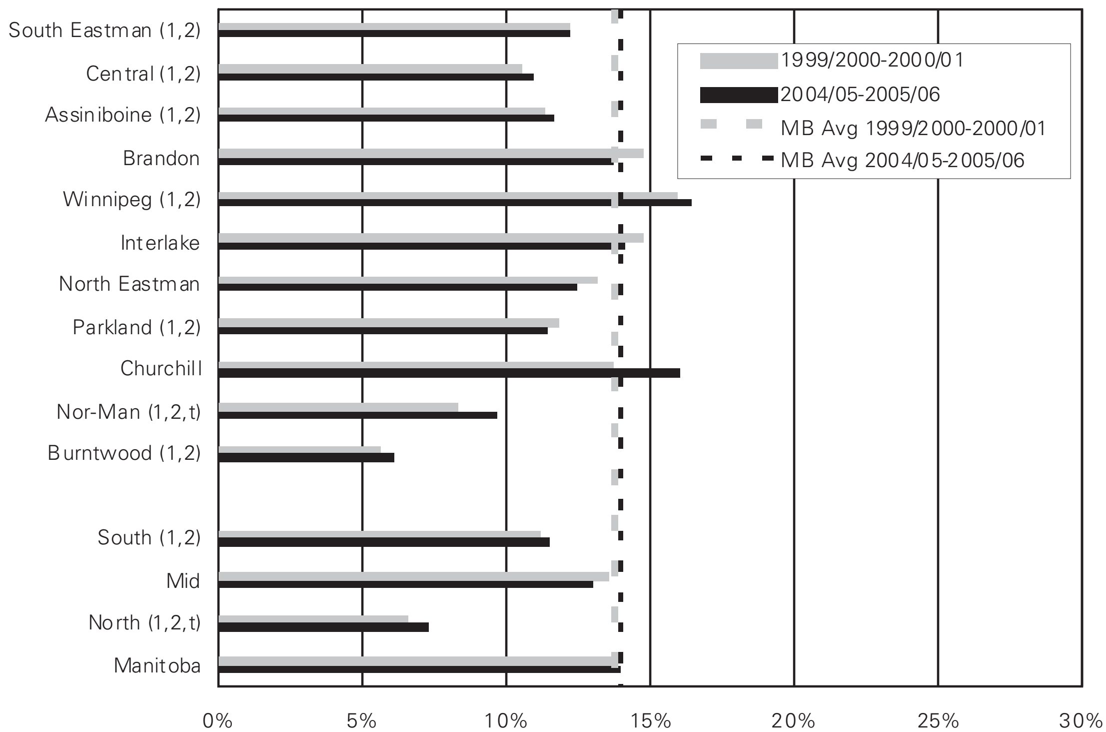
7.1 Asthma

Chronic conditions are not common in childhood, but asthma is the most frequent chronic condition in children, accounting for considerable morbidity burden in the pediatric population. Over the past few decades, the prevalence of asthma has increased dramatically in the Western world (Burr et al, 1989; Burr et al., 2006; Waltraud et al., 2006; Russell, 2006). In this report asthma in children was identified through diagnoses received during hospital or physician visits, or through asthma prescription medications. It is possible that children suffering from untreated asthma are not captured by this definition, which is really a measure of treatment prevalence. Prevalence was calculated for children aged 5 to 19 years for two two–year time periods: 1999/2000–2000/01 and 2004/05–2005/06.

The prevalence of asthma in Manitoba children was the same in both time periods (13.7% in time 1, 13.9% in time 2) (Figure 7.1). Only Nor–Man RHA showed a significant change in asthma prevalence over the study period, increasing from 8.3% to 9.6%. Regional variation in childhood asthma prevalence was evident. Winnipeg children experienced higher prevalence of asthma in both time periods (16.0% and 16.4%) compared to the provincial average, while several other RHAs had lower prevalence in both time periods: South Eastman (12.2%, 12.2%), Central (10.5%, 10.9%), Assiniboine (11.3%, 11.6%), Parkland (11.8%, 11.4%), Nor–Man and Burntwood (5.6%, 6.1%). The absence of change in asthma prevalence over the study period suggests that childhood asthma may have reached a plateau after several years of increase. Continued monitoring of the prevalence of this condition would determine whether this trend persists.

Figure 7.1: Asthma Prevalence by RHA

Age- and sex-adjusted percent of children aged 5-19 diagnosed with asthma



'1' indicates area's rate was statistically different from Manitoba average in first time period
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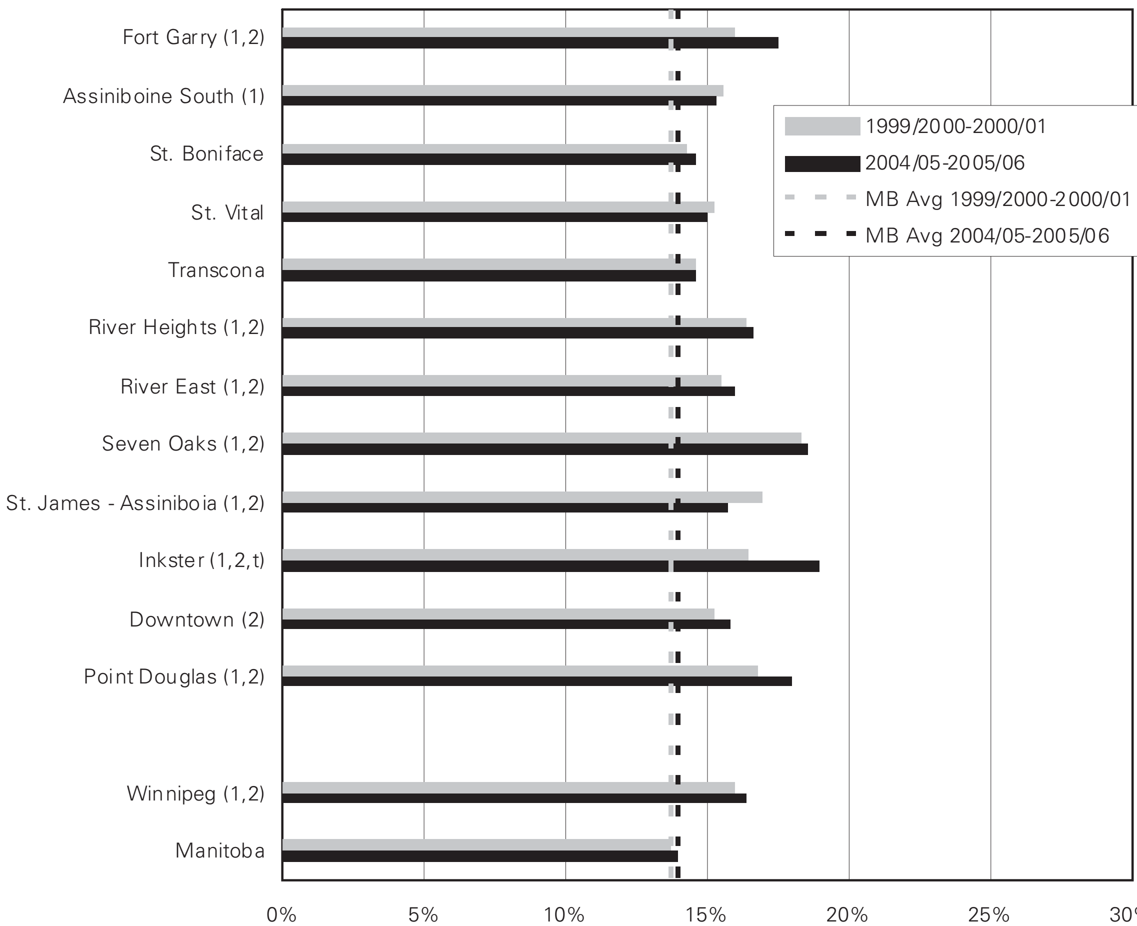
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

The only significant change over time in prevalence of childhood asthma for any of the Winnipeg Community Areas was a significant increase in Inkster (16.5% to 19.0%). In seven of the Winnipeg CAs, the prevalence of childhood asthma was higher than the provincial average in both time periods: Fort Garry (16.0%, 17.5%), River Heights (16.4%, 16.6%), River East (15.5%, 16.0%), Seven Oaks (18.3%, 18.5%), St. James–Assiniboia (16.9%, 15.8%), Inkster and Point Douglas (16.8%, 18.0%).

Figure 7.2: Asthma Prevalence by Winnipeg Community Area

Age- and sex-adjusted percent of children aged 5-19 diagnosed with asthma



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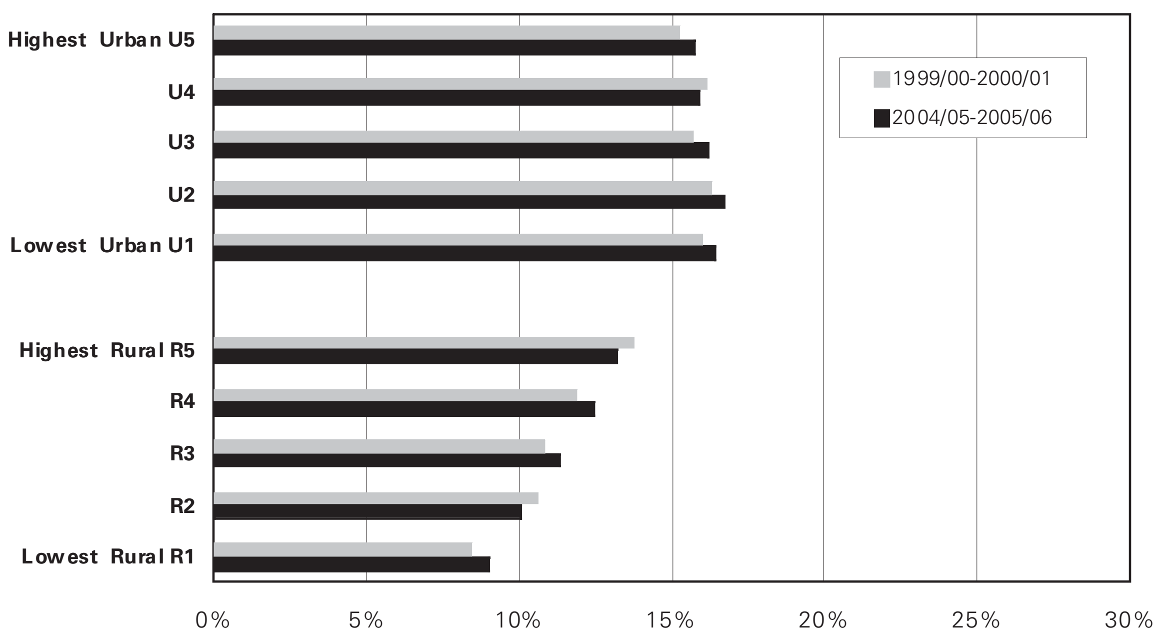
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

There was almost no variation in asthma prevalence across income quintiles in the urban areas for either time period. In rural areas, there was a significant association between area–level income and childhood asthma, with higher asthma prevalence in higher compared to lower income quintile neighbourhoods. For example, in time 2, the asthma prevalence for children living in the highest income quintile areas was 13.2% compared to 8.9% for children living in the lowest income quintile. The lack of a gradient for asthma in the urban areas, coupled with the significantly lower asthma prevalence for rural children from lower income areas, suggests the pattern in rural areas may be due to differences in access to treatment services rather than differences in true disease prevalence. Alternately, lower asthma prevalence in rural areas could be the result of greater exposure to toxins and infections that interfere with the development of asthma, that have been observed for children raised on farms (Platts–Mills, 2005).

Figure 7.3: Asthma Prevalence by Income Quintile

Age- and sex-adjusted percent of children aged 5-19 diagnosed with asthma



Linear Trend Test Results
Time 1: Rural: Significant (p<.001)
Time 2: Rural: Significant (p<.001)

Source: Manitoba Centre for Health Policy, 2008

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7.2 Diabetes

Diabetes 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. Type 1 diabetes typically develops in childhood or adolescence and is probably caused by a combination of genetic and environmental factors (Health Canada, 2002). Type 2 diabetes typically develops in adulthood and tends to be associated with diet, body weight and physical activity (Health Canada, 2002).

In this report, diabetes prevalence was determined by using three years of hospital discharge, physician visit and prescription data. Children who had one or more hospital visits and/or two or more physician visits with a diabetes diagnosis and/or filled two or more prescriptions for a diabetes medication were counted as having diabetes. This definition results in somewhat higher estimates of diabetes prevalence than reported in the National Diabetes Surveillance System (NDSS) by the Public Health Agency of Canada. Because not all provinces have prescription claims data available, NDSS does not include prescription information in its diabetes prevalence definition resulting in lower prevalence estimates than those reported here. Diabetes prevalence estimates using the NDSS definition (one or more hospital visits and/or two or more physician visits with a diabetes diagnosis) can be found in the Appendix of this report for comparison purposes.

Because Types 1 and 2 diabetes cannot be distinguished on physician claims, the diabetes prevalence reported here is for both types combined. Preliminary analysis indicated that less than 5% of the diabetes cases found in children 0 to 19 years of age were identified before 5 years of age, so our models of diabetes prevalence include only children 5 to 19 years of age (see Appendix for percent cases by age). Diabetes prevalence was measured in two three–year time periods: 1998/99–2000/01 and 2003/04–2005/06.[41]

The prevalence of diabetes for Manitoba children 5 to 19 years of age increased significantly over the two time periods, from 0.33% in the first time period to 0.41% in the second time period (Figure 7.4). There was also a significant increase in diabetes prevalence over the study period for children living in North Eastman (0.29% to 0.53%) and Burntwood (0.44% to 0.87%).[42] In the second time period, the diabetes prevalence was significantly higher in Burntwood compared to the Manitoba average; the prevalence in the collective "North" (0.77%) was also higher than the Manitoba average in time 2. In South Eastman (0.16%, 0.21%), diabetes prevalence was significantly lower in both time periods compared to the Manitoba average.

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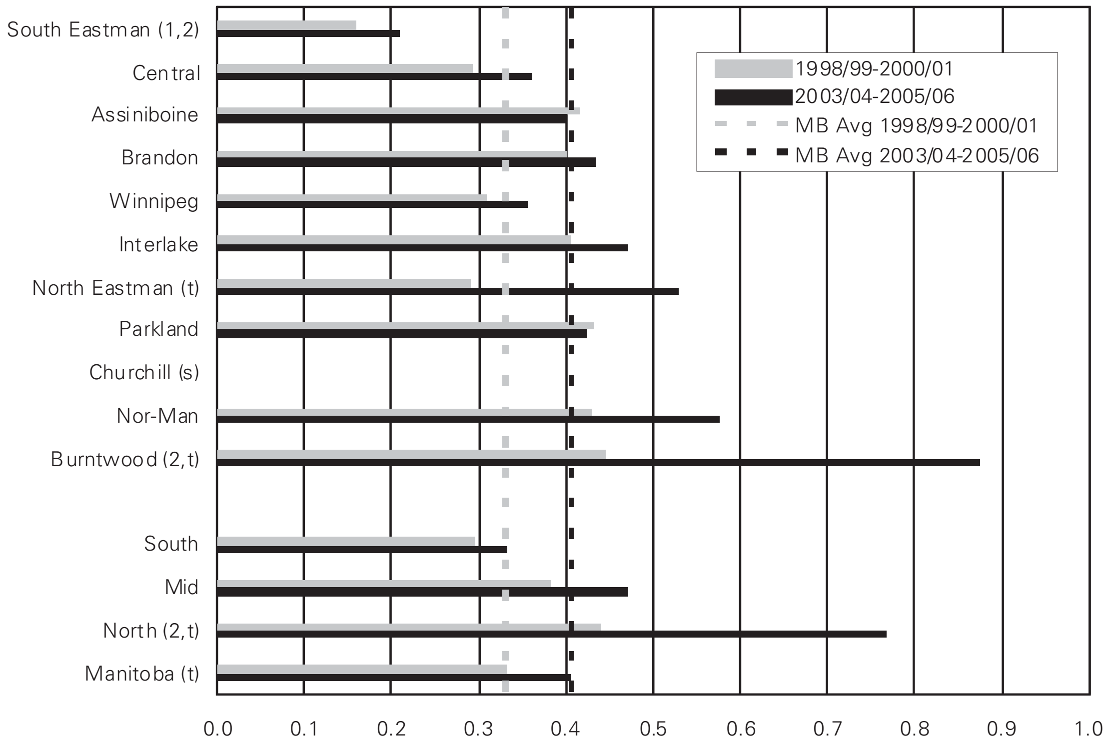
[41] NDSS uses only a two–year time period, but hospital visits are measured cumulatively. Comparisons using either a two– or three–year time period to measure diabetes prevalence resulted in almost identical estimates.

[42] Using the NDSS definition of diabetes, Winnipeg also showed a significant increase over time in diabetes prevalence, going from 0.27% to 0.33% (see the Appendix for details). Using our definition the change for Winnipeg (0.31% to 0.36%) was borderline significant ($p=0.051$).

Figure 7.4: Diabetes Prevalence by RHA

Age- and sex-adjusted percent of children aged 5-19 diagnosed with diabetes



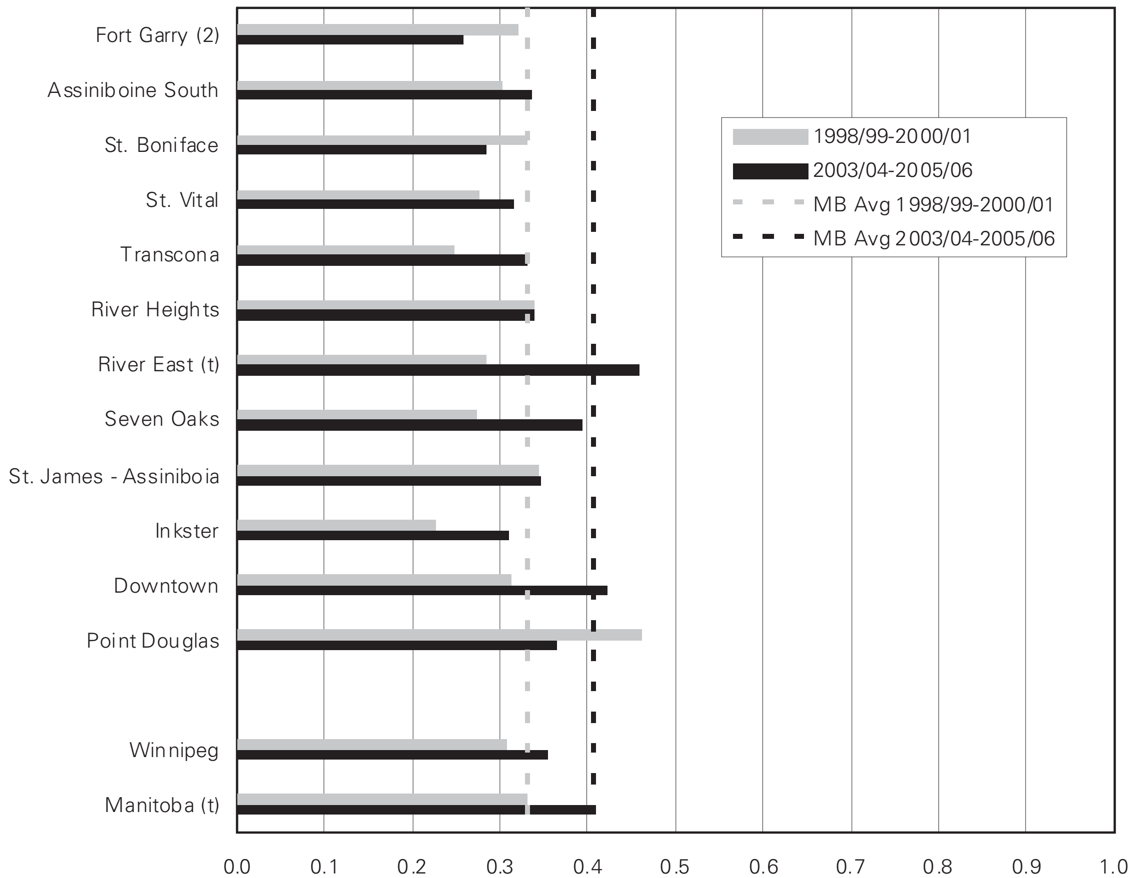
'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

In the Winnipeg Community Areas, diabetes prevalence was significantly lower than the Manitoba average in the second time period in Fort Garry (0.26%). Children living in River East experienced a significant increase in diabetes, from 0.28% in the first time period to 0.46% in the second time period.

Figure 7.5: Diabetes Prevalence by Winnipeg Community Area

Age- and sex-adjusted percent of children aged 5-19 diagnosed with diabetes



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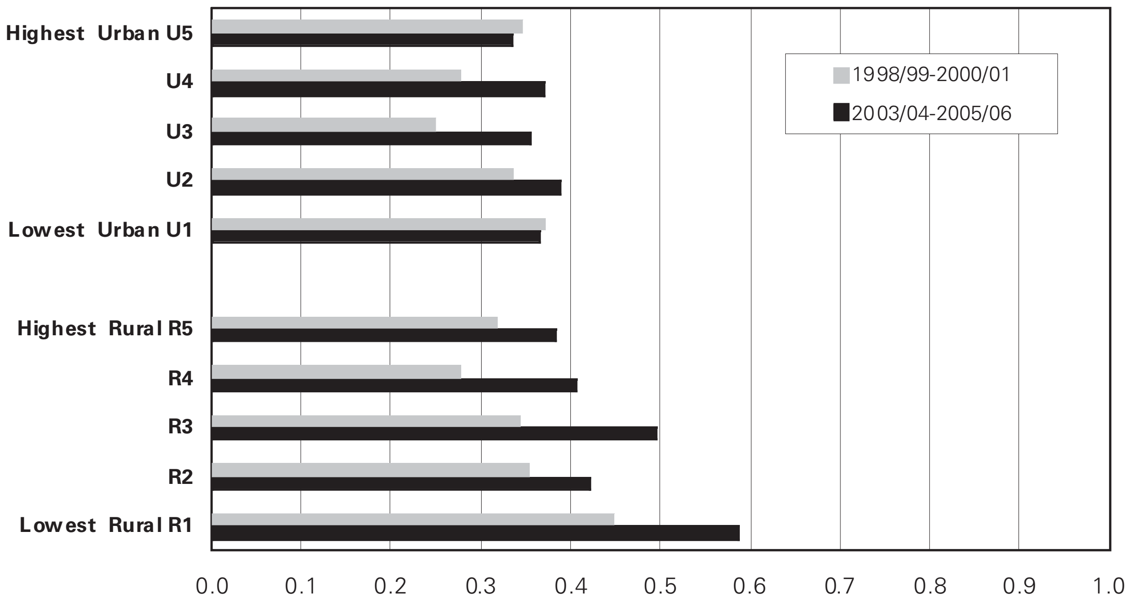
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

In rural areas, in both time periods, there was a significant association between diabetes prevalence in children and area–level socioeconomic status: prevalence of diabetes increased as area–level income decreased. In the first time period, diabetes prevalence was 40% higher in the lowest compared to the highest rural income areas; in the second time period, the prevalence of diabetes was 53% higher in the lowest compared to the highest rural income areas (0.38% in the highest income areas, 0.59% in the lowest income areas). The gradient across rural income quintiles did not increase significantly over time. No such relationship between diabetes prevalence and area–level urban income was found in either time period.

Figure 7.6: Diabetes Prevalence by Income Quintile

Age- and sex-adjusted percent of children aged 5-19 diagnosed with diabetes



Linear Trend Test Results
Time 1: Rural: Significant ($p < .01$)
Time 2: Rural: Significant ($p < .01$)

Source: Manitoba Centre for Health Policy, 2008

References

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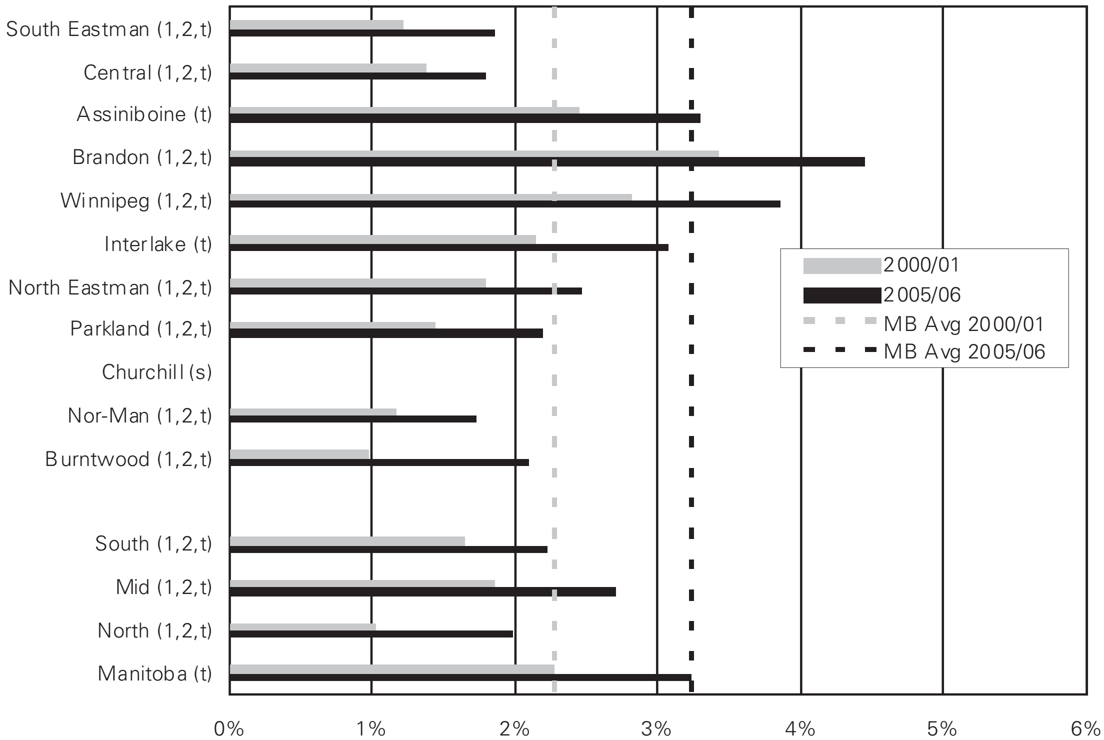
7.3 ADHD

Attention–deficit hyperactivity disorder (ADHD) is the most common behavioural disorder identified in school–aged children affecting about 3 to 7% of this population (American Psychiatric Association, 2000; Nietzel et al., 2003; Szatmari et al., 1989). ADHD can have a debilitating effect on functioning, with affected children more likely to experience learning difficulties, school failure, poor peer relationships and family conflict (Barkley et al., 1990; Biederman et al., 1996; Klassen et al., 2004; Lahey et al., 1998; National Institute of Mental Health, 2003). In this section, we look at the prevalence of ADHD in Manitoba children over two time periods: 2000/01 and 2005/06. Children with one or more diagnoses for ADHD, either from physician visit records or hospital discharge claims, during these fiscal years were included. We also included as "diagnosed with ADHD" any children with at least one prescription for a psychostimulant medication and an ADHD diagnosis in the previous three years. As well, children with two or more psychostimulant prescriptions in one fiscal year were included as "diagnosed with ADHD." An ADHD diagnosis is difficult to establish in children younger than 4 or 5 years of age (American Psychiatric Association, 1994), so we included only 5– to 19–year–olds in our analyses. Children with ADHD who have not received a diagnosis from a physician in the fiscal years we are focusing on and who are not receiving medication for their condition will not be captured in our definition of ADHD prevalence.

The prevalence of ADHD for Manitoba children increased significantly over the study period, from 2.3% to 3.2% (Figure 7.7). There were significant increases in all of the RHAs, with the exception of Churchill, where prevalence was suppressed due to small numbers. Both Brandon (3.4% and 4.5%) and Winnipeg (2.8% and 3.9%) had significantly higher ADHD prevalence in both time periods compared to the provincial average, whereas most of the other RHAs had significantly lower prevalence estimates in both time periods. The two exceptions were Assiniboine and Interlake where the prevalence of ADHD in 5– to 19–year–old children was not significantly different than the provincial average.

Figure 7.7: ADHD Prevalence by RHA

Age- and sex-adjusted percent of children aged 5-19 diagnosed with ADHD



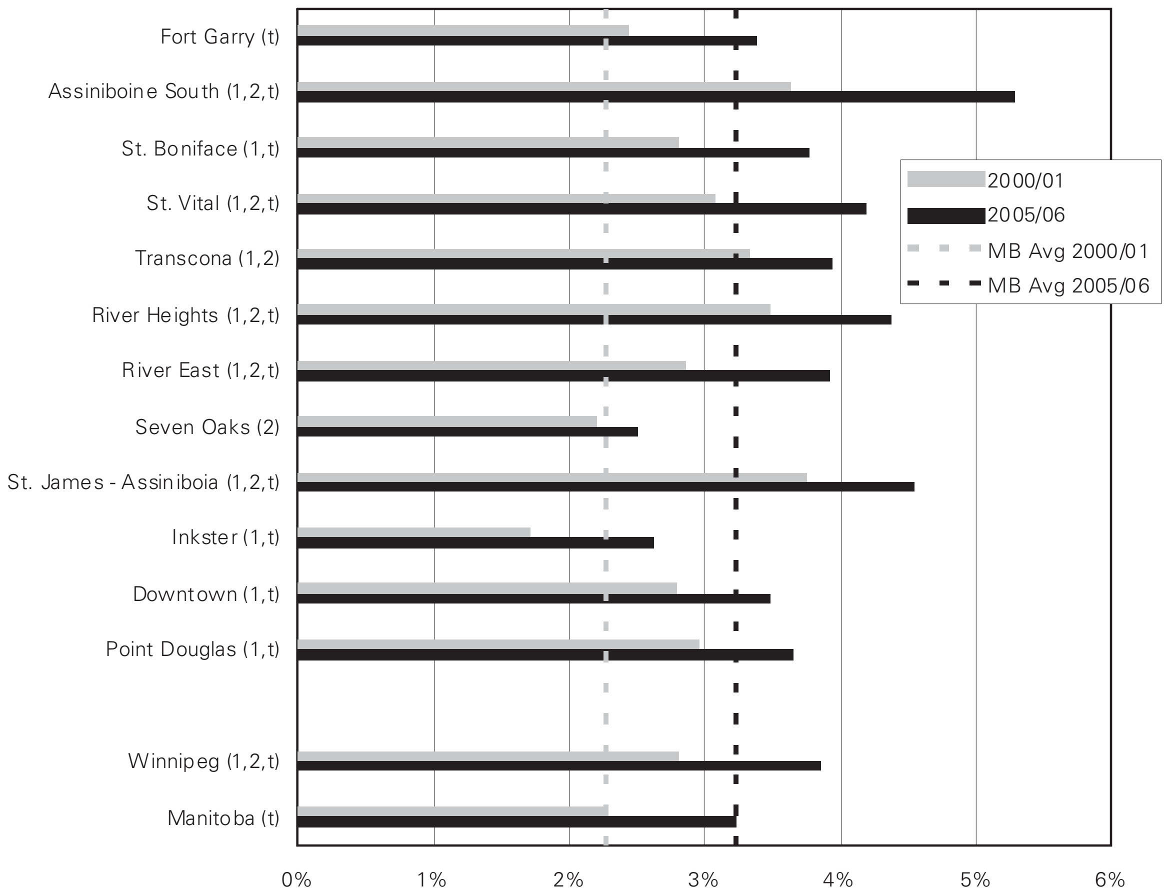
'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

Most of the Winnipeg Community Areas also demonstrated increases in ADHD prevalence over time. Only in Transcona and Seven Oaks did ADHD prevalence remain stable over the study period. In several RHAs, the prevalence of ADHD was significantly higher in both time periods compared to the provincial average: Assiniboine South (3.6% and 5.3%), St. Vital (3.1% and 4.2%), Transcona (3.3% and 3.9%), River Heights (3.5% and 4.4%), River East (2.9% and 3.9%) and St. James–Assiniboia (3.7% and 4.5%).

Figure 7.8: ADHD Prevalence by Winnipeg Community Area

Age- and sex-adjusted percent children aged 5-19 diagnosed with ADHD



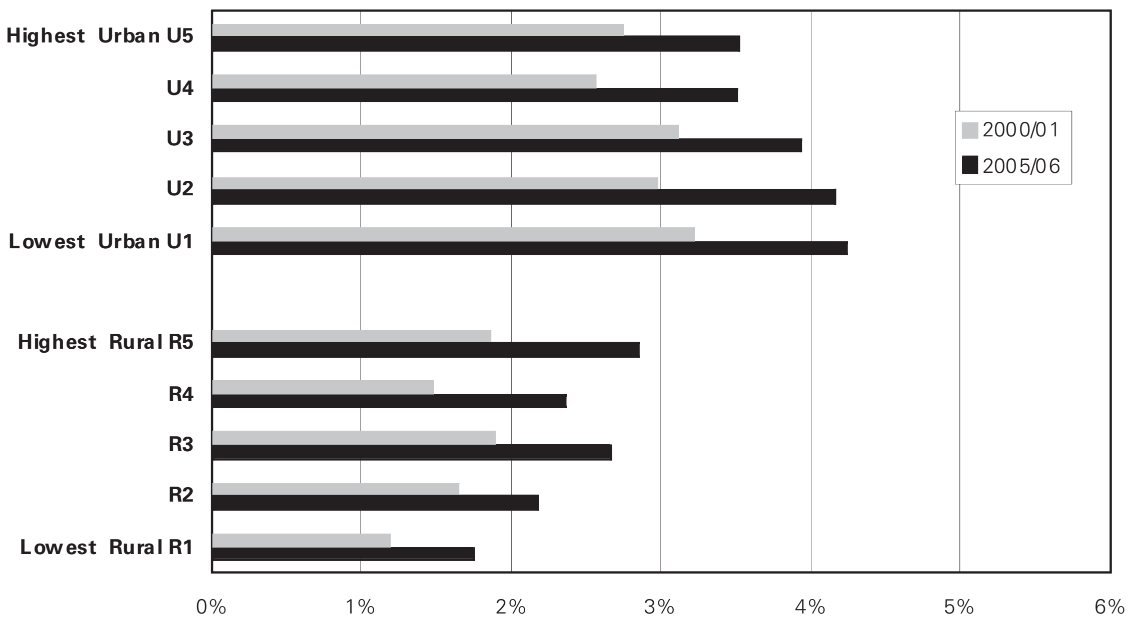
'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

Statistically significant relationships between area–level income and ADHD prevalence were found in both urban and rural areas in both time periods. In rural areas, higher area–level income was associated with higher prevalence of ADHD. This is likely due to a combination of access issues (with children living in areas with lower income less likely to have access to specialist practitioners who are more familiar with ADHD) and data issues (with data on diagnoses potentially missing for children living in remote areas served by salaried physicians) (Brownell and Yogendran, 2001). In urban areas, the opposite pattern was evident. Lower area–level income was associated with higher ADHD prevalence.[43] For example, in the second time period, the prevalence of ADHD was 3.5% for children living in the highest urban income quintile neighbourhoods compared to 4.2% for children in the lowest income areas. Other studies have found higher ADHD prevalence associated with lower socioeconomic status (Harel and Brown, 2003; Scahill and Schwab–Stone, 1999; St. Sauver et al., 2004; Szatmari, 1992).

Figure 7.9: ADHD Prevalence by Income Quintile

Age- and sex-adjusted percent of children aged 5-19 diagnosed with ADHD



Linear Trend Test Results

Time 1: Rural: Significant (p<.001) Urban: Significant (p<.01)

Time 2: Rural: Significant (p<.001) Urban: Significant (p<.001)

Source: Manitoba Centre for Health Policy, 2008

[43] Preliminary analysis by income quintile revealed that a high proportion of children with missing postal codes had an ADHD diagnosis. Children with the Winnipeg Child and Family Services (CFS) postal code are generally set to missing in income quintile analyses and previous research suggests that there is a high rate of ADHD among children who are under care of CFS (Fuchs et al., 2005). In order to include as many of these children in the analysis as possible, we took all children with the Winnipeg CFS postal code and determined what their previous postal code was to get an indication of their original area of residence. This resulted in re–classifying the postal codes of 189 children in the first time period and 156 children in the second time period.

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7.4 Autism Spectrum Disorders

Autism Spectrum Disorders (ASDs) are characterized by social, communicative and behavioural impairments, which range in severity along a continuum. As there is no genetic or biologic marker for diagnosis and no clear etiology for these disorders, they are currently diagnosed using the DSM–IV–R (American Psychiatric Association, 2004) under an umbrella classification of the Pervasive Developmental Disorders. This includes the more commonly recognized Autistic Disorder, Asperger's disorder and Pervasive Developmental Disorder NOS (Rice et al., 2007; Yeargin–Allsopp et al., 2003), and the less recognized Rett's Disorder and Childhood Disintegrative Disorder. The ASDs were previously thought to be rare, however recent American and Canadian studies indicate that there has been a dramatic increase in diagnosis of these disorders in the last several years leading to questions about whether this increase is secondary to broader case definitions and awareness of the disorders, or due to a true increase in disorder prevalence (Fombonne et al., 2006; Rice et al., 2007).

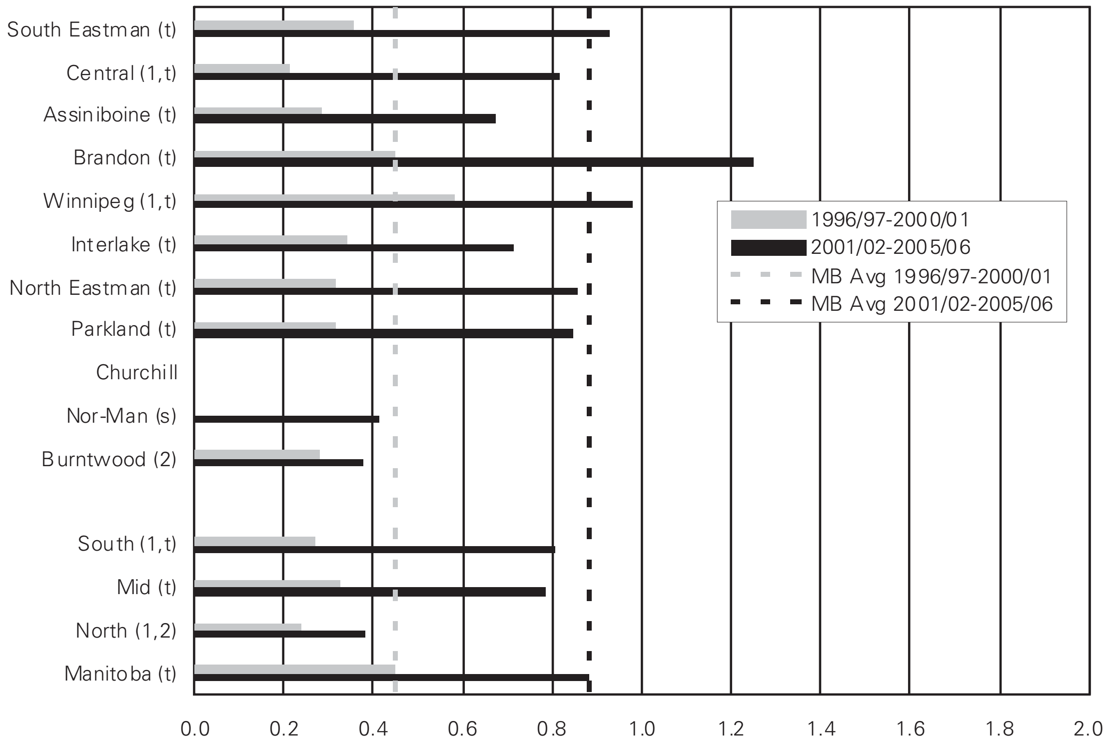
It is difficult to obtain accurate estimates of prevalence; however, use of a combination of data sources, such as medical claims and educational records, may provide a more complete picture of the extent of the disorder in children (Rice et al., 2007). In this section, we describe the prevalence of ASDs estimated using diagnoses on hospital and physician records and information from education records on special school funding received for students with ASD. It is possible that children with undiagnosed or untreated ASD, those whose diagnosis was not made in physician or hospital setting, or those not receiving specific educational interventions will not be captured in this analysis; therefore, the definition should be considered a measure of treatment prevalence. Prevalence was calculated using two five–year time periods: 1996/97–2000/01 and 2001/02–2005/06. Because preliminary analysis found that ASDs peaked for children aged 5 to 9 years and the literature in this area often focuses on children around 8 years of age, we ran our analysis on children aged 5 to 9 years. Results for children 0 to 19 years showed similar patterns and can be found in the Appendix.

The prevalence of an ASD captured in this manner for Manitoba children aged 5 to 9 years increased dramatically over the study period, from 0.49% to 0.88% (Figure 7.10). Using Montreal data from 1987–1998, Fombonne et al. (2006) estimated the prevalence of ASD as 0.65%, higher than the Manitoba rate in time 1, but lower than the time 2 rate. A report from the Centers for Disease Control found the prevalence in six different sites in 2000 ranged from 0.3% to 1.1%, with an overall prevalence of 0.66%. The reasons for this high variability in prevalence across time, location and patient population remain unexplained, furthering the debate as to whether the differences are due to changing diagnostic patterns and case definitions or true differences in disorder prevalence (Fombonne et al., 2006).

All RHAs, with the exception of the three RHAs in the North, experienced a significant increase in ASD prevalence over the study period, in many cases more than doubling between time 1 and time 2. No children in Churchill were identified with ASD in either time period. In Nor–Man, data were suppressed in the first time period due to small numbers. In Burntwood, the prevalence of ASD in the second time period was significantly lower (0.38%) than the provincial average.

Figure 7.10: Autism Spectrum Disorder Prevalence by RHA

Age- and sex- adjusted percent of children aged 5-9 years diagnosed with autism



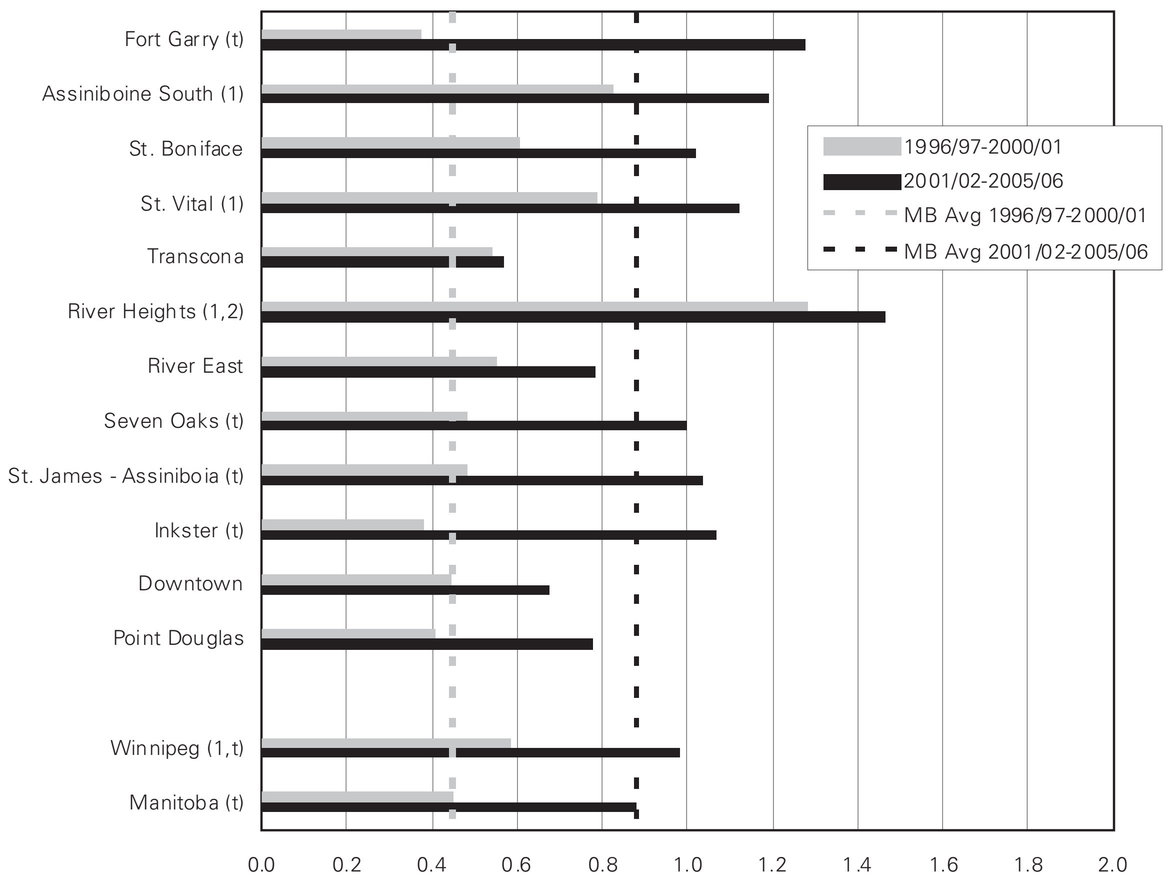
'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

In Winnipeg, four Winnipeg CAs demonstrated significant increases in ASD prevalence over the study period: Fort Garry (0.37% to 1.28%), Seven Oaks (0.48% to 1.00%), St. James–Assiboina (0.5% to 1.04%) and Inkster (0.38% to 1.07%). Children living in River Heights had higher rates of ASD in both time periods (1.28% in time 1 and 1.47% in time 2) compared to the provincial average.

Figure 7.11: Autism Spectrum Disorder Prevalence by Winnipeg Community Area

Age- and sex- adjusted percent of children aged 5-9 years diagnosed with autism



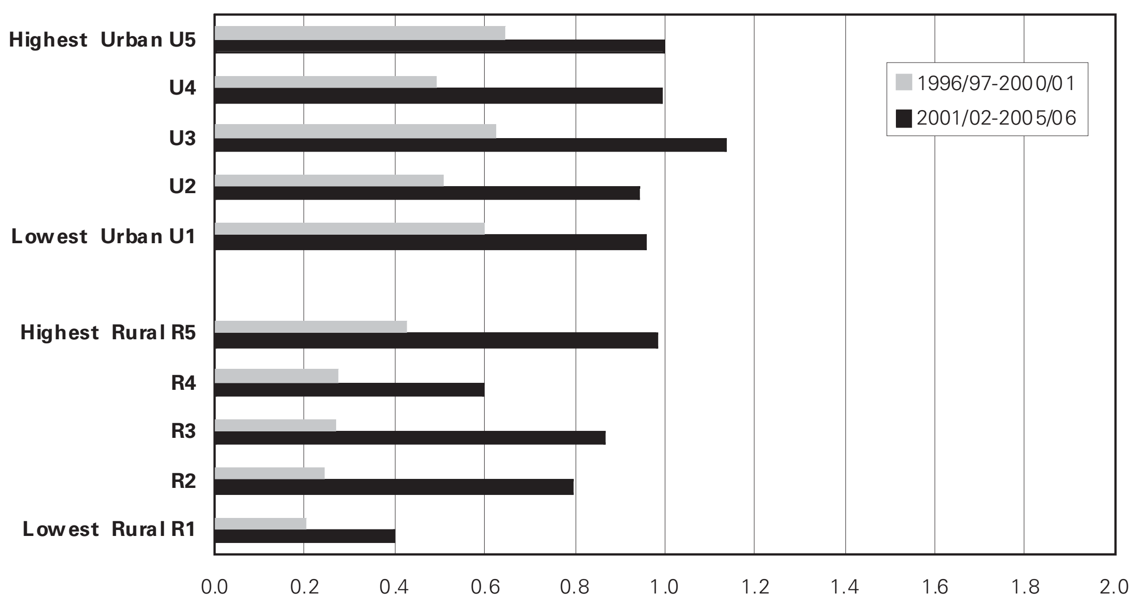
'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

The only significant association between area–level income and ASD prevalence was found for rural children in the second time period. No association was found in urban areas in either time period. In rural areas in time 2, children from the lowest income quintile neighbourhoods had lower ASD prevalence than children in the higher income quintile neighbourhoods. For example, the rate for children in the highest income quintile areas (0.98%) was almost two–and–a–half times higher than the rate for children from the lowest income quintile areas (0.40%). This wide gap in rural areas, coupled with the finding that there was no similar pattern in urban areas, may reflect a lack of parental recognition of the disorder or lower access to services for children with ASD in lower SES rural areas. It is possible that the increase in prevalence of ASD in rural areas observed over the study period suggests that improvements in diagnosis and services have been made in these areas; the gradient found in time 2 in the rural areas would suggest that these improvements have not been experienced in all rural locations.

Figure 7.12: Autism Spectrum Disorder Prevalence by Income Quintile

Age- and sex- adjusted percent of children aged 5-9 years diagnosed with autism



Linear Trend Test Results
Time 2: Rural: Significant ($p<.01$)

Source: Manitoba Centre for Health Policy, 2008

We found that boys were much more likely to have ASD than girls, at a ratio of over 3.6 to 1, similar to the 4:1 ratio described in the literature (please see graph of ASD by sex and age in the Appendix).

Given the dramatic increases in ASD treatment prevalence demonstrated in Manitoba, as well as the observed regional variations, this will be an important indicator to continue to monitor in Manitoba.

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7.5 Disabilities

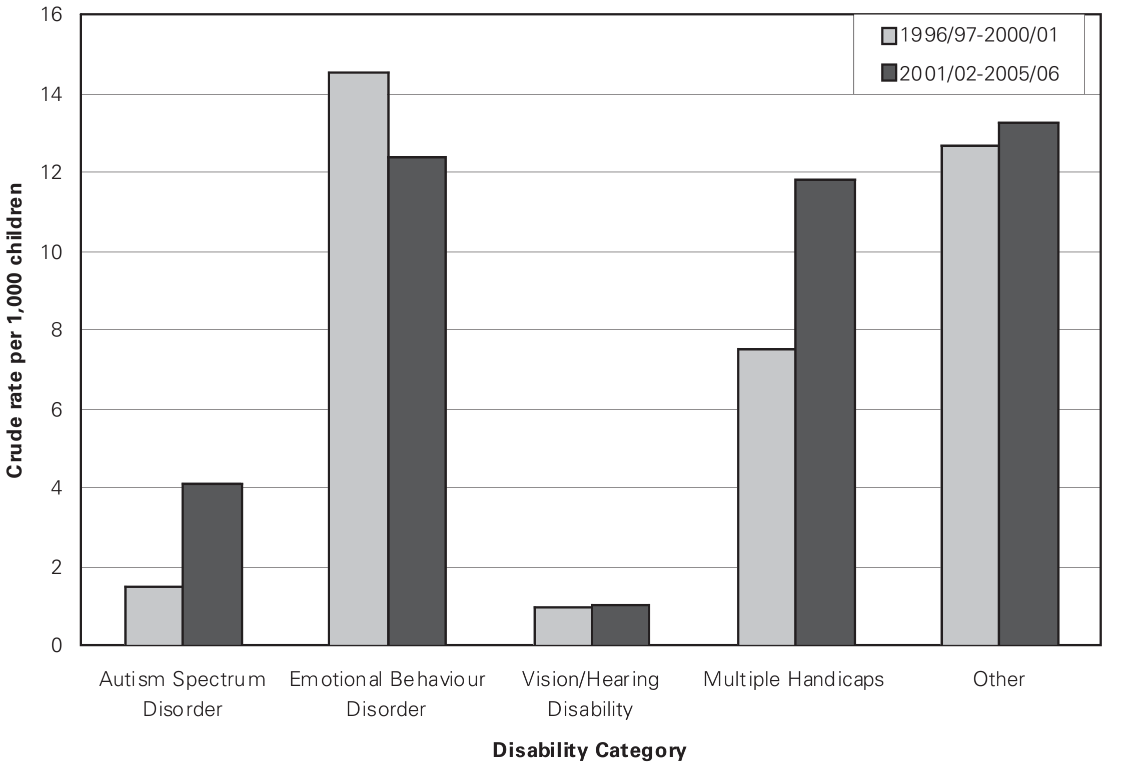
Determining the prevalence of **children with disabilities** is an important step in identifying the services needs for these children, however the lack of a standard definition of "disability" makes it a difficult task. Definitions of childhood disability can include some of the conditions we have included in other chapters in this report (e.g., asthma, autism spectrum disorder (ASD), ADHD, diabetes, congenital anomalies, traumatic brain injury) as well as conditions not easily identified through the Repository (e.g., communication disorders, speech delay, learning disabilities and behavioural disorders). Another way of identifying children with disabilities involves determining which children are enrolled in special education classes or receiving additional services due to special needs (Government of Canada, 2002). Disabilities have also been defined by identifying limitations in performing activities of daily living (Statistics Canada, 2007).

In this section, we have defined children with disabilities as school–aged children 6 to 17 years of age who receive Level II or Level III funding support through the Department of Education, Citizenship and Youth. Level II support is provided to students with severe multi–handicaps, severe psychoses, deafness or hard of hearing conditions, severe visual impairment, or severe emotional or behavioural disorders, or a diagnosis of a moderate ASD (Manitoba Department of Education, Citizenship and Youth, 2008). Level III support is provided to students with profound multi–handicaps, profound deafness or blindness, profound emotional or behavioural disorders, or a diagnosis of severe to profound ASD. (Manitoba Department of Education, Citizenship and Youth, 2008). Crude rates of children aged 6 to 17 years who received either of these levels of funding are reported here for two time five–year time periods: 1996/97–2000/01 and 2001/02–2005/06.

The overall crude rate of Manitoba children 6 to 17 years who received Level II or III funding for disabilities was 3.7% in 1996/97–2000/01 and 4.3% in 2001/02–2005/06. Figure 7.13 shows the percent of students by disability category in each of the two time periods. Graphs broken down into smaller age categories can be found in the Appendix. The largest category was emotional/behavioural disorders, with 1.5% and 1.2% students 6 to 17 years receiving funding in this category. The percent of children who received Level II or III funding for ASDs increased from 0.15% to 0.41% over the study period, as did the percent of children categorized as having multiple handicaps (0.76% to 1.2%). It is not possible to determine from this information whether these increases represent a real increase in these disorders in the child population of Manitoba or whether they reflect increased identification and/or funding for these disorders in Manitoba students.

Figure 7.13: Rate of Children with Disabilities Based on Educational Funding for Disability

Crude rates per 1,000 children ages 6-17 years



Source: Manitoba Centre for Health Policy, 2008

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CHAPTER 8: EDUCATION

8.1 Retention Rates up to Grade 8

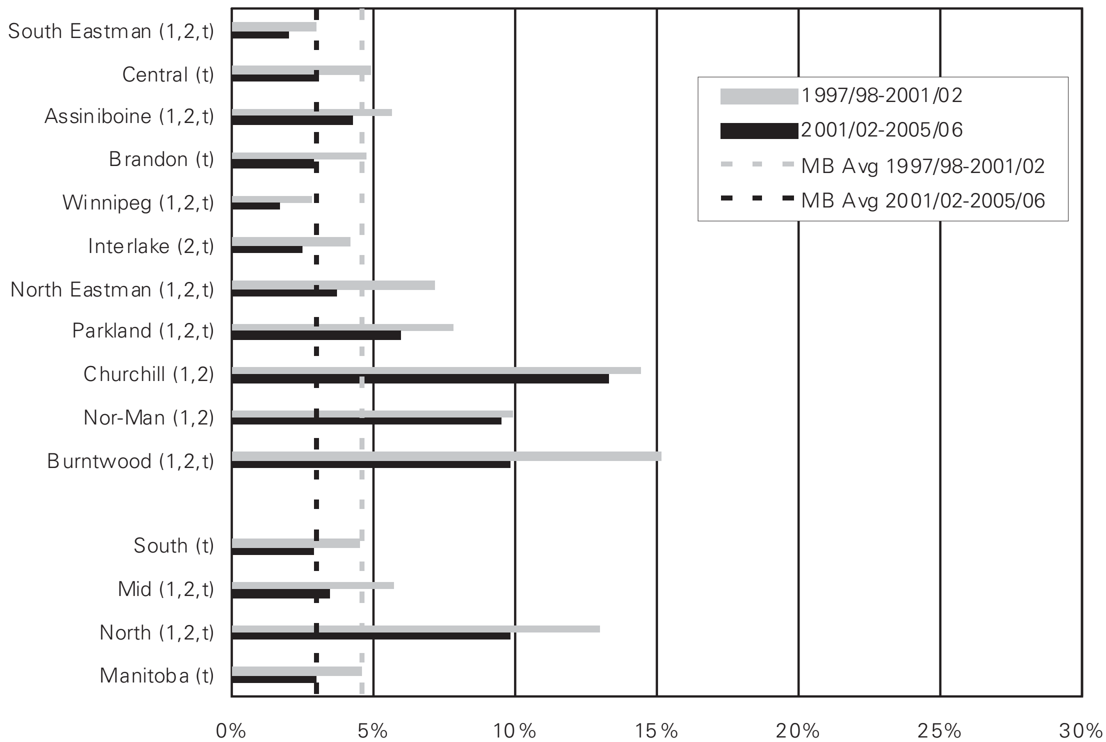
Retention, or holding students back in the same school grade for consecutive years, is a contentious issue. Research suggests that retention of students with academic or adjustment difficulties provides no more benefits to the students than promotion to the next grade (Holmes, 1989; Holmes and Matthews, 1984; Jimerson, 2001). Indeed, students who are retained at some point in their school career are more likely to drop out of school than their non–retained peers (Guevremont et al., 2007; Jimerson et al., 2002). Despite evidence suggesting retention is not beneficial and potentially harmful to students, it continues to be a widely used education intervention (Hauser, 2000; U.S. Department of Education, 1999). Many teachers believe that retention is an effective way of preventing students from experiencing failure in the next highest grade (Pouliot and Potvin, 2000; Rosado, 2002); however evidence suggests it does not even prevent students from experiencing further failure in the repeated grade (Guevremont et al., 2007).

In this report, we looked at retention for students in kindergarten through grade 8 in two five–year periods: 1996/97–2000/01 and 2001/02–2005/06. Rates are based on students who were retained at least once.[44] The retention rate for Manitoba students decreased significantly over the study period, from 4.6% in time 1 to 3.0% in time 2 (Figure 8.1). Almost all the RHAs experienced significant decreases in retention rates over the study period, most probably reflecting a growing awareness of the lack of benefits of retention and district policies limiting retentions. The exceptions were Churchill (14.4%, 13.3%) and Nor–Man (9.9%, 9.5%) where rates of retention did not decrease significantly. South Eastman (3.0%, 2.0%) and Winnipeg (2.8%, 1.7%) had significantly lower retention rates in both time periods compared to the provincial average, whereas several RHAs had significantly higher rates in both time periods: Assiniboine (5.6%, 4.2%), North Eastman (7.2%, 3.7%), Parkland (7.8%, 6.0%), Churchill, Nor–Man and Burntwood (15.2%, 9.9%). Boys had higher retention rates than girls in both time periods and children were more likely to experience retention in grade 1 than in the other grades (see the Appendix for graphs of these results).

[44] Retention rates for students who attend band–operated schools may be underestimated due to sometimes incomplete enrolment data from these schools.

Figure 8.1: Retention Rates from Kindergarten to Grade 8 by RHA

Percent of students that were retained at least once



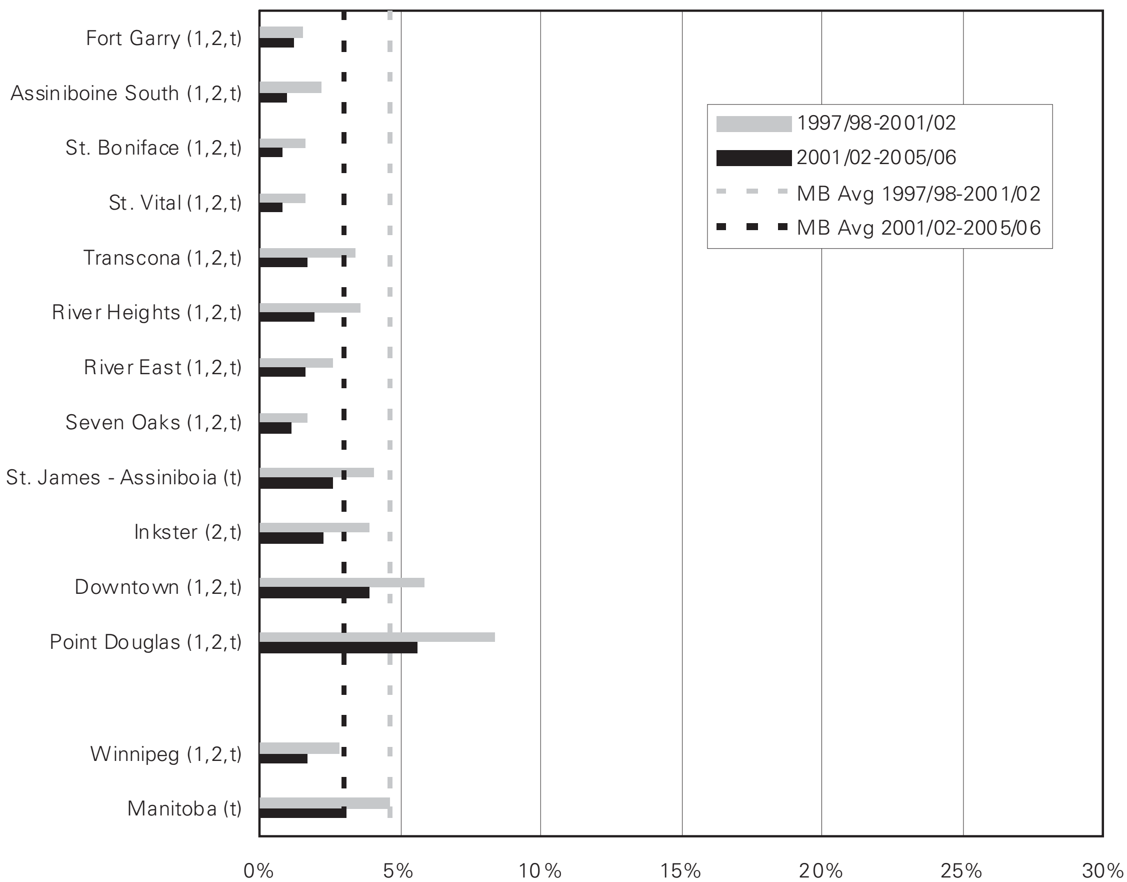
'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

All Winnipeg Community Areas experienced significant decreases in retention rates over the study period. And all, but four, Winnipeg CAs had significantly lower retention rates in both time periods compared to the provincial average. In two of these Winnipeg CAs, the retention rates in both time periods were significantly higher than the provincial average: Downtown (5.8%, 3.9%) and Point Douglas (8.4%, 5.6%).

Figure 8.2: Retention Rates from Kindergarten to Grade 8 by Winnipeg Community Area

Percent of students that were retained at least once



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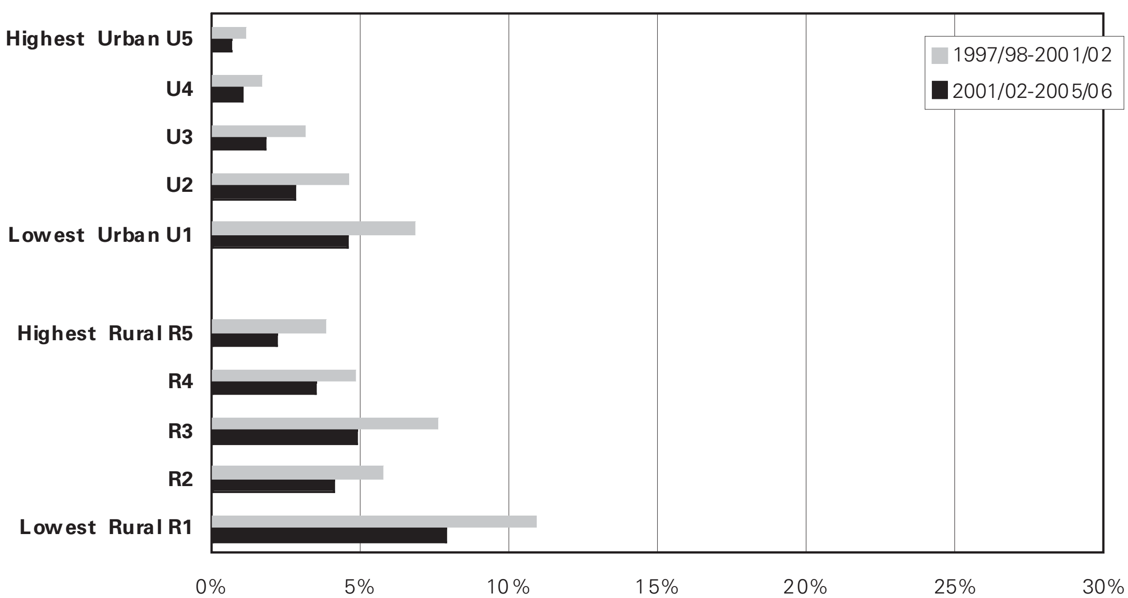
Source: Manitoba Centre for Health Policy, 2008

For both rural and urban areas in both time periods, retention rates were significantly related to area–level income, with increasing retention rates as area–level income decreased. For example, in time 2, the retention rate in the highest urban income quintile neighbourhoods was 0.65% compared to 4.5% in the lowest income quintile neighbourhoods. In rural areas in time 2, the retention rate in the highest income quintile was 2.2% compared to 7.8% in the lowest income quintile. The trend across rural income quintiles changed significantly over time, although it is difficult to interpret the meaning of this change: in absolute terms, the decreases in retention rates were greatest for the lowest income quintile areas (10.9% to 7.8%), however in relative terms the decreases in retention rates were greatest in the highest income quintile areas (42% decrease, compared to a 29% decrease in the lowest income quintile). As with the RHA graph, the income graph highlights the substantially higher retention rates for children living in rural compared to urban areas.

Figure 8.3: Retention Rates from Kindergarten to Grade 8 by Income Quintile

Percent of students that were retained at least once



Linear Trend Test Results
Time 1: Rural: Significant (p<.001) Urban: Significant (p<.001)
Time 2: Rural: Significant (p<.001) Urban: Significant (p<.001)
Rural time change: Significant (p<.01)

Source: Manitoba Centre for Health Policy, 2008

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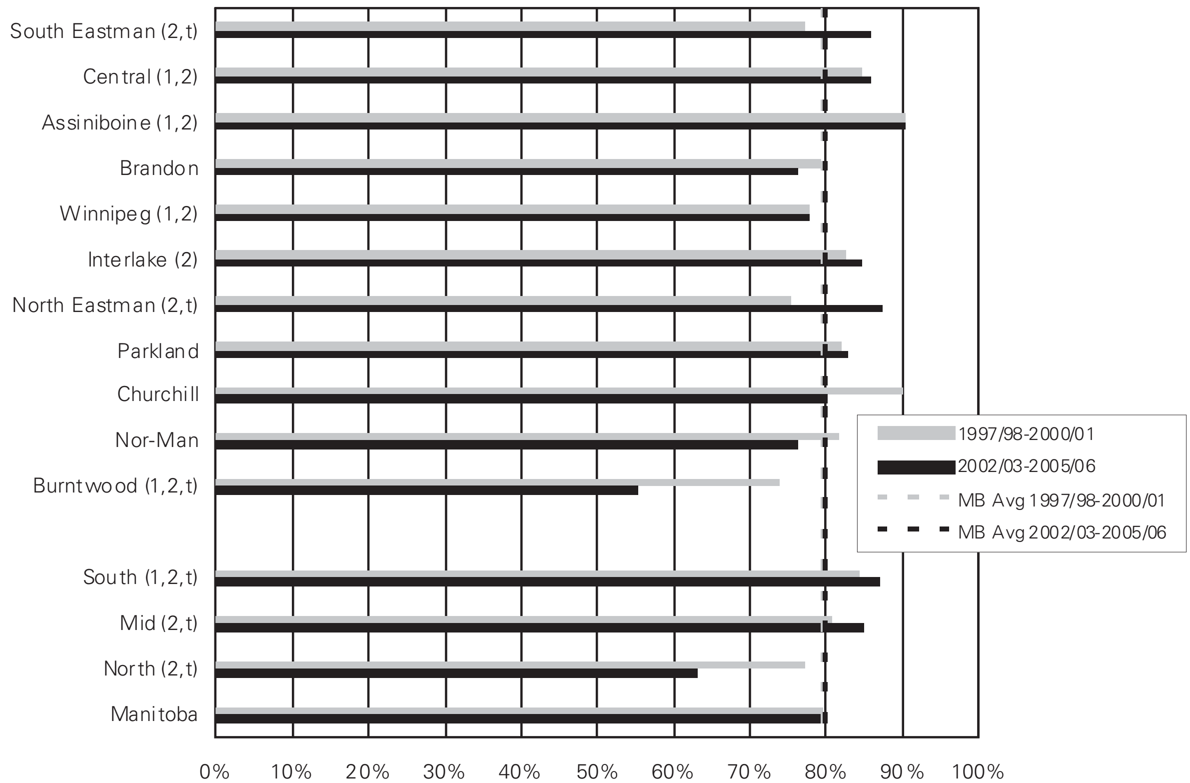
8.2 Grade 3 Students with No School Changes

Frequent school moves are associated with a higher rate of grade retention (Guevremont et al., 2007; McCoy and Reynolds, 1999), which is in turn associated with higher rates of subsequent school failure and high school withdrawal (Guevremont et al., 2007; Jimerson et al., 2002). Students who change schools frequently may have more difficulty in school due to the disruptions, particularly in social relationships, associated with the changes (Pribesh and Downey, 1999). Students who move frequently are also more likely to have been doing more poorly even before they began moving because frequent **school changes** are markers for other social factors, such as lone–parent families and low socioeconomic status, which are associated with poor school performance (Pribesh and Downey, 1999).

We followed two different cohorts of Grade 3 students for four years to determine how many school changes they experienced over that time period. The first cohort entered grade 3 in the 1997/98 school year and were followed until the end of the 2000/01 school year; the second cohort entered grade 3 in 2002/03 and were followed until 2005/06. Students who moved away from Manitoba were excluded, and changes that were expected (e.g., moving from primary to middle school) were not counted as school changes. Rates are expressed as percents of students with no school changes. In the first time period, 79.5% of Manitoba students experienced no school changes and this stayed the same (79.8%) in the second time period (Figure 8.4). The majority of students who changed schools experienced only one school move during the four–year period (see pie graph in the Appendix). Students in South Eastman and North Eastman RHAs experienced an increase in the percent of students with no school changes indicating an increase in stability (South Eastman, 77.2% to 85.9%; North Eastman, 75.4% to 87.4%) whereas students in Burntwood experienced a decrease over the study period in the percent of students experiencing no school changes (73.9% to 55.3%) indicating a decrease in stability. Assiniboine (90.2%, 90.2%) and Central (84.5%, 85.8%) RHAs had higher percents of students experiencing no school changes in both time periods than the provincial average, whereas Winnipeg (77.6%, 77.8%) and Burntwood had lower percents. Additionally, in the second time period, South Eastman, Interlake and North Eastman all had higher percents of students experiencing no school changes compared to the provincial average.

Figure 8.4: Grade 3 Students with No School Changes in 4 Years by RHA

Adjusted by sex: Percent of students that did not transfer schools



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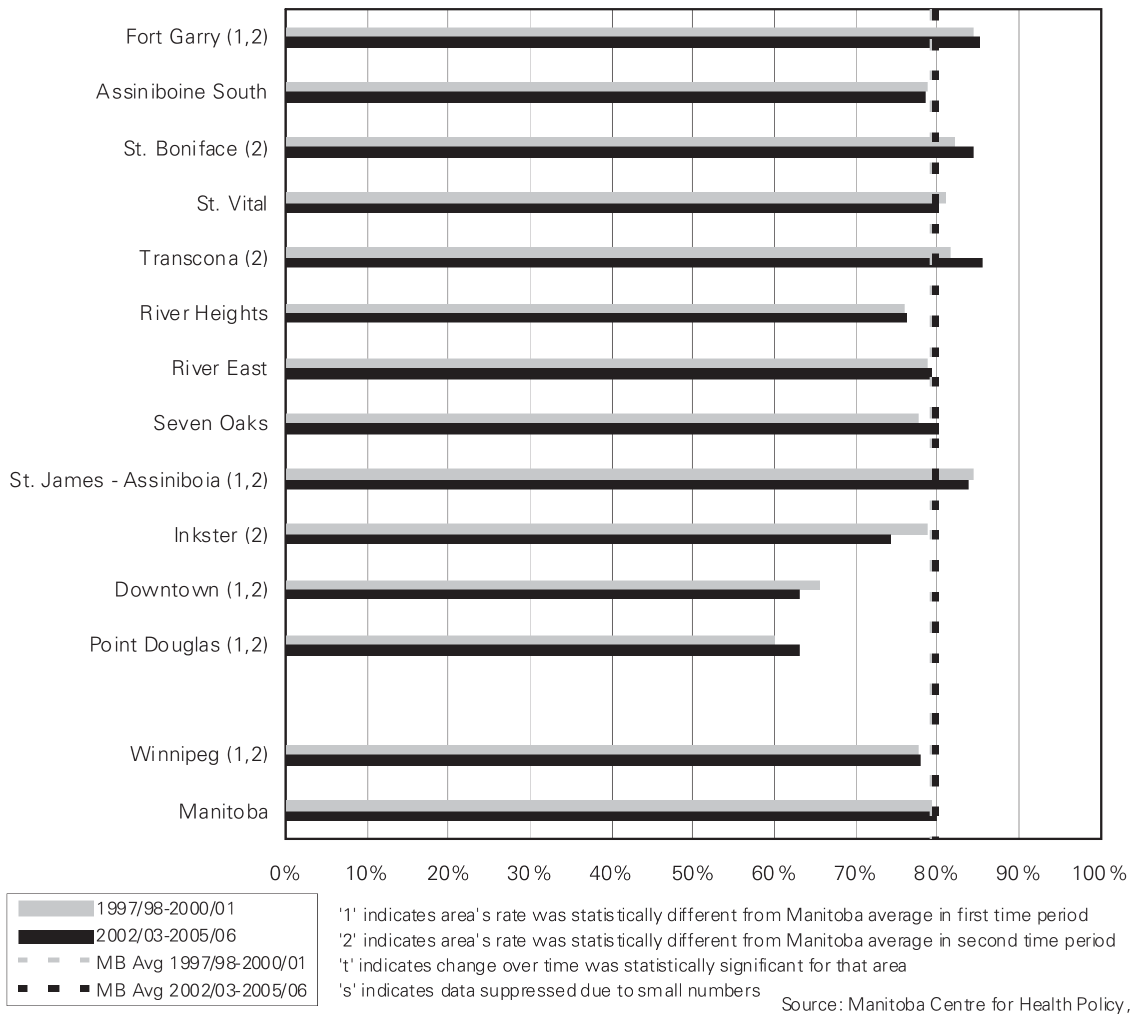
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

In the Winnipeg Community Areas, those CAs that experienced higher percentages of students with no school changes included Fort Garry (84.4%, 85.2%) and St. James–Assiniboia (84.4%, 84.0%) in both time periods and St. Boniface and Transcona in the second time period. Areas where lower percentages of students experienced no school changes (and therefore more students experienced one or more school changes) included Downtown (65.7%, 63.0%) and Point Douglas (60.0%, 63.2%) in both time periods and Inkster in the second time period. Over a third of students in Downtown and Point Douglas experienced at least one school change over four years.

Figure 8.5: Grade 3 Students with No School Changes in 4 Years by Winnipeg Community Area

Adjusted by sex: Percent of students that did not transfer schools



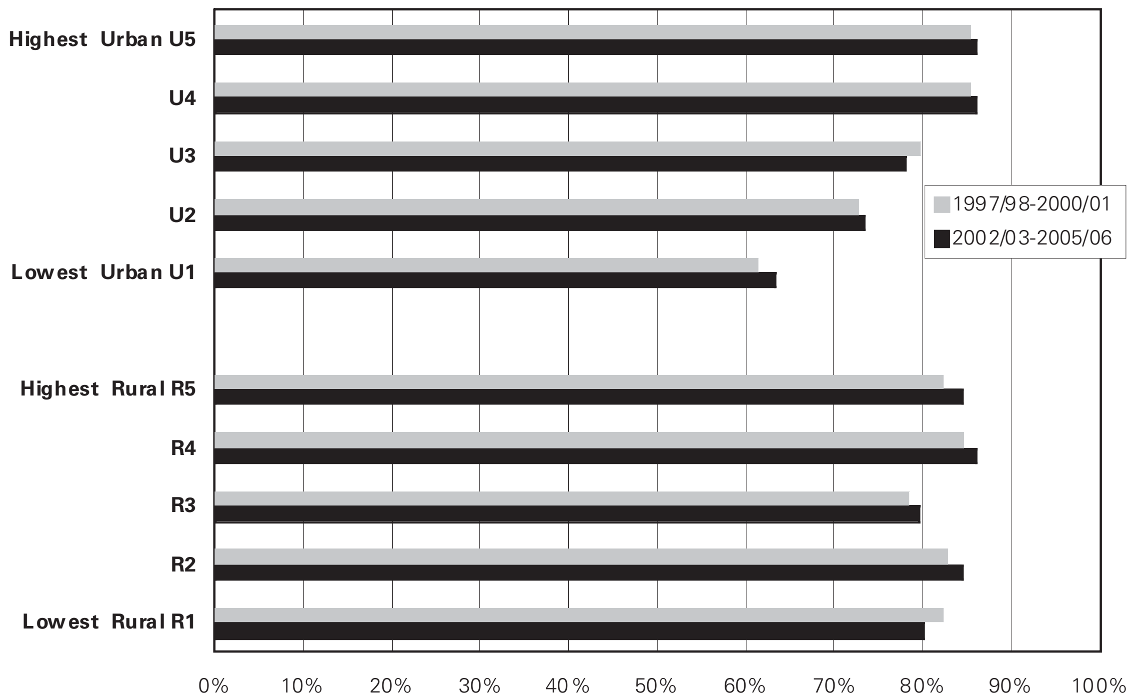
'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

The percent of students experiencing no school changes was associated with area–level income for urban areas in both time periods and for rural areas in the second time period. As area level income decreases, so does the percent of students experiencing no school changes. For example, in the second time period, 86.0% of the students living in the highest urban income quintile experienced no school changes whereas 63.3% of the students living in the lowest urban income quintile experienced no school changes.

Figure 8.6: Grade 3 Students with No School Changes in 4 Years by Income Quintile

Adjusted by sex: Percent of students that did not transfer schools



Linear Trend Test Results

Time 1: Urban: Significant (p<.001)

Time 2: Rural: Significant (p<.01) Urban: Significant (p<.001)

Source: Manitoba Centre for Health Policy, 2008

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8.3 Grade 12 Exam Performance

Student performance on scholastic exams is a commonly used indicator of educational outcomes and has been used to make regional comparisons of relative standings (Bussiere et al., 2001; Canadian Education Statistics Council, 2003; Willms, 1997; Wirt et al., 2003). Some of these comparisons can produce biased results, depending on how the populations being compared are defined and whether students who are retained or **withdrawn** from school are included in the analysis (Brownell et al., 2004; Brownell et al., 2006; Raudenbush and Kim, 2002; Roos et al., 2006). Of interest, then, is not only the pass rate on particular exams, but also information about who should have been writing the exam but did not. Failure to write can be due to absences, incomplete tests, dropping the course, and, more importantly, being held back one or more grades or withdrawal from school.

In this report, we looked at performance on two standards exams given to all Grade 12 students in Manitoba: the Language Arts test and the Math test. Rather than looking only at the performance of those students present to write these exams, we selected two different birth cohorts and included only those individuals who remained in Manitoba until the year they turned 18 years of age—the year they should have written these **standards tests** if they had progressed through the school system in the expected fashion. In this way, we were able to measure not only the percent of the cohort that passed or failed these standards tests "on time", but also the percent who were absent or did not complete the test, who were in Grade 11 or lower (i.e., retained at least one year) and who had withdrawn from school. All children born in 1984 and remaining in Manitoba in the 2001/02 school year made up the first cohort and children born in 1988 and remaining in Manitoba in the 2005/06 school year comprised the second cohort.[45] Patterns of results for both standards tests were similar, so only the Language Arts results are displayed in this chapter. Results for the Math tests can be found in the Appendix.

The percent of Manitoba youths passing the Language Arts (LA) test on time was 55.4% for the first cohort and this increased significantly to 59.3% for the second cohort[46] (Figure 8.7). Results for the Math tests showed that fewer students passed these tests on time, but the percent who did pass on time increased significantly over the study period (47.7% to 49.9%, see Appendix). Six RHAs also showed increased rates of passing the LA test on time over the study period: South Eastman (61.9% to 68.8%), Central (59.5% to 63.9%), Assiniboine (59.8% to 67.6%), Winnipeg (59.9% to 63.1%), Interlake (53.4% to 61.9%) and North Eastman (48.0% to 61.3%). In Burntwood, the rate of passing the LA test on time decreased significantly over the study period (19.6% to 15.5%). South Eastman, Central, Assiniboine and Winnipeg had significantly higher rates of passing this exam on time in both time periods compared to the provincial average, whereas Parkland (39.8%, 44.1%) and Burntwood had significantly lower rates of youths passing this exam on time in both time periods compared to the provincial average.

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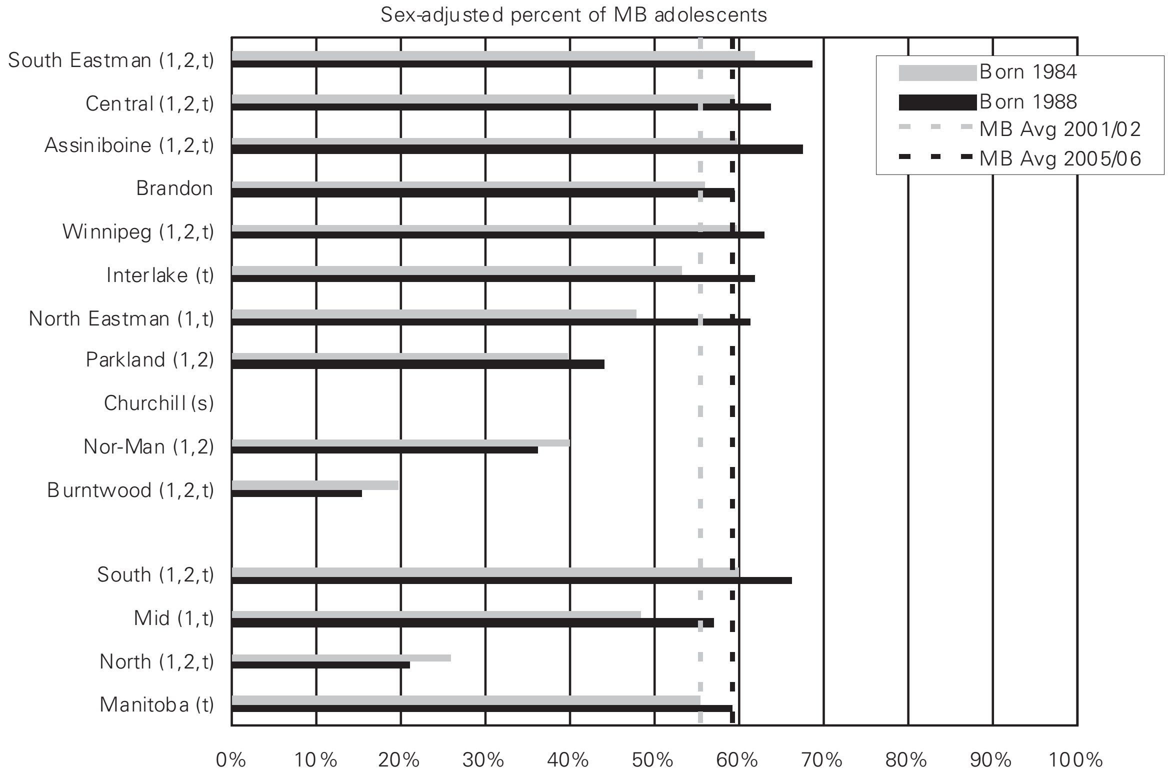
[45] 80.9% of the first birth cohort and 81.6% of the second birth cohort remained in Manitoba through the year in which they turned 18 years of age.

[46] Some students in our 18–year cohorts were enrolled in a band–operated school in 2001/02 and 2005/06. Enrolment data for band–operated schools is only partially reported to the provincial Education Information System (EIS). Students in band–operated schools and not in EIS enrolment data would be misclassified as withdrawn, so an estimated number of students expected to be enrolled in band–operated schools were removed from the analyses.

Figure 8.7: On-time Pass Rates for the Grade 12 Standard LA Test by RHA



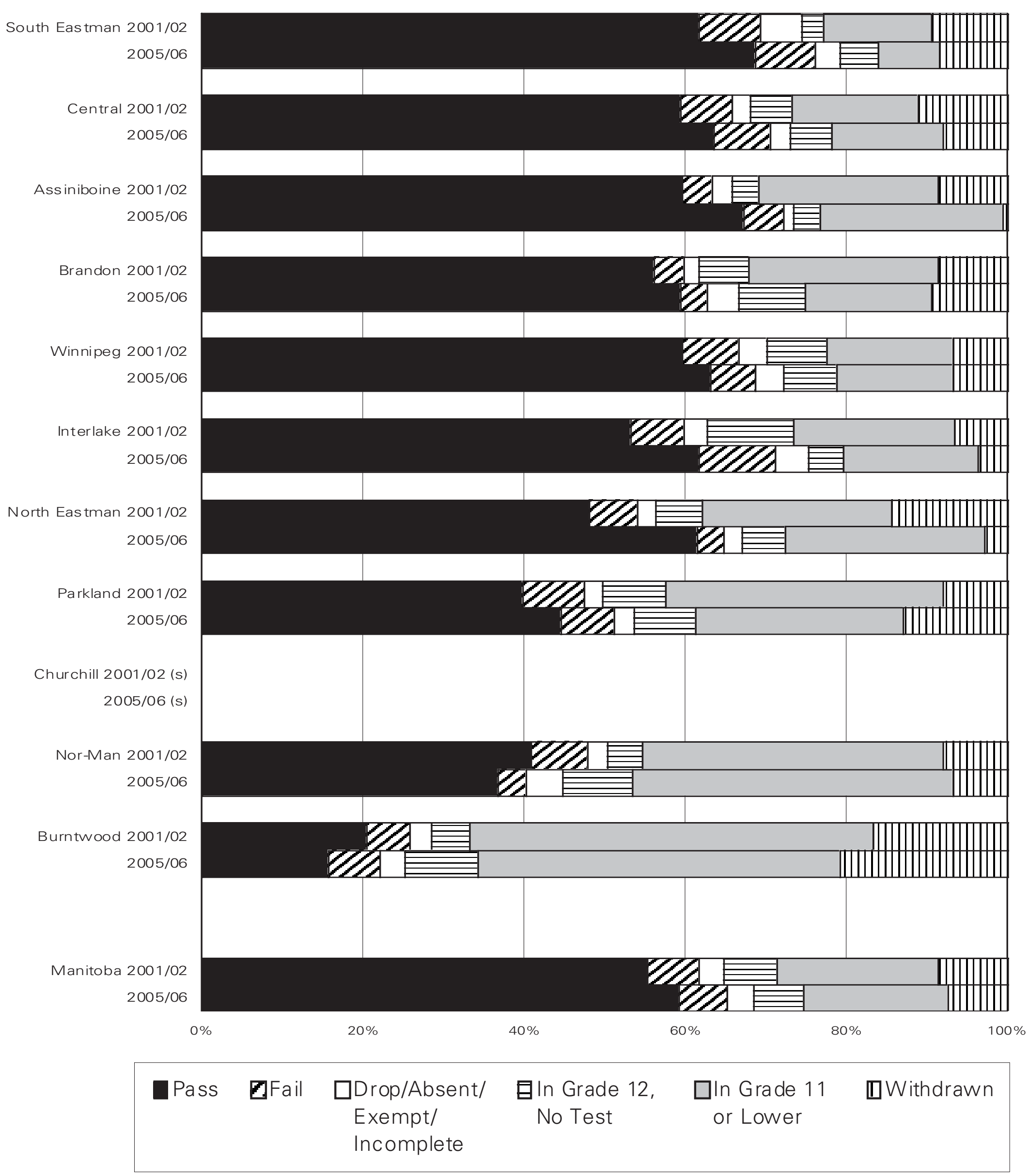
'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

The stacked bar graph indicates that the major drivers of the low on–time pass rates for Parkland, Nor–Man and Burntwood are students still in school but who have not yet reached grade 12 (due to retention at some point—shown as "grade 11 or lower" on the graph) and youths who had withdrawn from school. Although the percent of students who were in grade 11 or lower has dropped for all three RHAs (Parkland 34.4% to 25.8%; Nor–Man 37.4% to 39.7%; Burntwood 50.2% to 45.0%), the percent of students who have withdrawn from school has increased over time in Parkland and Burntwood (Parkland 8.0% to 13.0%; Nor–Man 8.1% to 7.0%; Burntwood 16.7% to 20.9%).

Figure 8.10: Grade 12 Language Arts Standards Test Performance by Manitoba RHAs

18 year olds who should have written the test, 2001/02 and 2005/06



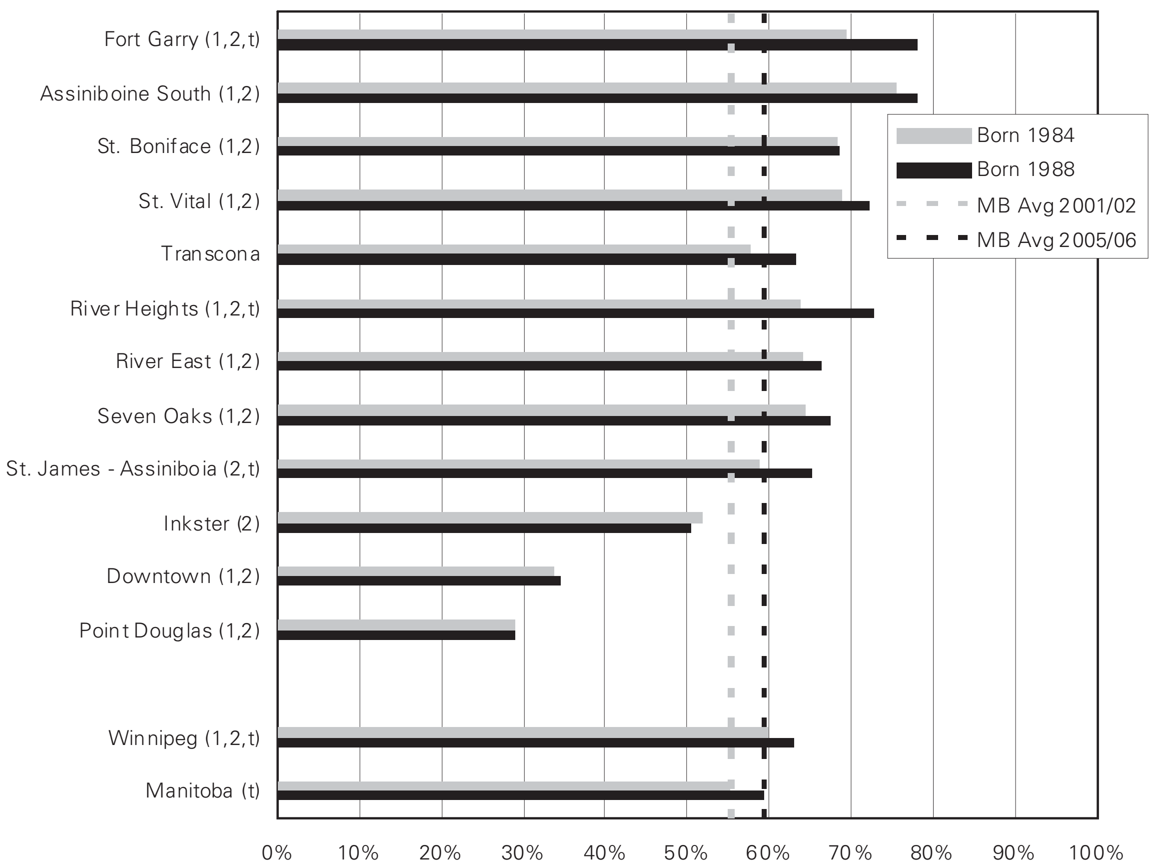
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

In the Winnipeg Community Areas, significant increases over time in the percent of youths passing the LA standards test on time were found in Fort Garry (69.5% to 78.1%), River Heights (63.8% to 72.8%) and St. James–Assiniboia (58.9% to 65.3%). Several of the Winnipeg CAs had on–time pass rates that were significantly higher in both time periods than the provincial average: Fort Garry, Assiniboine South (75.5%, 78.2%), St. Boniface (68.5%, 68.5%), St. Vital (69.0%, 72.3%), River Heights, River East (64.2%, 66.5%) and Seven Oaks (64.5%, 67.4%). Two RHAs had significantly lower on–time pass rate than the Manitoba average in both time periods, and for a third RHA the on–time pass rate was lower than the Manitoba average in the most recent time period: Downtown (33.8%, 34.6%), Point Douglas (29.1% in both time periods), Inkster (50.6% in time 2).

Figure 8.9: On-time Pass Rates for the Grade 12 Standard LA Test by Winnipeg Community Area

Sex-adjusted percent of MB adolescents



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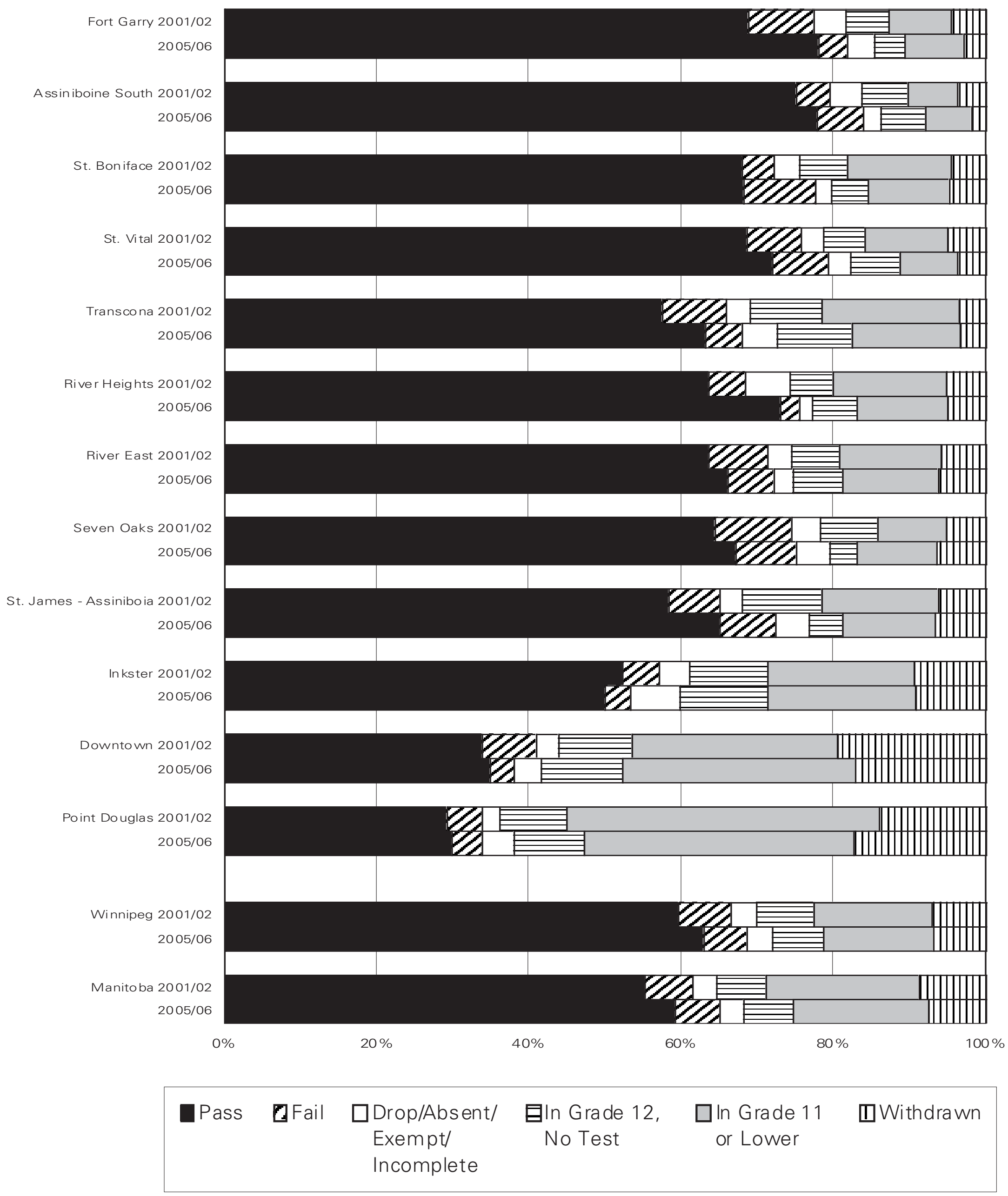
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

The stacked bar graph for the Winnipeg CAs shows that the main drivers of the low on–time pass rates for Inkster, Downtown and Point Douglas were students who had been retained at some point (in grade 11 or lower) and so had not yet reached grade 12 (time 2 Inkster 19.5%, Downtown 30.6% and Point Douglas 35.3%), and youths who had withdrawn from school (time 2 Inkster 9.1%, Downtown 17.2%, Point Douglas 17.3%).

Figure 8.10: Grade 12 Language Arts Standards Test Performance by Winnipeg Community Areas

18 year olds who should have written the test, 2001/02 and 2005/06

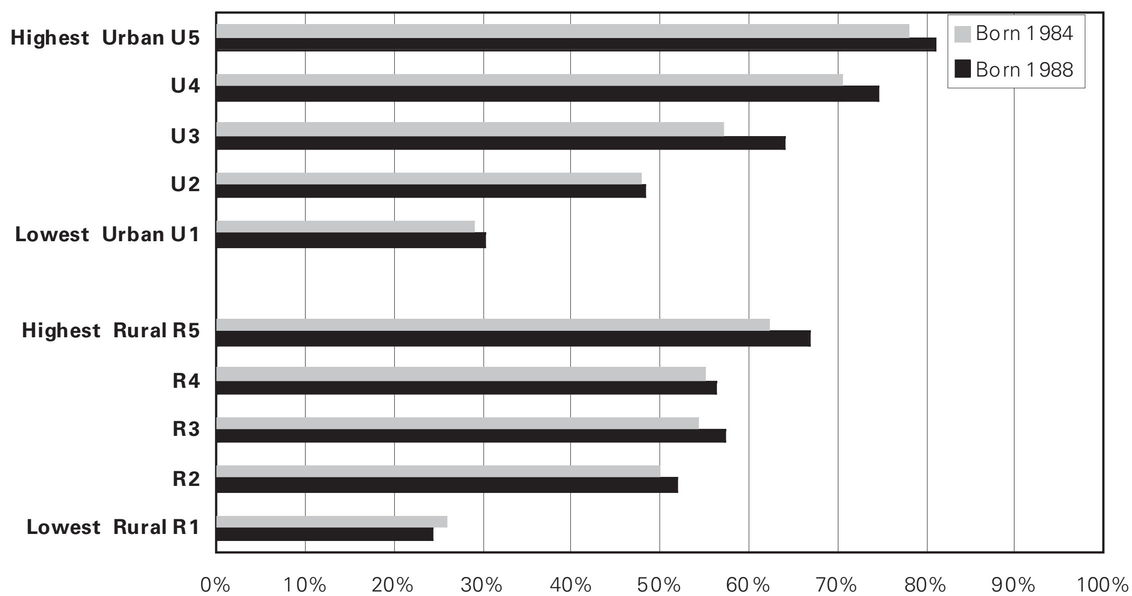


Source: Manitoba Centre for Health Policy, 2008

The percent of students passing the LA (and math) tests on time was significantly related to area–level income in both rural and urban areas in both time periods, with higher rates of on–time passing found in areas with higher income levels and lower rates as income levels decrease. For example, in urban areas, the on–time pass rate in time 2 for the highest income quintile neighbourhoods was 81.0% which is two–and–a–half times higher than the rate in the lowest income quintile neighbourhoods (30.2%). In rural areas in time 2, the difference in on–time pass rates between highest and lowest income quintile areas was also over two–and–a–half fold: the on–time pass rate for the highest income quintile area was 66.8% compared to 24.2% for youths in the lowest income quintile areas. Similar shocking differences across income quintiles were found for the Math test results. Comparisons of pass rates for test takers compared to the cohort who should have written the test (see Brownell et al., 2006) can be found in the Appendix.

Figure 8.11: On-time Pass Rates for the Grade 12 Standard LA Test by Income Quintile

Sex-adjusted percent of MB adolescents



Linear Trend Test Results

Time 1: Rural: Significant (p<.001) Urban: Significant (p<.001)

Time 2: Rural: Significant (p<.001) Urban: Significant (p<.001)

Source: Manitoba Centre for Health Policy, 2008

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8.4 High School Completion Rates

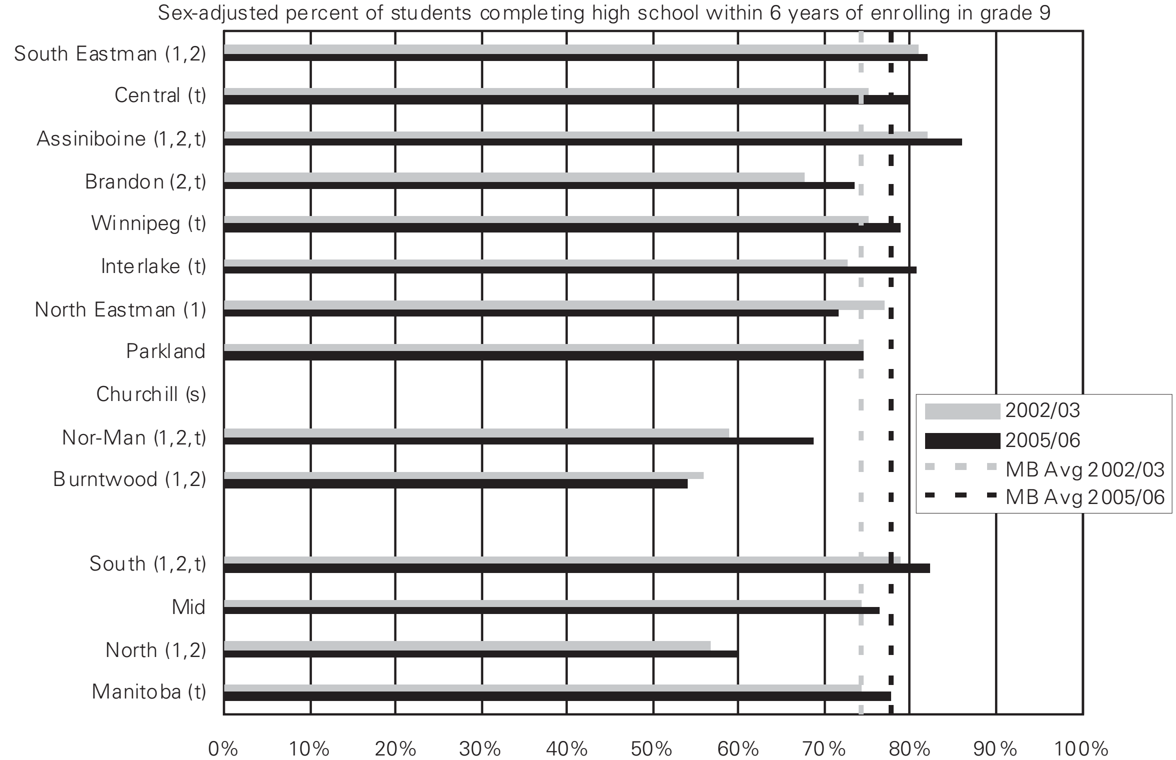
High school completion is an important milestone in an individual's life providing the bridge for further opportunities such as post–secondary education and training and employment. High school graduation alone no longer guarantees employment opportunities, particularly in our increasingly knowledge–based economy. Nonetheless, the lack of a high school diploma remains a significant predictor of negative outcomes: lower earnings, higher rates of unemployment, poorer health, higher rates of reliance on social assistance and higher rates of teen motherhood (Backlund et al., 1999; Brownell et al., 2007; Rumberger and Lamb, 2003).

In this report, we looked at high school completion rates by following two separate cohorts of grade 9 students for six years to determine what percentage of the students completed high school. Students enrolled in grade 9 in 1997/98 were followed until the 2002/03 school year; students enrolled in grade 9 in 2000/01 were followed until the 2005/06 school year. Because enrolment data for students in **band–operated schools** is often incomplete, students in band–operated schools were excluded from this analysis. This criterion removed only 3% of students from our first cohort and 4% from our second cohort; however, for regions with a higher percentage of students in band–operated schools the results reported here may not provide an accurate picture of high school graduation rates.

The rate of Manitoba youths completing high school within six years of entering grade 9 increased significantly over the study period, from 74.3% to 77.7% (Figure 8.12). Six RHAs also showed significant increases in high school completion rates over the study period: Central (75.0% to 80.0%), Assiniboine (82.1% to 86.1%), Brandon (67.5% to 73.5%), Winnipeg (75.1% to 78.7%), Interlake (72.8% to 80.6%) and Nor–Man (58.8% to 68.6%). South Eastman (80.9%, 81.9%) and Assiniboine had significantly higher rates of high school completion in both time periods compared to the Manitoba average, whereas Nor–Man and Burntwood (55.9%, 54.0%) had significantly lower rates in both time periods.

Figure 8.12: High School Completion Rates by RHA

Sex-adjusted percent of students completing high school within 6 years of enrolling in grade 9



'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

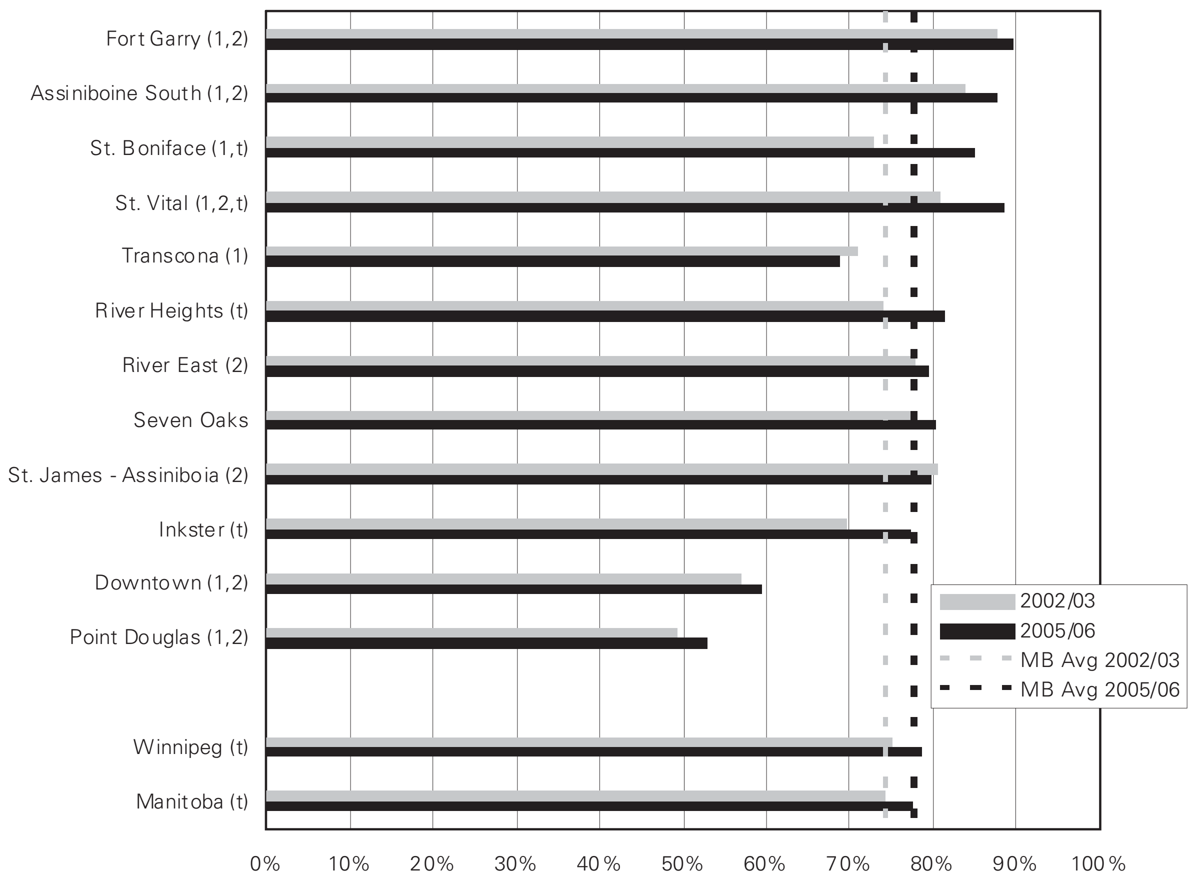
Note: Band-operated schools were excluded from the analysis

Source: Manitoba Centre for Health Policy, 2008

In the Winnipeg Community Areas, high school completion rates increased significantly over time for St. Boniface (73.1% to 84.9%), St. Vital (80.9% to 88.4%), River Heights (74.0% to 81.4%) and Inkster (69.7% to 77.4%). Fort Garry (87.8%, 89.7%), Assiniboine South (83.8%, 87.7%) and St. Vital all had high school completion rates that were significantly higher than the provincial average in both time periods, whereas the rates in Downtown (57.0%, 59.5%) and Point Douglas (49.2%, 52.8%) were significantly lower in both time periods.[47]

Figure 8.13: High School Completion Rates by Winnipeg Community Area

Sex-adjusted percent of students completing high school within 6 years of enrolling in grade 9



Note: Band-operated schools were excluded from the analysis

'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

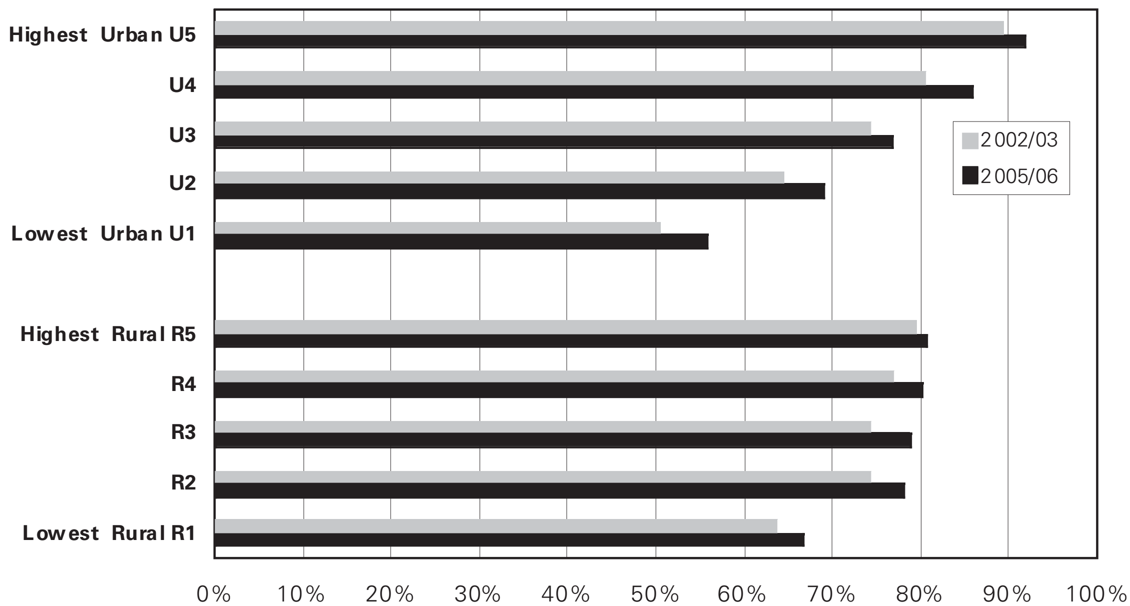
Source: Manitoba Centre for Health Policy, 2008

[47] Note that the percentage of students graduating by area in time 1 may not match what is reported in Brownell et al. 2004 for several reasons. In the current analysis, we have allowed students an additional year for graduation, used revised enrolment records from the Department of Education, Citizenship and Youth, removed youths attending band operated schools at any point in the 6–year period, used a revised format for defining Winnipeg neighbourhoods, and refined our definition of graduation.

The relationship between area–level income and high school completion was significant for both rural and urban areas in both time periods, with higher completion rates associated with higher area–level income. For example, in rural areas in the second time period, the high school completion rate was 80.7% in the highest income quintile areas compared to 66.7% in the lowest income quintile areas. In urban areas, the difference across income levels was even more dramatic: in the second time period, the high school completion rate for the highest income quintile neighbourhoods was 91.8% compared to 55.8% in the lowest income quintile neighbourhoods.

Figure 8.14: High School Completion Rates by Income Quintile

Sex-adjusted percent of students completing high school within 6 years of enrolling in grade 9



Note: Band-operated schools were excluded from the analysis

Linear Trend Test Results

Time 1: Rural: Significant (p<.001) Urban: Significant (p<.001)

Time 2: Rural: Significant (p<.001) Urban: Significant (p<.001)

Source: Manitoba Centre for Health Policy, 2008

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Chapter 9: Community and Social Services

9.1 Licensed Child Care Spaces

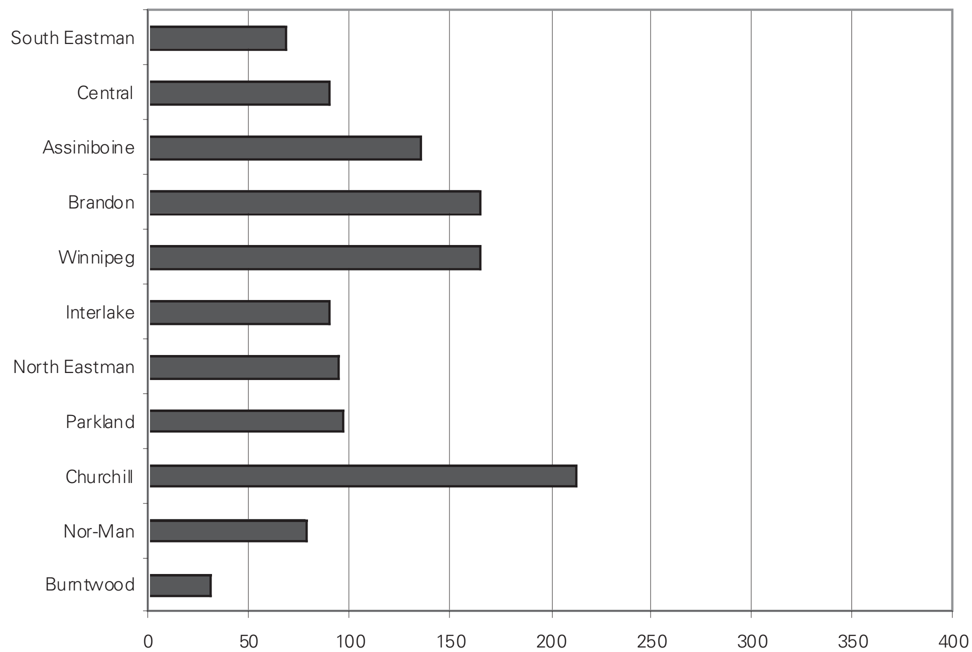
Over half of Canadian children between the ages of six months to 5 years were involved in some form of non–parental child care in 2002/03 (Bushnik, 2006). High quality child care is associated with positive outcomes in preschoolers, especially in the areas of language and cognitive development, with particular benefits found for children at risk of poor cognitive development, such as those from low socioeconomic status families (Anderson et al., 2003; Hill et al., 2002; McCain et al., 2007; NICHD Early Childcare Research Network, 2000, 2002a, 2002b, 2003; Peisner–Feinberg et al., 2001). In this report, we looked at the number of licensed **child care spaces** per 1,000 children 0 to 12 years of age in 2006, the most recent year in which data were available.[48]

There was substantial range across RHAs in the number of child care spaces for children 0–12 years (Figure 9.1). Churchill had the most child care spaces at 211.6/1,000, followed by Brandon (164.7/1,000) and Winnipeg (164.2/1,000). The lowest rates of spaces were found in Burntwood (30.0/1,000) and South Eastman (68.0 /1,000). The graph suggests there is little relationship between the socioeconomic status (as indicated by the ordering of the graphs by premature mortality rate which is related to socioeconomic status) and the provision of child care spaces. This is not unexpected given that child care spaces have evolved largely in response to need based on parental employment, rather than on the need for enriched early childhood development.

[48] Data are also available for earlier years, however, less complete data collection in those years makes comparisons across time less meaningful.

Figure 9.1: Licensed Child Care Spaces by RHA, 2006

Crude rate of child care spaces per 1,000 children ages 0-12 years

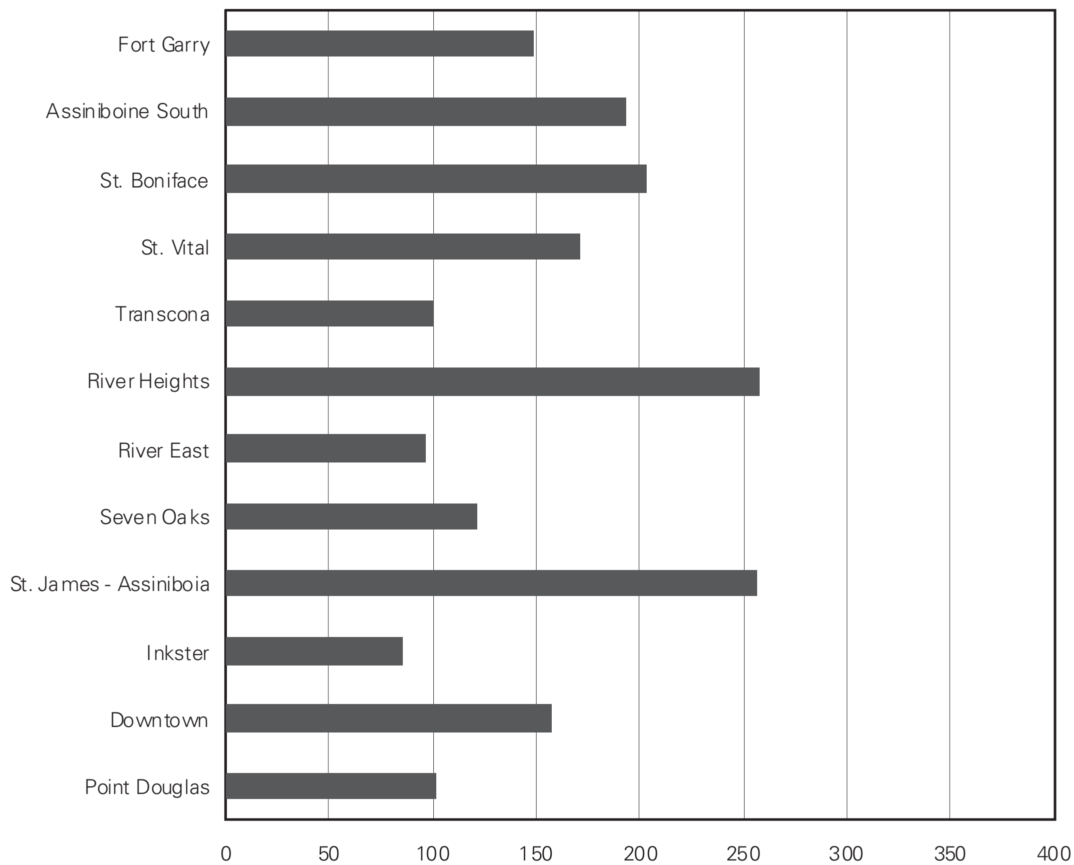


Source: Manitoba Centre for Health Policy, 2008

There was also considerable range in the number of child care spaces for children 0 to 12 across the Winnipeg Community Areas. River Heights had the highest number of child care spaces at 258.1/1,000, followed by St. James–Assiniboina with 256.3/1,000. Inkster (86.0/1,000), River East (96.1/1,000), Transcona (100.7/1,000) and Point Douglas (101.4/1,000) had the fewest child care spaces.[49]

Figure 9.2: Licensed Child Care Spaces by Winnipeg Community Area, 2006

Crude rate of child care spaces per 1,000 children ages 0-12 years



Source: Manitoba Centre for Health Policy, 2008

Graphs with information on child care spaces per 1,000 children 0 to 12 years at the RHA district and Winnipeg NC levels can be found in the Appendix.

[49] Not captured here are nursery school spaces for 4–year–old children which are available to children in the Winnipeg School Division (formerly Winnipeg School Division #1) and may substitute for child care spaces in areas served by this school division.

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9.2 Receipt of Income Assistance

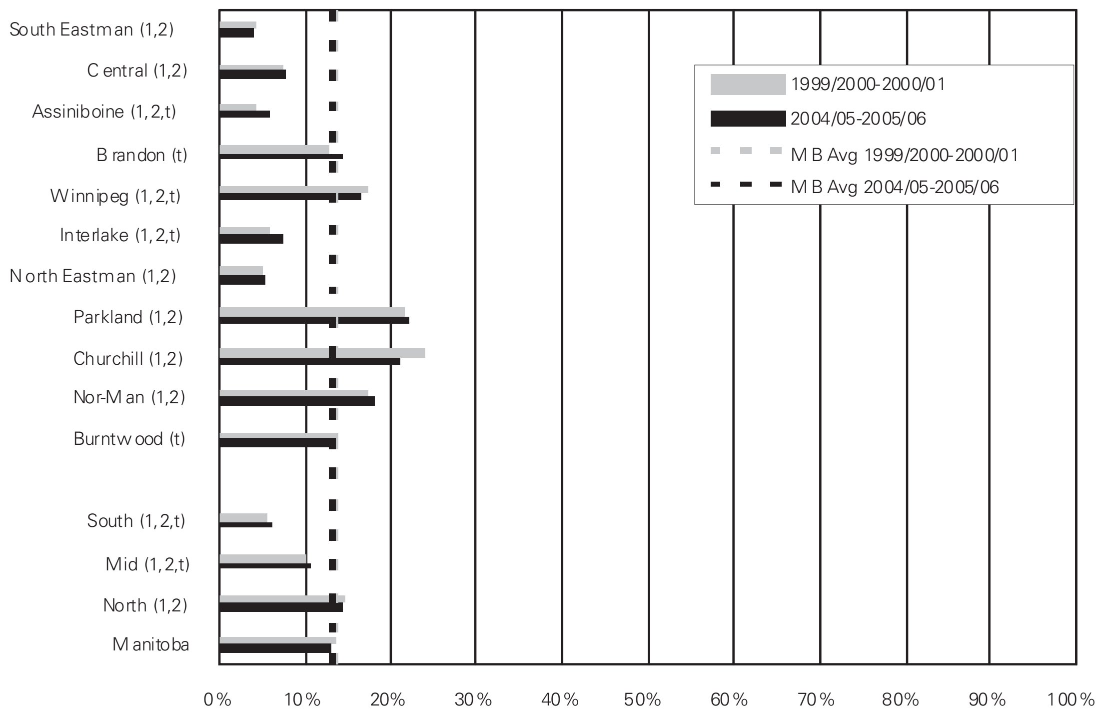
The Department of Family Services and Housing in Manitoba administers the Employment and Income Assistance program which is described as "a provincial program of last resort for people who need help to meet basic personal and family needs." (Manitoba Family Services and Housing, 2008). These families experience poverty and the associated poorer health outcomes which are generally found for people with lower incomes (Adler et al., 1994; Benzeval and Judge, 2001; Woolf et al., 2006). Receipt of income assistance is also associated with behavioural and emotional difficulties as well as poorer academic performance in adolescents (Brownell et al., 2007; Chase–Lansdale et al., 2002; Duncan and Yeung, 1994; Gennetian et al., 2004; Morris and Gennetian, 2003). It is important, then, when describing child health in Manitoba to include information about this "at–risk" population of children and youths.

In this report, we looked at the percent of children in Manitoba who lived in a family receiving income assistance. Once children turn 18 years of age they are no longer considered dependents and can thereafter apply for their own income assistance. For this reason, we looked at rates of income assistance separately for children 0 to 17 and 18 to 19 years of age. Rates were calculated for two two–year time periods: 1999/2000–2000/01 and 2004/05–2005/06. A family or individual was considered to be receiving income assistance if they received assistance for two or more consecutive months within either of the two–year periods. First Nations families living in First Nations communities are not eligible for the provincial income assistance program, but may receive assistance from federally funded programs which are not captured in our analysis.

The percent of Manitoba children aged 0 to 17 years who lived in families receiving income assistance was stable across the study period, at 13.3% in time 1 and 13.2% in time 2 (Figure 9.3). For three RHAs, the percent of children in families receiving income assistance increased over the study period: Assiniboine (4.1% to 5.8%), Brandon (12.9% to 14.2%) and Interlake (6.0% to 7.4%). In two RHAs, the percent of children in families receiving income assistance decreased over the study period: Winnipeg (17.4% to 16.6%) and Burntwood (13.8% to 12.7%). For the rest of the RHAs, the percent receiving income assistance remained stable over the study period. South Eastman, (4.3%, 3.9%) Central (7.4%, 7.9%), Assiniboine, Interlake and North Eastman (5.1%, 5.3%) RHAs had significantly lower rates of 0– to 17–year–olds living in families receiving income assistance compared to the provincial average in both time periods. In contrast, Winnipeg, Parkland, (21.6%, 22.1%) Churchill (23.9%, 21.1%) and Nor–Man (17.1%, 18.3%) had significantly higher rates of income assistance receipt for this age group of children compared to the provincial average.

Figure 9.3: Percent of Children in Families Receiving Income Assistance Aged 0-17 Years by RHA

Age- and Sex-adjusted rates per 100 children



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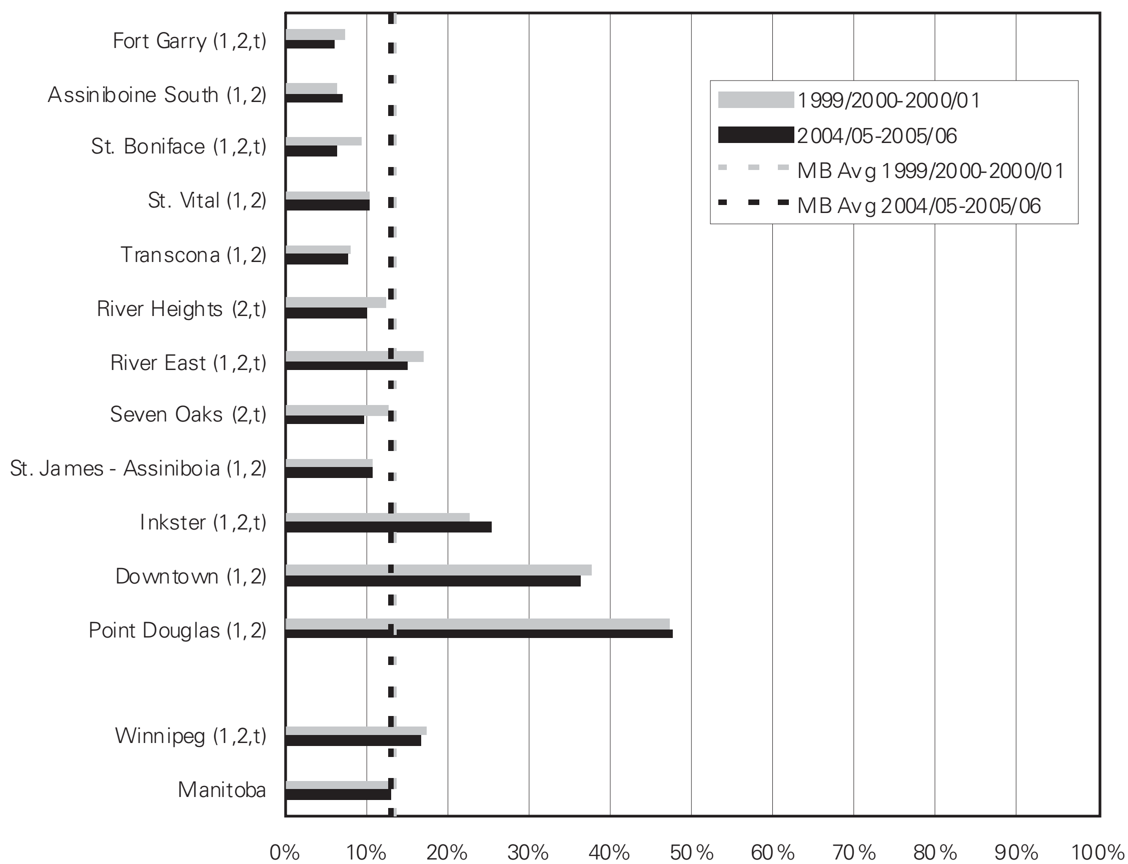
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

Five Winnipeg Community Areas experienced decreases over the study period in the percent of children 0 to 17 years of age living in families receiving income assistance: Fort Garry (7.5% to 5.9%), St. Boniface (9.4% to 6.3%), River Heights (12.4% to 10.0%), River East (17.0% to 15.0%) and Seven Oaks (12.8% to 9.7%). In Inkster, the percent increased significantly over the study period from 22.6% to 25.4%. Four Winnipeg CAs had significantly higher rates of children in families receiving income assistance than the provincial average in both time periods: River East, Inkster, Downtown (37.6%, 36.2%) and Point Douglas (47.3%, 47.6%).

Figure 9.4: Percent of Children in Families Receiving Income Assistance Aged 0-17 by Winnipeg Community Area

Age- and Sex-adjusted rates per 100 children



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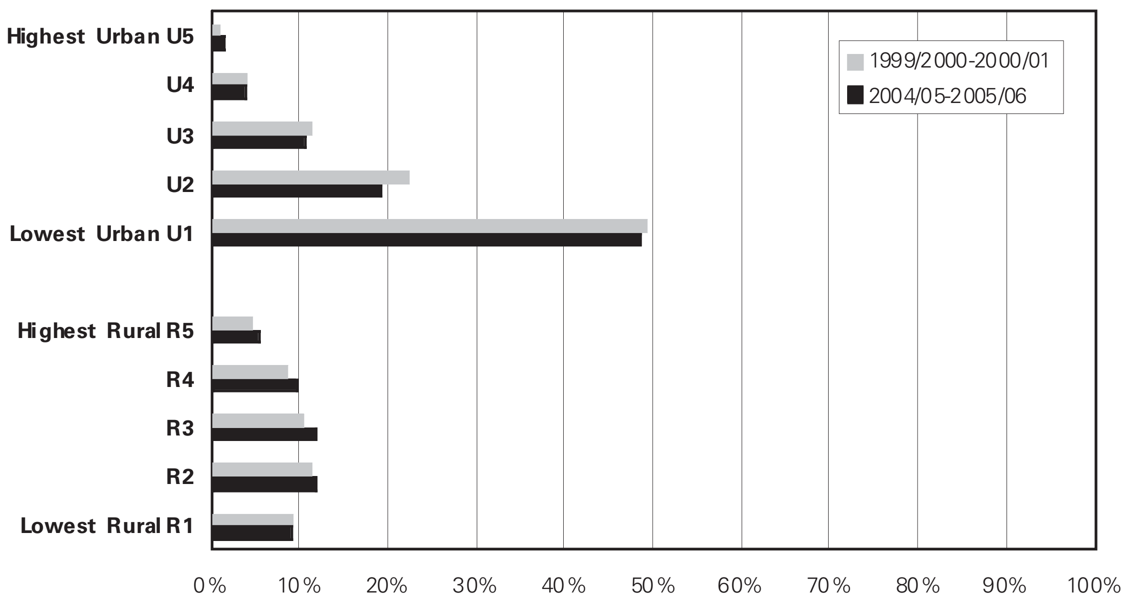
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

Not surprisingly, there was a significant relationship between receipt of income assistance for children 0 to 17 years and area–level income, with much higher rates of children receiving income assistance in the lowest urban income quintile neighbourhoods. For example, in the second time period, 48.5% of the children 0 to 17 years living in the lowest urban income quintile neighbourhoods were in families receiving income assistance compared to 1.3% of the children in the highest income area. In rural areas, the relationship was significant, however there was more of a u–shape than a gradient, possibly because some of the children in the lowest income quintile areas may live in First Nations communities and their social assistance receipt is not captured here.

Figure 9.5: Percent of Children in Families Receiving Income Assistance Ages 0-17 Years by Income Quintile

Age- and sex-adjusted rates per 100 children



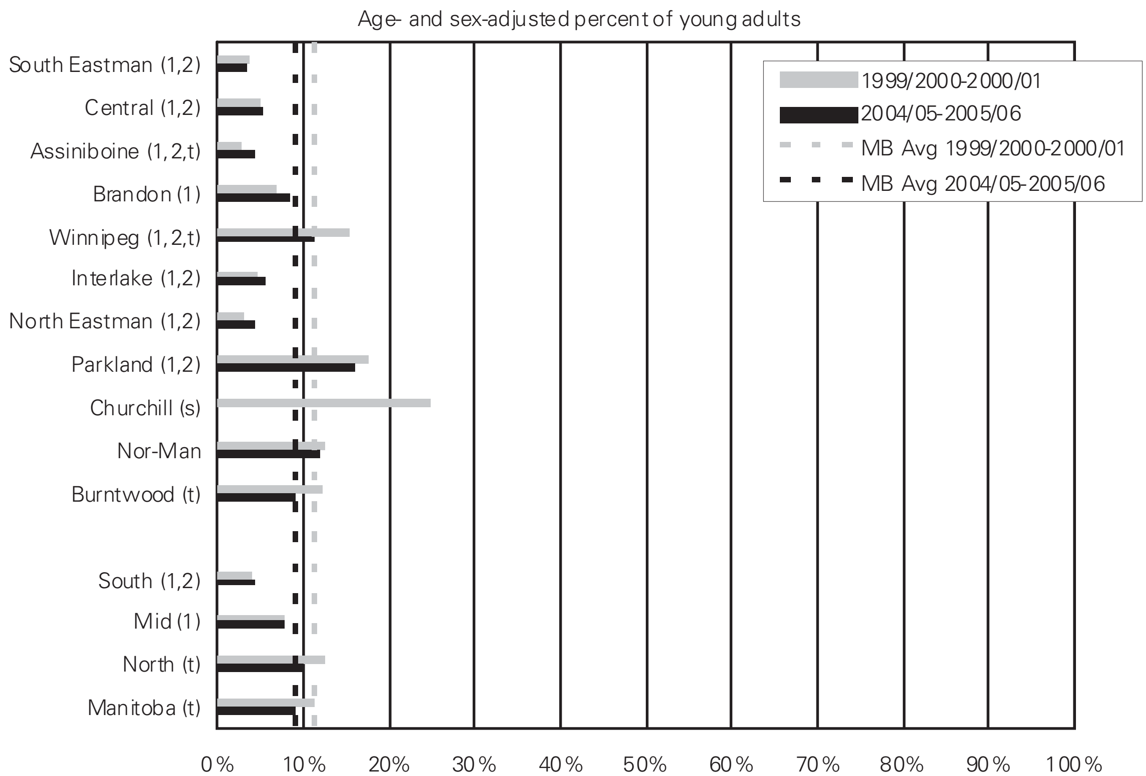
Linear Trend Test Results
Time 1: Rural: Significant (p<.001) Urban: Significant (p<.001)
Time 2: Rural: Significant (p<.001) Urban: Significant (p<.001)
Rural time change: Significant (p<.01)

Source: Manitoba Centre for Health Policy, 2008

Children 1 to 4 years of age have the highest rates of income assistance receipt (17.9% in time 2), followed by infants and children 5 to 9 years (14.1% and 14.6% in time 2, respectively), with the lowest rate for youths 15 to 17 years of age (8.5% in time 2). A graph of the crude rates of income assistance receipt by age group and time period can be found in the Appendix.

Over 90% of the cases of income assistance receipt by youths 18 to 19 years in Manitoba fall into three categories: single parents (42.0% in time 2), general assistance (single employables—32.7% in time 2) and disability cases (22.5% in time 2).[50] The percent of Manitoba youths 18 to 19 years of age who were receiving income assistance decreased over the study period, from 11.1% to 9.1%.[51] A significant decrease over time was also found in Winnipeg (15.3% to 11.3%) and in Burntwood (12.1% to 8.9%), whereas an increase was found in Assiniboine (2.6% to 4.1%). Winnipeg and Parkland youths had significantly higher rates of income assistance receipt in both time periods compared to the provincial average, whereas the rates in South Eastman, Central, Assiniboine, Interlake and North Eastman were all significantly lower in both time periods.

Figure 9.6: Young Adults Receiving Income Assistance Aged 18-19 by RHA



'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

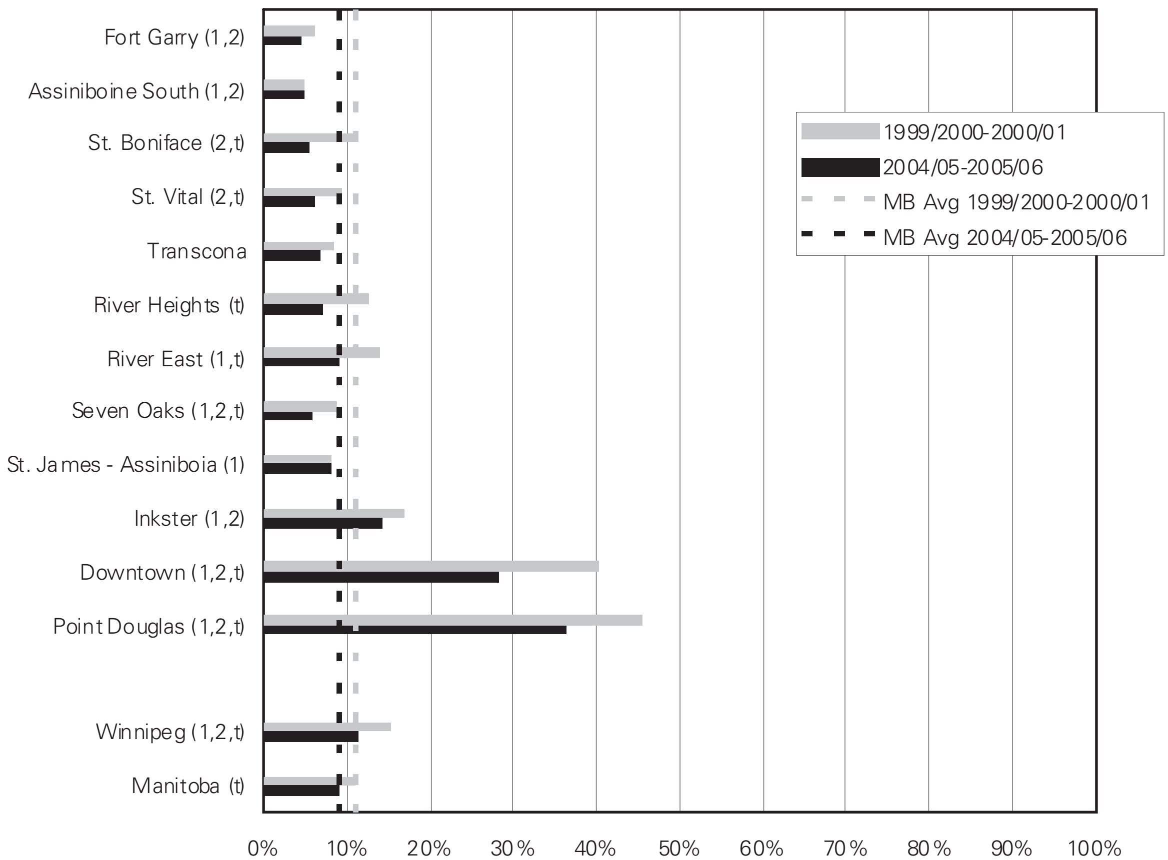
[50] The other categories include "Special Cases" and "Disabled".

[51] There was an 11% decrease in number of cases in the single parent category and a 24% decrease in the number of cases in the general assistance case category. Over the same period, there was about a 23% increase in disability cases for this age group.

The percent of youths 18 to 19 years receiving income assistance dropped significantly over time in seven Winnipeg Community Areas: St. Boniface (10.9% to 5.4%), St. Vital (9.5% to 6.3%), River Heights (12.6% to 7.3%), River East (14.1% to 9.1%), Seven Oaks (8.7% to 5.8%), Downtown (40.4% to 29.3%) and Point Douglas (45.6% to 36.4%). In Inkster (16.8%, 14.1%), Downtown and Point Douglas, the rates were significantly higher in both time periods than the provincial average.

Figure 9.7: Young Adults Receiving Income Assistance Aged 18-19 by Winnipeg Community Area

Age- and sex-adjusted percent of young adults



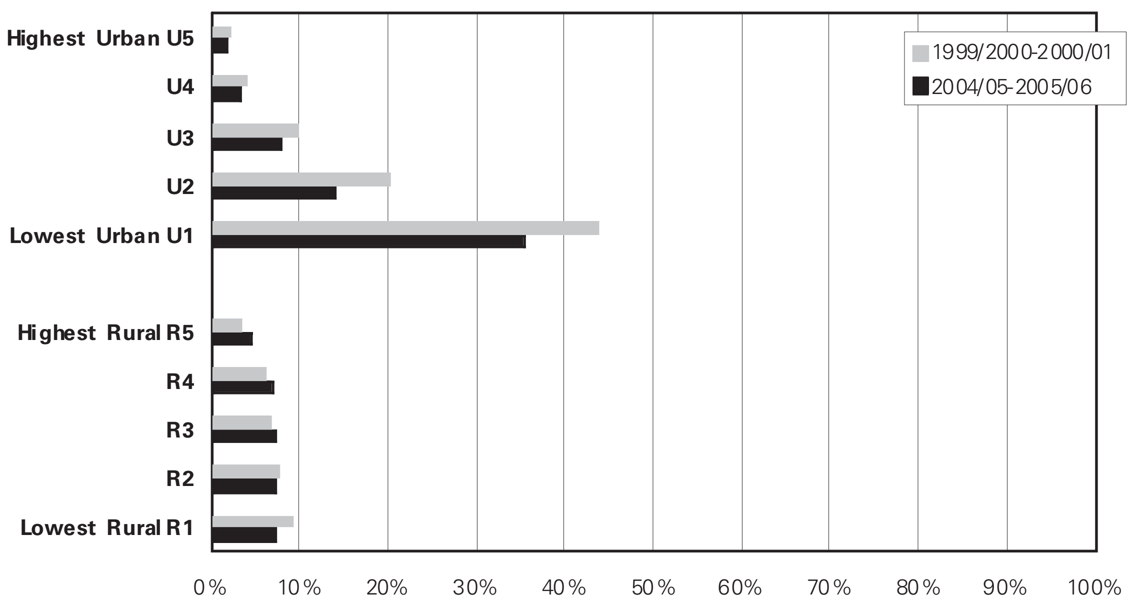
'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

There was a significant relationship between area–level income and receipt of income assistance for 18– to 19–year–olds, with increasing levels of income assistance receipt as area–level income decreased. The gradient was particularly steep in the urban areas in time 2: 35.3% of youths in the lowest income quintile neighbourhoods were receiving income assistance compared to 1.6% of the youths in the highest income neighbourhoods. In rural areas, the gradient was not as pronounced, and it became less steep over time. The lack of data from First Nations communities on income assistance may have contributed to this shallower gradient in rural areas.

Figure 9.8: Young Adults Receiving Income Assistance Aged 18-19 Rates by Income Quintile

Age- and sex-adjusted percent of young adults



Linear Trend Test Results
Time 1: Rural: Significant (p<.001) Urban: Significant (p<.001)
Time 2: Rural: Significant (p<.001) Urban: Significant (p<.001)
Rural time change: Significant (p<.01)

Source: Manitoba Centre for Health Policy, 2008

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9.3 Children in Care

There are situations where a family is unable or unfit to properly look after their child(ren), and in these cases the child(ren) may be placed into foster care. In this section, we look at the rate of children in care in Manitoba. Children in care are children who are removed from their families of origin and placed in the care of another adult(s) due to concerns about the proper provision of care in the family of origin. Children can come into care for a variety of reasons including abuse and neglect, illness, death or conflict in their family, disability or emotional problems.

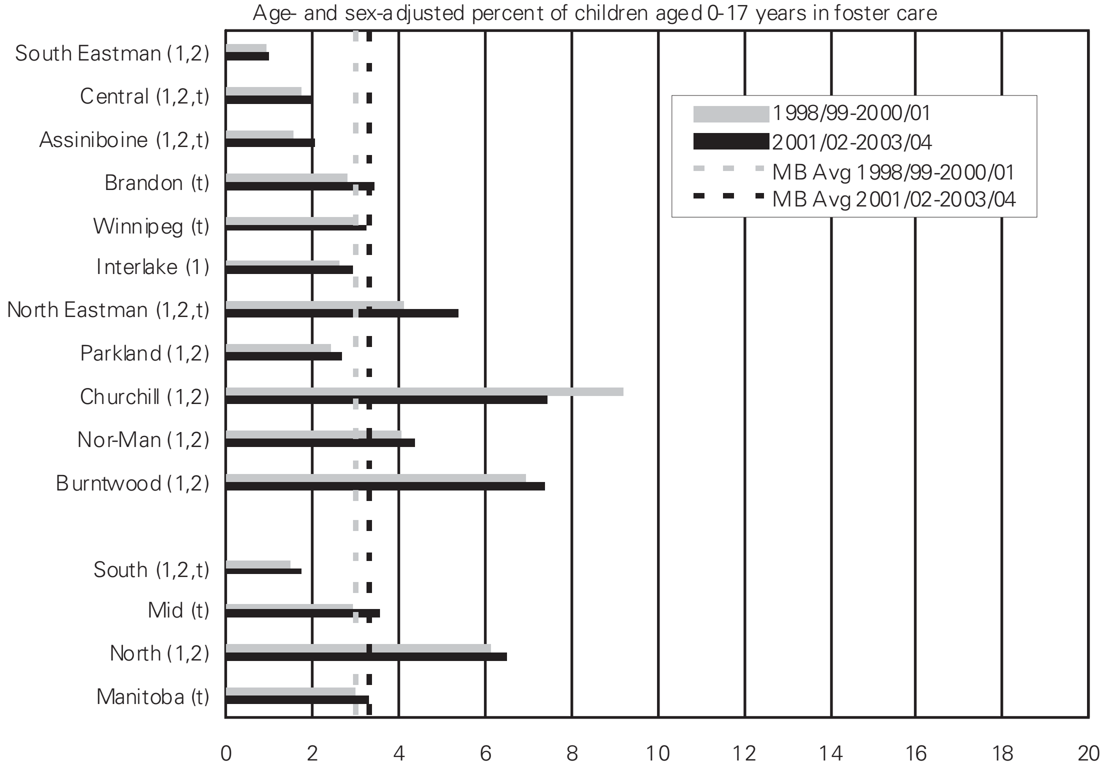
In this report, information on the number of children in care was taken from the Child and Family Services Information System (CFSIS) dataset held at MCHP, which is currently available from 1992 through fiscal year 2003/04. Prior to 1997, the recording of children in care in CFSIS was incomplete and so we examined data for two three–year periods: 1998/99–2000/01 and 2001/02–2003/04.[52] Recording of information from Aboriginal Agencies on children in care was poor prior to 2000 because CFSIS was not a province–wide system until then, after which point about two–thirds of the children in care served by these agencies were recorded in CFSIS (Stevens, 2007). It should, therefore, be kept in mind that children in care served by Aboriginal Agencies, which primarily serve children from northern Manitoba, will be under–counted in this report, particularly in the first time period. Even in areas where data collection has been consistent in both time periods, changes in the prevalence of children in care over time could be due to a number of different factors including staff turnover, system restructuring, and changes in occurences of **child maltreatment**.

The prevalence of children in care was determined at regional levels using the postal code available from the Manitoba Health and Healthy Living registry to place children into regions of residence. As such, these postal codes represent the current location of the registered family head rather than the current location of the child, and likely reflect the child's residence prior to being taken into care. Because child welfare services generally end when a child turns 18, we examined prevalence for children 0 to 17 years of age. The prevalence of children in care in Manitoba increased significantly over the study period from 3.0% in 1998/99–2000/01 to 3.3% in 2001/02–2003/04 (Figure 9.9). Significant increases in the prevalence of children in care were found in five RHAs: Central (1.7% to 2.0%), Assiniboine (1.6% to 2.0%), Brandon (2.8% to 3.4%), Winnipeg (3.0% to 3.3%) and North Eastman (4.1% to 5.4%). To the extent that children in these areas are served by Aboriginal Agencies, these increases could reflect a more complete data capture in the second time period rather than true increases in the prevalence of children in care. The prevalence of children in care was lower than the provincial average in both time periods in South Eastman (0.93%, 0.98%), Central, Assiniboine and Parkland (2.4%, 2.7%). The prevalence was higher than the provincial average in both time periods in North Eastman, Churchill (9.2%, 7.4%), Nor–Man (4.1%, 4.4%) and Burntwood (7.0%, 7.4%). Once again, it is important to remember that the prevalence of children in care may be underestimated in areas where children are served by Aboriginal Agencies, particularly in the first time period.

[52] Children appearing multiple times in the CFSIS dataset were counted only once per time period.

Figure 9.9: Prevalence of Children In Care by RHA

Age- and sex-adjusted percent of children aged 0-17 years in foster care



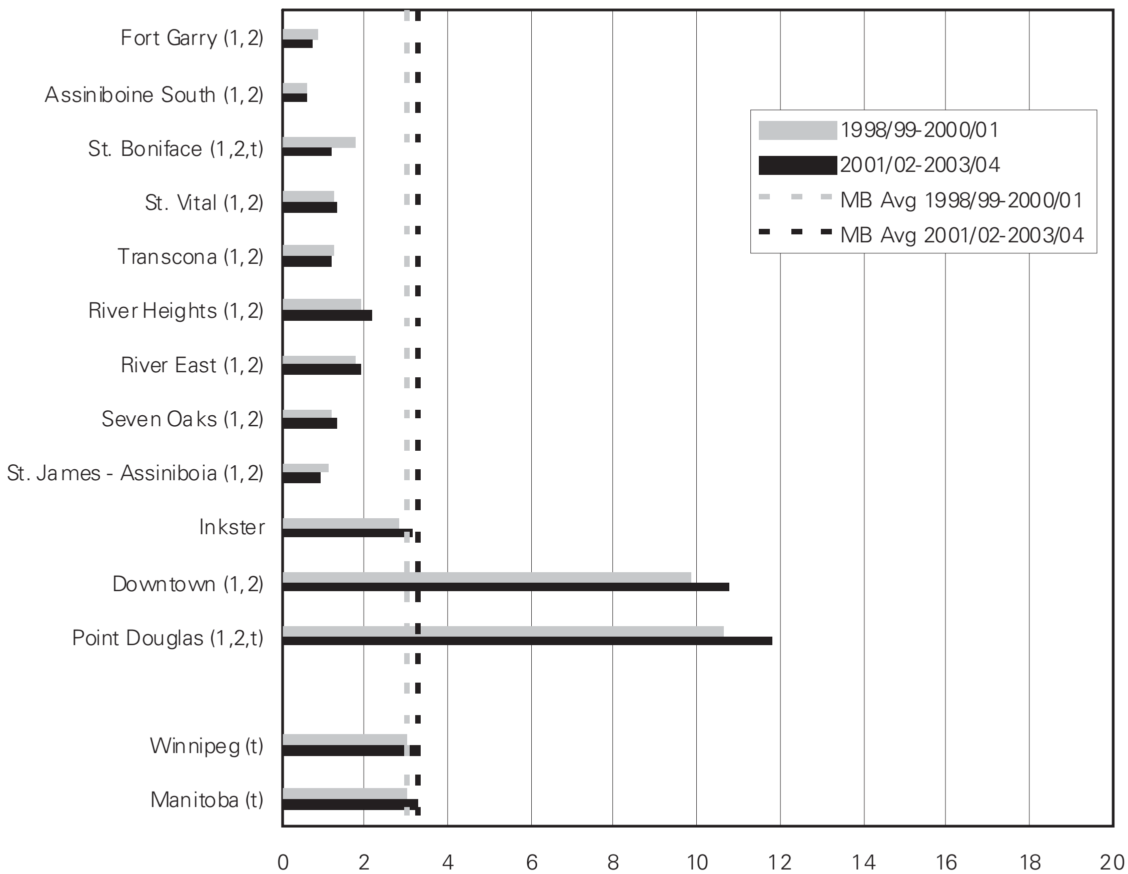
'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

In the Winnipeg Community Areas, there was a decrease over time in the prevalence of children in care in St. Boniface (1.8% to 1.2%). The prevalence in most Winnipeg CAs was significantly lower than the provincial average in both time periods, with the exceptions of Inkster, where prevalence did not differ from the provincial average, and Downtown (9.8%, 10.8%) and Point Douglas (10.6%, 11.8%), where the prevalence was significantly higher than the provincial average in both time periods.

Figure 9.10: Prevalence of Children In Care by Winnipeg Community Area

Age- and sex-adjusted percent of children aged 0-17 years in foster care



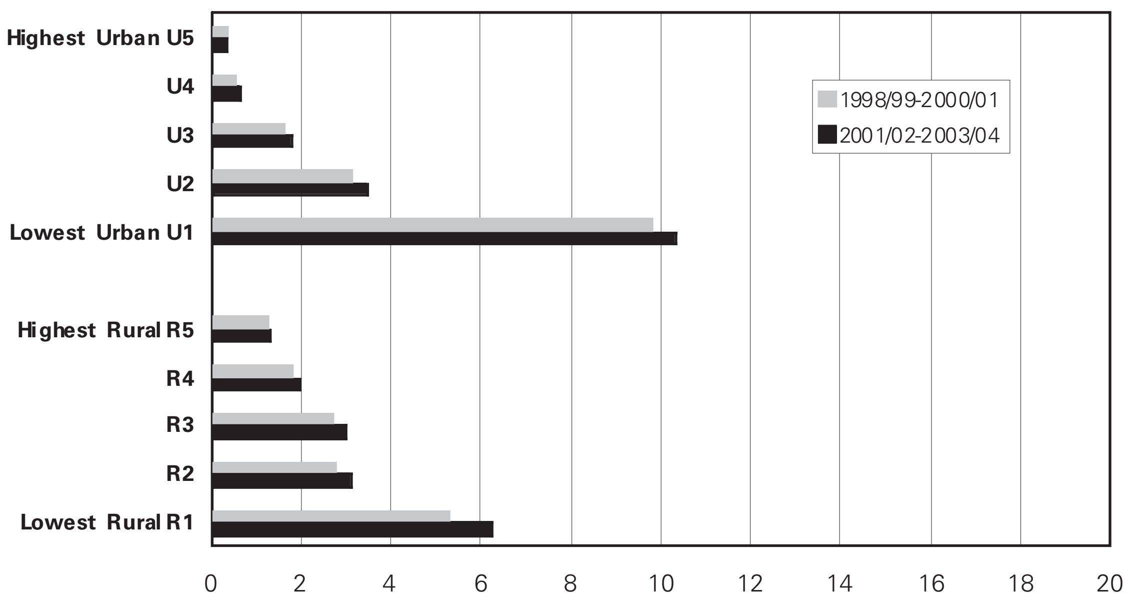
'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

In both rural and urban areas, in both time periods, there was a significant relationship between area–level income and the prevalence of children in care, with children in care increasing as area–level income decreased. For example, in time 2 in urban areas, the percent of children in care in the lowest income quintile neighbourhoods was over 34 times higher than the percent for the highest income quintile neighbourhoods (10.3% compared to 0.3%). Prevalence in rural areas in time 2 differed by almost five–fold: in the lowest income quintile areas the percent of children in care was 6.3% compared to 1.3% in the highest income quintile areas.

Figure 9.11: Prevalence of Children In Care by Income Quintile

Age- and sex-adjusted percent of children aged 0-17 years in foster care



Linear Trend Test Results

Time 1: Rural: Significant (p<.001) Urban: Significant (p<.001)

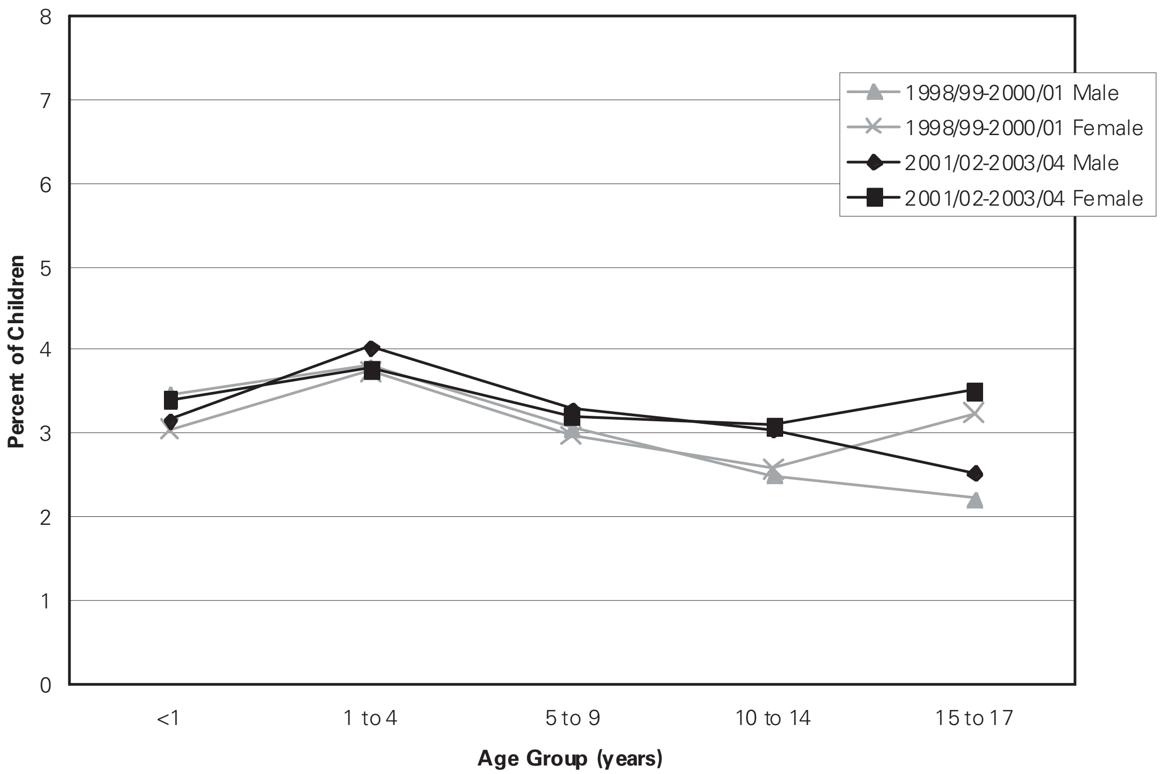
Time 2: Rural: Significant (p<.001) Urban: Significant (p<.001)

Source: Manitoba Centre for Health Policy, 2008

The prevalence of children in care was highest in the 1– to 4–year–old age group at 3.9% in the second time period and lowest in adolescence at 3.1% for the 10– to 14–year olds in time 2 and 3.0% for the 15– to 17–year–olds. Prevalence for males and females tended to be similar at all ages except at 15 to 17 years when more females than males were in care (3.5% compared to 2.5% in time 2).

Figure 9.12: Prevalence of Children In Care by Age Group and Sex, 1998/99-2000/01 and 2001/02-2003/04

Crude percent of children aged 0-17 years in foster care



Source: Manitoba Centre for Health Policy, 2008

We also looked at the rates of hospitalization episodes and injury hospitalizations for children in care. These were hospitalizations that occurred, at any point in the time period, to children who were in care, at any point in that time period. The hospitalization episode(s) may or may not have coincided with the time in care. Hospitalization rates for children in care were markedly higher than the rates for the total population. The crude rate of hospital episodes for children in care, 0 to 17 years of age, in 2001/02–2002/03 was 111.0/1,000, whereas the comparable rate for children not in care was 37.4/1,000, an almost three–fold difference (see "all cause hospitalizations" in Table 9.1). As was the case for the total Manitoba child population, rates of hospitalization episodes are highest for children in care during infancy, after which they fall and then rise again during adolescence. Rates of hospital episodes for children in care, by age group, can be found in the Appendix.

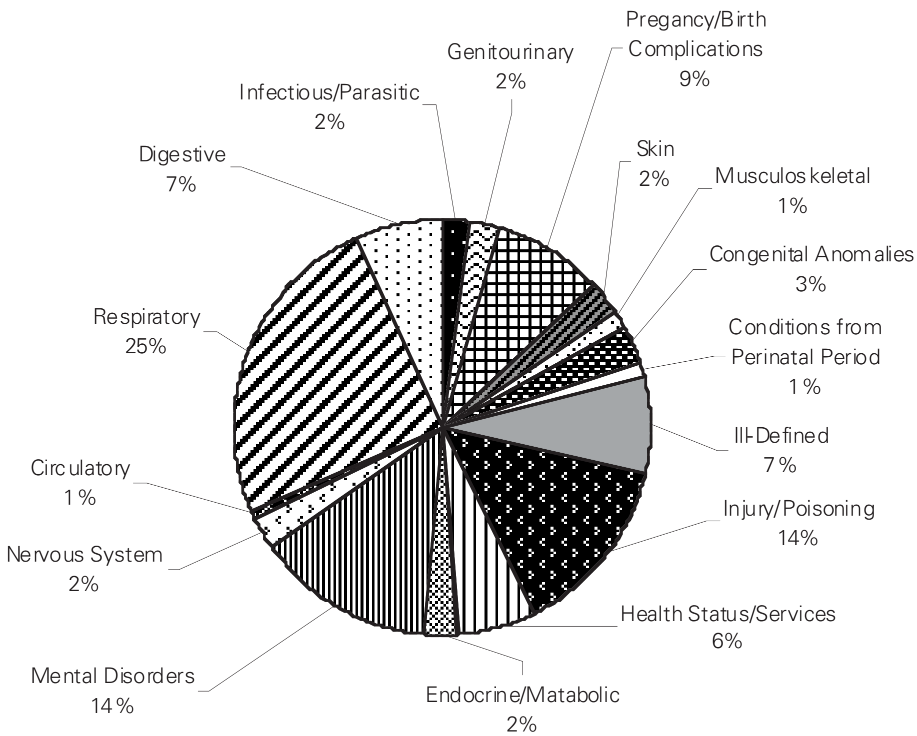
Table 9.1: Table of Crude Hospital Episode Rates per 1,000 for Children In Care and Children Not In Care, 0-17 years, 1998/99-2000/01 and 2001/02-2003/04, Overall Hospitalizations and by Cause

Cause of Hospital Episode	1998/99-2000/01		2001/02-2003/04	
	In care	Not in care	In care	Not in care
All cause hospitalizations	127.68	42.48	110.96	37.37
Infectious and Parasitic Diseases	2.81	1.56	1.59	1.10
Diseases of the Genitourinary System	2.81	1.34	2.63	1.20
Complications of Pregnancy, Childbirth and the Puerperium	11.17	1.91	9.03	1.53
Diseases of the Skin and Subcutaneous Tissue	3.14	1.05	2.98	0.81
Diseases of the Musculoskeletal System and Connective Tissue	1.63	0.71	1.14	0.60
Congenital Anomalies	3.93	1.52	2.88	1.53
Certain Conditions Originating in the Perinatal Period	1.52	0.98	1.39	1.03
Symptoms, Signs, and Ill-Defined Conditions	9.37	3.62	8.73	3.21
Fractures, Wounds, and Injuries/Poisoning and Complications/External Causes of Injury & Poisoning	18.18	5.53	16.37	4.91
Factors Influencing Health Status and Contact With Health Services	7.58	2.82	5.06	2.25
Neoplasms	0.39	0.37	0.60	0.34
Endocrine, Nutritional and Metabolic Diseases, and Immunity Disorders	2.92	0.74	2.53	0.72
Diseases of the Blood and Blood-Forming Organs	0.34	0.51	0.69	0.52
Mental Disorders	17.62	1.50	18.20	1.71
Diseases of the Nervous System and Sense Organs	2.97	1.37	2.63	1.06
Diseases of the Circulatory System	0.90	0.32	0.60	0.32
Diseases of the Respiratory System	31.88	12.36	27.23	10.61
Diseases of the Digestive System	8.53	4.28	6.70	3.90

Source: Manitoba Centre for Health Policy, 2008

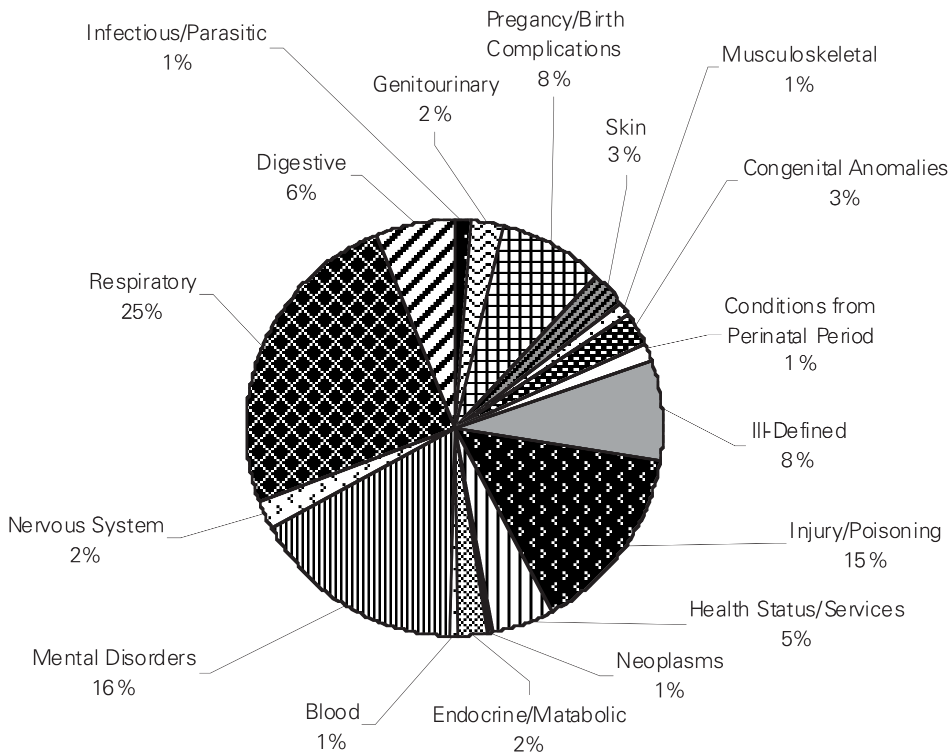
The most common causes of hospitalization for children who were in care at some point in the study period were similar to those for the total population of children: respiratory disorders comprised 24.5%, injuries comprised 14.8%, and pregnancy and birth complications comprised 8.1% of the hospitalizations for children in care in 2001/02–2002/03 (Figures 9.13 and 9.14). One major difference in the causes of hospitalization between children in care and the total child population was hospitalizations for mental disorders. These comprised 16.4% of the hospitalizations for children in care in time 2 compared to only 4.6% of the hospitalizations for children 0–17 year who were not in care. As can be seen in the table, in the second time period, the rate of hospitalizations for mental disorders was over 10 times higher for children in care compared to children not in care. Hospitalizations for mental disorders were particularly high during adolescence: for adolescents who were in care at some point over the study period, close to one third of their hospitalizations were due to mental disorders. Pie graphs of causes of hospitalization for children in care by different age groups can be found in the Appendix.

Figure 9.13: Causes of Hospitalization for Children In Care Aged 0-17 Years, 1998/99-1999/2000



Source: Manitoba Centre for Health Policy, 2008

Figure 9.14: Causes of Hospitalization for Children In Care Aged 0-17 Years, 2001/02-2002/03



Source: Manitoba Centre for Health Policy, 2008

Injury hospitalization rates are also considerably higher for children in care compared to children not in care (179.1/10,000 in time 2 compared to 48.0/10,000). The top five causes of injury hospitalizations (excluding the reason "other") differed slightly for children in care compared to children not in care (Figures 9.15 and 9.16). In the second time period, the top five causes of injury hospitalizations for children who were in care at any point in the study period were: self–inflicted injuries (25.2%), falls (13.0%), poisoning (11.4%), violence by others (10.5%), and motor vehicle collisions (8.3%); for children not in care the top five causes were falls (25.0%), motor vehicle collisions (9.4%), other vehicle (9.9%) self–inflicted (8.5%), and poisoning (6.7%). Rates of the top causes of injury hospitalizations for children in care and children not in care are shown in Table 9.2. Of particular note are the much higher rates of hospitalizations for self–inflicted injuries (over 11 times higher for children in care) and violence by others (almost 10 times higher for children in care).

Table 9.2: Table of Crude Injury Hospital Episode Rates per 10,000 for Children In Care and Children Not In Care, 0-17 years, 1998/99-2000/01 and 2001/02-2003/04, Overall Hospitalizations and by Cause

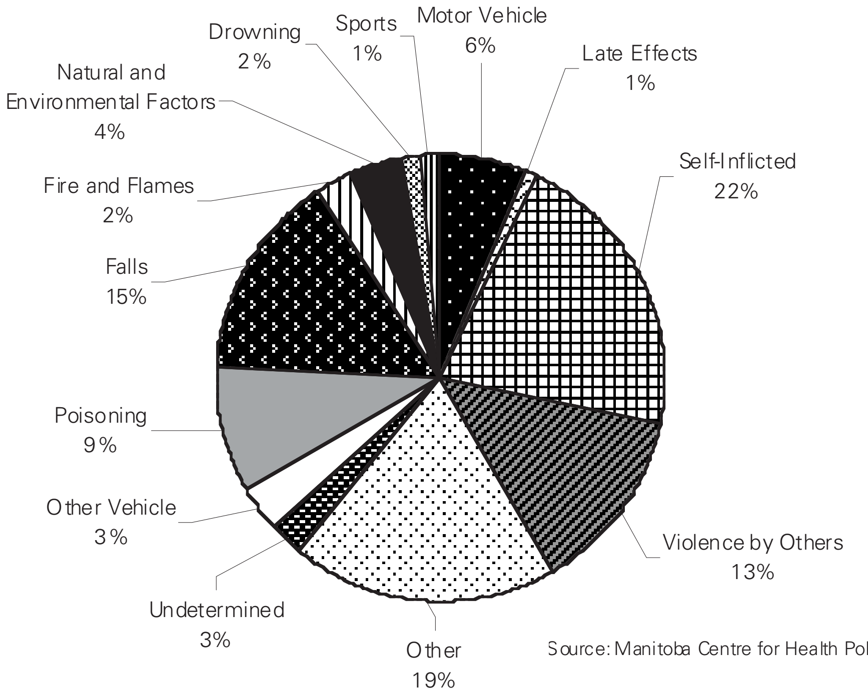
Cause of Hospital Episode	1998/99-2000/01		2001/02-2003/04	
	In care	Not in care	In care	Not in care
All cause injury hospitalizations	214.95	54.90	179.07	47.98
Motor Vehicle	12.91	5.47	14.88	4.53
Late Effects	s	1.12	3.47	0.51
Self-Inflicted	46.02	4.69	45.14	4.09
Violence by Others	28.62	2.14	18.85	1.96
Other	40.97	12.49	28.77	11.06
Undetermined	5.61	0.24	5.46	0.27
Other Vehicle	6.73	4.24	6.94	4.73
Poisoning	19.64	4.00	20.34	3.21
Falls	32.55	13.75	23.31	11.98
Fire and Flames	5.05	1.13	3.47	0.74
Natural and Environmental Factors	8.42	1.72	4.96	1.35
Drowning	3.37	0.38	s	0.24
Suffocation and Choking	0.00	0.61	s	0.56
Sports	s	2.91	s	2.75

Source: Manitoba Centre for Health Policy, 2008

References

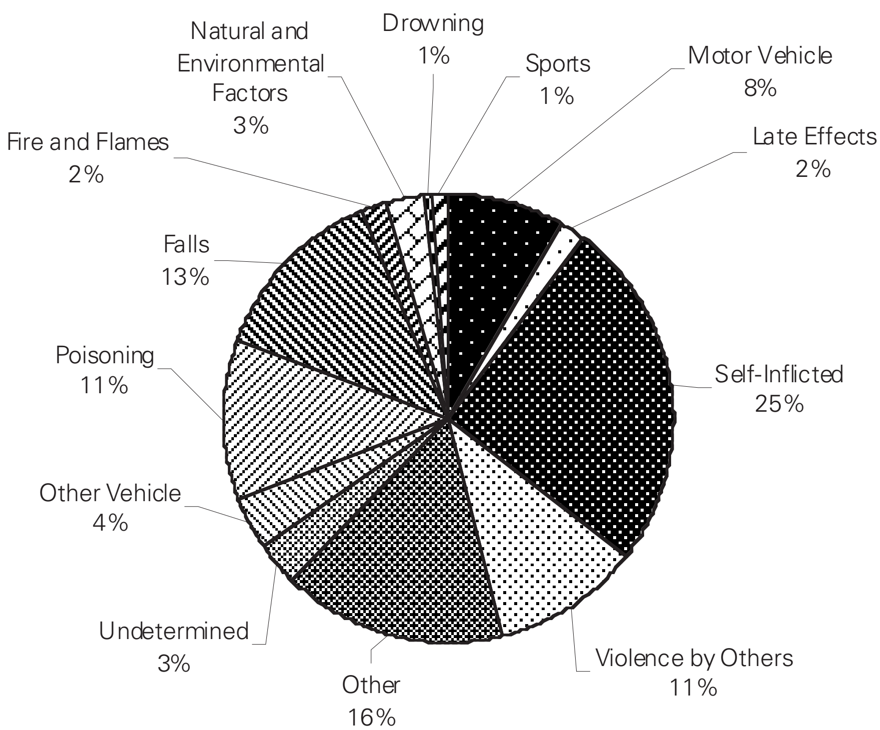
Stevens H. An assessment of CFSIS's coverage of the number of children in care. Report to the Department of Family Services and Housing. 2007. Unpub.

Figure 9.15: Causes of Injury Hospitalizations for Children In Care Aged 0-17 Years, 1998/99-1999/2000



Source: Manitoba Centre for Health Policy, 2008

Figure 9.16: Causes of Injury Hospitalizations for Children In Care Aged 0-17 Years, 2001/02-2002/03



Source: Manitoba Centre for Health Policy, 2008

9.4 Children in Families Receiving Protection/Support Services

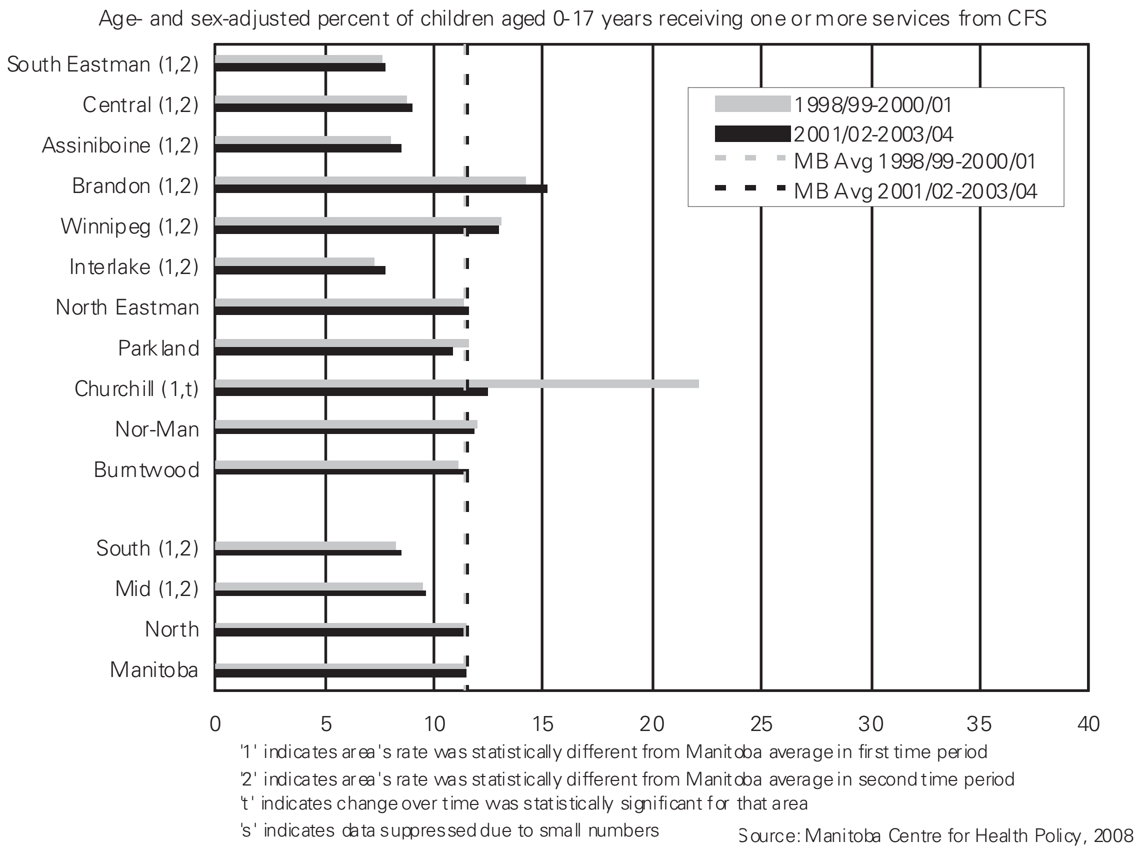
The Child and Family Services Information System (CFSIS) includes information on families receiving protective services. These services are provided, without the removal of the child from the home, when a child is seen as in need of protection because his/her life, health or emotional well–being is endangered. CFSIS also includes information on families receiving support services, which are services that the family requests to aid in the resolution of family matters. While "protection" and "support" are distinct categories of services, in reality these distinctions are often blurred, and so for the purposes of this report, children living in families receiving either of these two categories of service are analyzed together under the category "receiving services from CFS."

For this indicator we examined data for children 0 to 17 years of age in two three–year periods: 1998/99–2000/01 and 2001/02–2003/04.[53] As was the case for children in care, recording of information from Aboriginal Agencies on receipt of services from CFS was poor in the first time period, and better, but still incomplete, in the second time period. It should, therefore, be kept in mind that children in families receiving services from CFS and served by Aboriginal Agencies will be under–counted in this report, particularly in the first time period.

The prevalence of children in families receiving services from CFS remained stable over the study period, at 11.5% in both time 1 and in time 2 (Figure 9.17). In Churchill, the prevalence of children in families receiving CFS decreased significantly over the study period, from 22.1% to 12.4%. The prevalence of children receiving CFS was significantly lower than the Manitoba average in both time periods in four RHAs: South Eastman (7.7%, 7.7%), Central (8.8%, 9.0%), Assiniboine (8.0%, 8.6%) and Interlake (7.2%, 7.8%). The percent of children in families receiving services from CFS was higher than the provincial average in both time periods in Brandon (14.2%, 15.2%) and Winnipeg (13.0%, 12.9%).

[53] Children appearing multiple times in the CFSIS dataset were counted only once per time period.

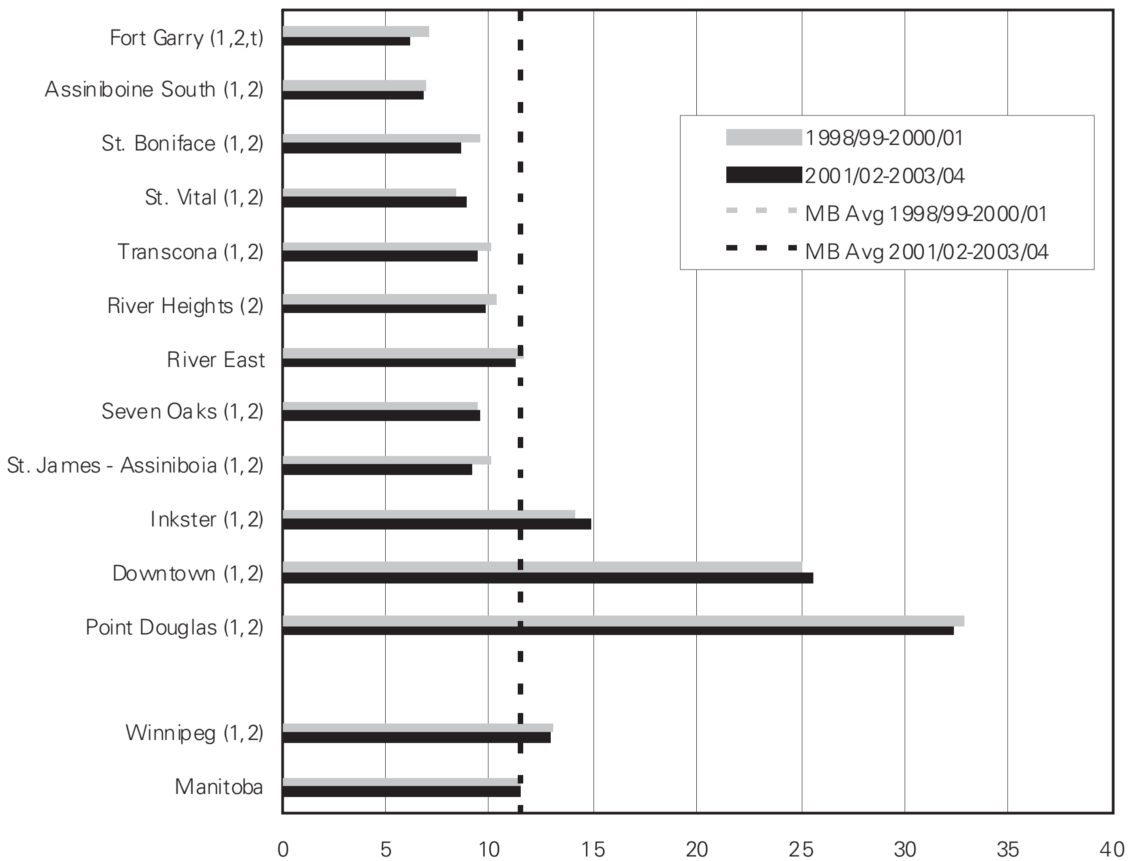
Figure 9.17: Prevalence of Children in Families Receiving Protection/Support Services from CFS by RHA



In the Winnipeg Community Areas, there was a significant decrease over the study period in the prevalence of children in families receiving services from CFS in Fort Garry (7.1% to 6.2%). The prevalence of children in families receiving services from CFS was significantly lower than the provincial average in both time periods in seven Winnipeg CAs: Fort Garry, Assiniboine South, St. Boniface, St. Vital, Transcona, Seven Oaks and St. James Assiniboia. The prevalence was significantly higher than the provincial average in both time periods in three Winnipeg CAs: Inkster (14.2%, 14.9%), Downtown (25.1%, 25.6%) and Point Douglas (32.8%, 32.3%).

Figure 9.18: Prevalence of Children in Families Receiving Protection/Support Services from CFS by Winnipeg Community Area

Age- and sex-adjusted percent of children aged 0-17 years receiving one or more services from CFS



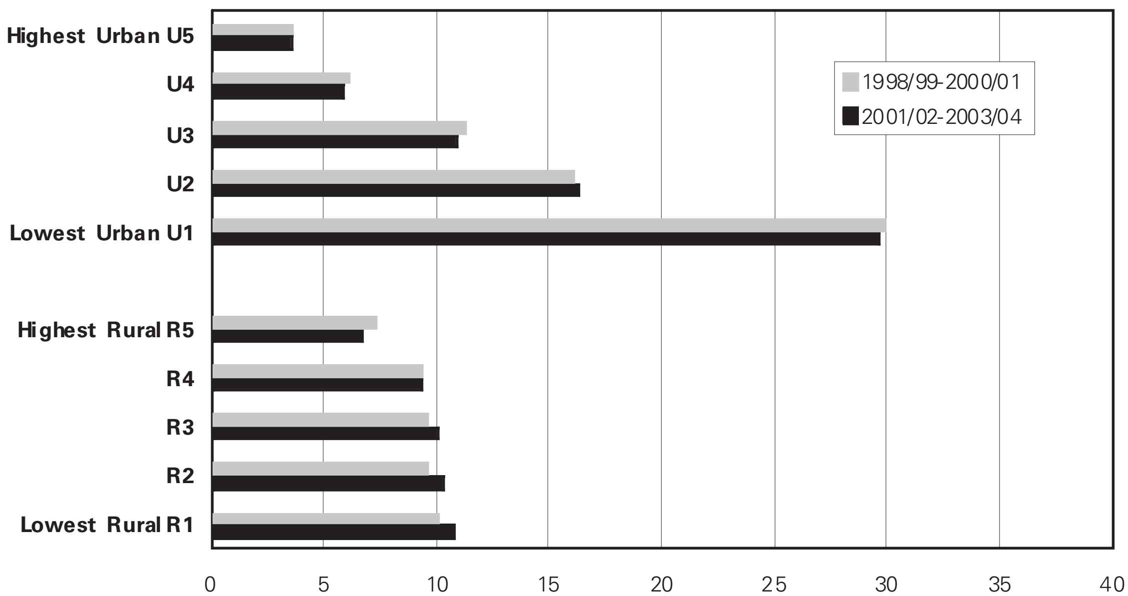
'1' indicates area's rate was statistically different from Manitoba average in first time period
'2' indicates area's rate was statistically different from Manitoba average in second time period
't' indicates change over time was statistically significant for that area
's' indicates data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

For both rural and urban areas in both time periods, there was a significant relationship between area–level income and receipt of services from CFS, with higher levels of CFS in areas with lower incomes. For example, in urban areas in the second time period, the prevalence of children in families receiving services from CFS living in the lowest income quintile neighbourhoods was over eight times higher (29.7%) compared to children living in the highest income quintile neighbourhoods (3.5%). In rural areas in the second time period, the percent of children living in families receiving services from CFS for the lowest income quintile areas was 10.8% compared to 6.6% for those living in the highest income quintile areas. The gradient in rural areas steepened over time, meaning that the differences between the lowest and highest income quintile areas grew larger.

Figure 9.19: Prevalence of Children in Families Receiving Protection/Support Services from CFS by Income Quintile

Age- and sex-adjusted percent of children aged 0-17 years receiving one or more services from CFS



Linear Trend Test Results

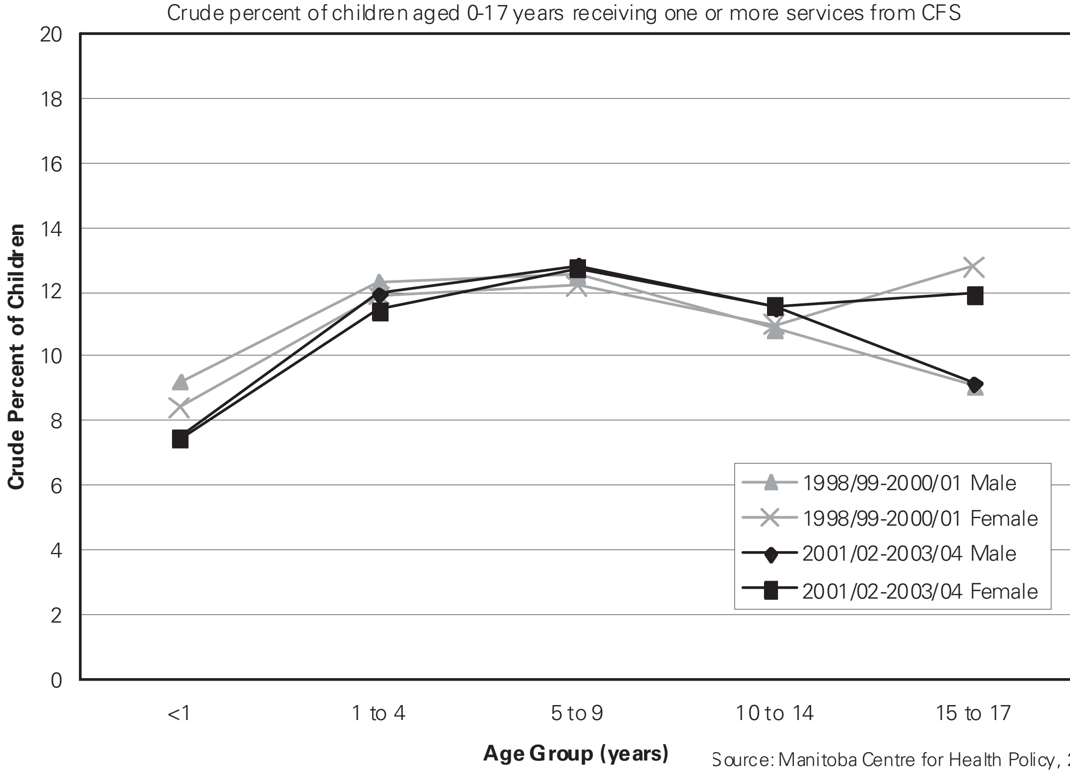
Time 1: Rural: Significant (p<.001) Urban: Significant (p<.001)
Time 2: Rural: Significant (p<.001) Urban: Significant (p<.001)
Rural time change: Significant (p<.01)

Source: Manitoba Centre for Health Policy, 2008

Unlike children in care, the prevalence of children receiving services from CFS tends to be highest in the middle age groups, at a crude prevalence of 12.8% for 5– to 9–year–old children in the second time period, and lowest in infancy, at 7.5%. As was the case with children in care, the prevalence of receipt of CFS is similar for males and females at all ages except for the 15– to 17–year–olds, where females (12.0%) are higher than males (9.2%).

Figure 9.20: Prevalence of Children in Families Receiving Protection/Support Services from CFS by Age Group and Sex, 1998/99-2000/01 and 2001/02-2003/04

Crude percent of children aged 0-17 years receiving one or more services from CFS



Source: Manitoba Centre for Health Policy, 2008

We also looked at hospitalization rates for children in families receiving services from CFS at any time during the time period and found that, although the hospitalization rates were not as high as those found for children in care, they were still higher than those found in the total child population. The crude rate of hospital episodes for children in families receiving CFS, 0 to 17 years of age in 2001/02–2002/03, was 76.0/1,000 whereas for children not receiving CFS it was 36.0/1,000 (see Table 9.3). The crude hospital episode rates for children receiving CFS, by age groups, can be found in the Appendix. The most common causes of hospitalization for children in families receiving services from CFS were similar to those found for children in care: in the second time period, these were respiratory (21.3%), pregnancy and birth complications (15.8%), injury (13.7%) and mental disorders (13.3%). Pie graphs of the causes of hospitalization for children receiving CFS can be found in the Appendix.

Table 9.3: Table of Crude Hospital Episode Rates per 1,000 for Children Receiving CFS and Children Not Receiving CFS, 0-17 years, 1998/99-2000/01 and 2001/02-2003/04, Overall Hospitalizations and by Cause

Cause of Hospital Episode	1998/99-2000/01		2001/02-2003/04	
	In protection	Not in protection	In protection	Not in protection
All cause hospitalizations	91.20	40.56	76.04	36.05
Infectious and Parasitic Diseases	2.20	1.54	1.62	1.07
Diseases of the Genitourinary System	2.47	1.28	1.79	1.19
Complications of Pregnancy, Childbirth and the Puerperium	15.72	1.05	12.02	0.86
Diseases of the Skin and Subcutaneous Tissue	2.16	1.01	1.85	0.78
Diseases of the Musculoskeletal System and Connective Tissue	1.11	0.70	0.93	0.58
Congenital Anomalies	2.07	1.53	1.58	1.56
Certain Conditions Originating in the Perinatal Period	1.29	0.97	0.73	1.07
Symptoms, Signs, and Ill-Defined Conditions	6.67	3.51	5.32	3.17
Fractures, Wounds, and Injuries/Poisoning and Complications/External Causes of Injury & Poisoning	11.15	5.37	10.40	4.76
Factors Influencing Health Status and Contact With Health Services	4.69	2.78	3.06	2.25
Neoplasms	0.54	0.36	0.67	0.33
Endocrine, Nutritional and Metabolic Diseases, and Immunity Disorders	1.51	0.73	1.19	0.72
Diseases of the Blood and Blood-Forming Organs	0.81	0.49	0.69	0.51
Mental Disorders	9.86	1.20	10.14	1.45
Diseases of the Nervous System and Sense Organs	2.31	1.33	2.10	1.02
Diseases of the Circulatory System	0.56	0.31	0.35	0.33
Diseases of the Respiratory System	20.24	12.16	16.18	10.57
Diseases of the Digestive System	5.84	4.25	5.41	3.84

Source: Manitoba Centre for Health Policy, 2008

Injury hospitalization rates are also considerably higher for children receiving CFS compared to children not receiving these services, but not as high as those for children in care. The rate of injury hospitalizations for children receiving CFS was 110.4/10,000 compared to 46.2/10,000 for children not receiving services (recall from Section 9.3 that the rate for children in care was 179.1/10,000). In the second time period, the top five causes of injury hospitalizations (excluding the reason "other") for children receiving CFS were falls (20.4%), self–inflicted (17.0%), violence by others (9.7%), poisoning (8.6%) and motor vehicle collisions (7.6%). Table 9.4 shows the rates of injury hospitalizations by cause for children receiving services from CFS and for children not receiving these services.

Table 9.4: Table of Crude Injury Hospital Episode Rates per 10,000 for Children Receiving CFS and Children Not Receiving CFS 0-17 years, 1998/99-2000/01 and 2001/02-2003/04, Overall Hospitalizations and by Cause

Cause of Hospital Episode	1998/99-2000/01		2001/02-2003/04	
	In protection	Not in protection	In protection	Not in protection
All cause injury hospitalizations	125.54	52.89	110.41	46.25
Motor Vehicle	8.49	5.22	7.62	4.50
Late Effects	2.92	0.95	1.80	0.46
Self-Inflicted	16.60	4.36	17.04	3.98
Violence by Others	9.13	2.01	9.70	1.70
Other	20.28	12.07	18.84	10.68
Undetermined	1.27	0.26	1.52	0.29
Other Vehicle	4.06	4.22	4.99	4.71
Poisoning	8.62	3.80	8.59	3.14
Falls	19.90	13.27	20.36	11.41
Fire and Flames	2.03	1.14	2.35	0.65
Natural and Environmental Factors	3.17	1.69	3.74	1.21
Drowning	0.89	0.39	s	0.24
Suffocation and Choking	s	0.58	0.97	0.51
Sports	2.03	2.93	2.08	2.76

Source: Manitoba Centre for Health Policy, 2008

Chapter 10: Nutrition and Physical Activity

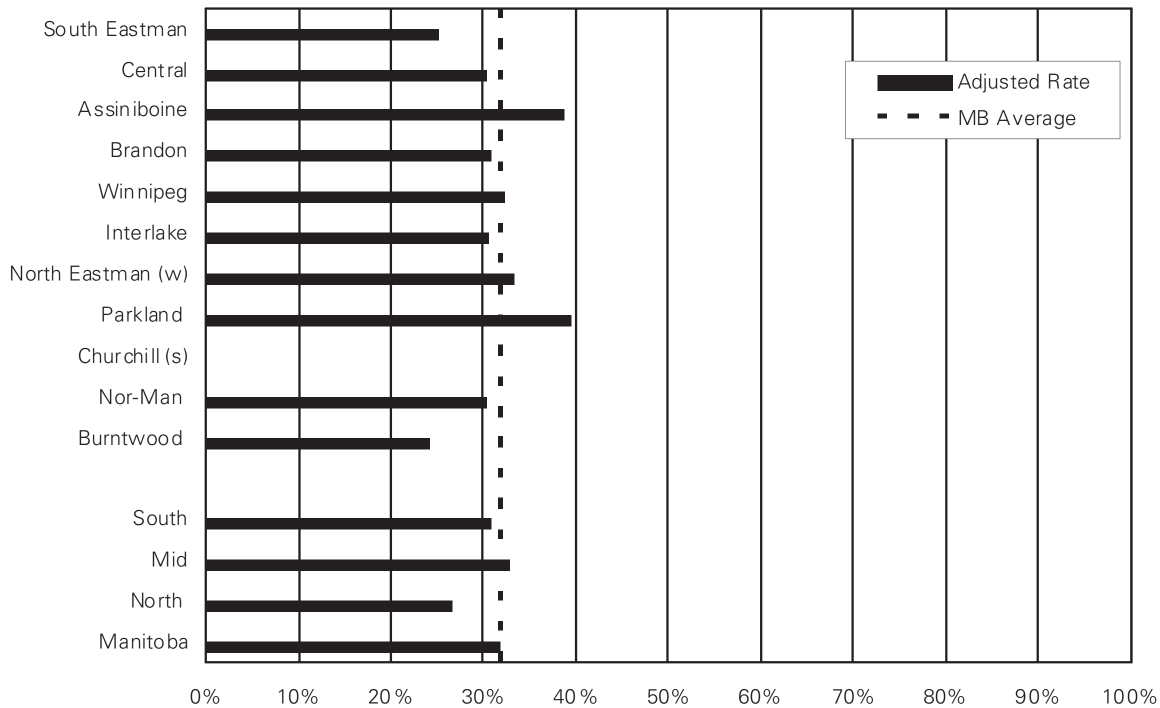
10.1 Nutrition: Fruit and Vegetable Consumption

Information on nutrition comes from three cycles (1.1, 2.1, 2.2) of the Canadian Community Health Survey (CCHS) which sampled children 12–19 years of age. It should be kept in mind that children living in First Nations communities were not part of this survey. Respondents were asked about the number of servings of fruits and vegetables they consumed on a daily basis. Adjustments were made to account for seasonal variations in consumption. Canada's Food Guide recommends that children 9 to 13 years of age consume six servings of fruits and vegetables daily and children 14 to 18 years consume seven servings if they are female and eight servings if they are male (Health Canada, 2007).

After examining frequencies of number of servings of fruits and vegetables, we grouped responses into 0–4 servings and five or more servings per day. The graphs show the percent of respondents who consumed five or more fruit and/or vegetable servings daily. According to a Statistics Canada study, which used the CCHS 2005, 45.8% of 12 to 19–year–olds in Canada ate five or more servings of fruits and vegetables a day, with males at 42.5% and females at 49.3% (Statistics Canada, 2006). As can be seen in Figure 10.1, the rate was lower in Manitoba, with 31.8% of Manitoba children 12–19 years consuming five or more servings of fruits and vegetables daily. Put another way, at least 68% of Manitoba children consumed less than the recommended number of servings of fruits and vegetables daily. Children living in Assiniboine and Parkland RHAs appear to have a higher daily consumption of fruits and vegetables whereas children living in South Eastman and Burntwood appear to have lower consumption, however none of the differences across RHAs were statistically significant. Analyses also revealed no significant differences for males and females in fruit and vegetable consumption (see Appendix).

Figure 10.1: 5+ Daily Servings of Fruits and Vegetables by RHA

Sex-adjusted percent of sample from the CCHS 1.1, 2.1 & 2.2 cycles combined (2001, 2003, & 2004)
Percent of children ages 12-19 who have five or more servings of fruits and vegetables per day



'*' indicates that area's rate is significantly different from the Manitoba average
'w' indicates a warning - rates are highly variable; interpret with caution
's' indicates data suppressed due to small numbers
Total Manitoba sample size = 832

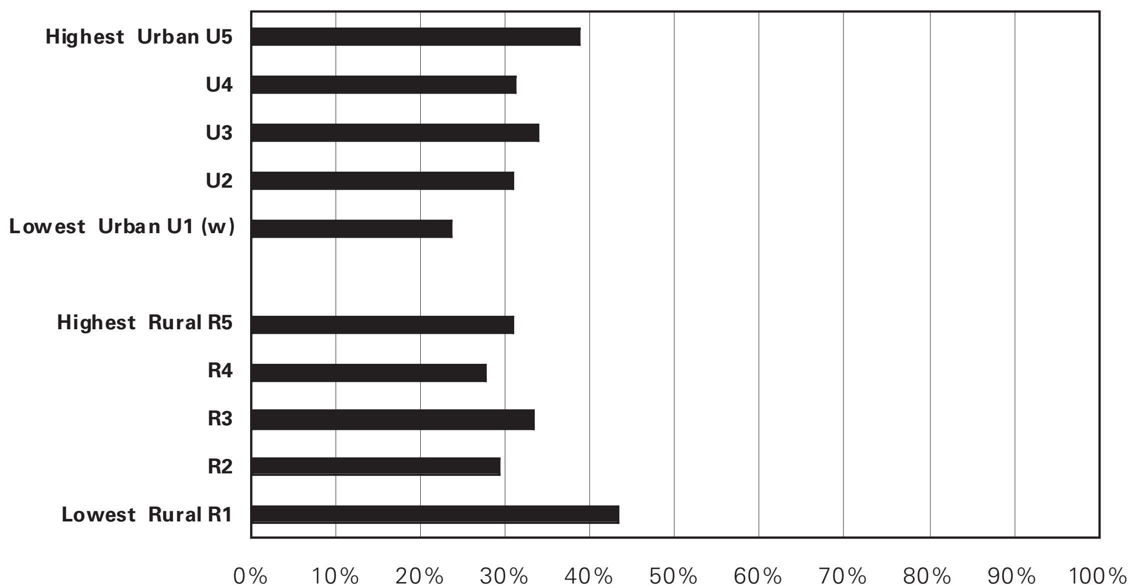
Source: Manitoba Centre for Health Policy, 2008

Across urban income areas, fruit and vegetable consumption appears to increase with increasing income quintile, whereas the opposite is true in rural areas, where fruit and vegetable consumption appears to increase with decreasing income quintile. Once again, however, none of these differences were statistically significant.

Figure 10.2: 5+ Daily Servings of Fruits and Vegetables by Income Quintile

Sex-adjusted percent of sample from the CCHS 1.1, 2.1 & 2.2 cycles combined (2001, 2003, & 2004)

Percent of children ages 12-19 who have five or more servings of fruits and vegetables per day



'*' indicates that area's rate is significantly different from the Manitoba average
'w' indicates a warning - rates are highly variable; interpret with caution
's' indicates data suppressed due to small numbers
Total Manitoba sample size = 832

Source: Manitoba Centre for Health Policy, 2008

References

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Statistics Canada. *CANSIM database 105–0449*. Available from URL: http://cansim2.statcan.ca. Accessed on: January 18, 2008.

10.2 Physical Activity

Information on physical activity comes from four cycles (1.1, 2.1, 2.2, 3.1) of the Canadian Community Health Survey (CCHS) which sampled children 12–19 years of age.[54] It should be kept in mind that children living in First Nations communities were not part of this survey. Respondents were asked about the number of days per week that they were active for at least 60 minutes or more as well as the number of hours per week that they were active in various settings (e.g., class time in school, organized sports or lessons outside of school). Based on a composite score from these questions, which took into consideration the type of physical activities engaged in as well as the duration and frequency of those activities, respondents were divided into three levels of physical activity: active, moderately active, and inactive. The percent of respondents who were considered to be active by RHA is presented in Figure 10.3. Percents of moderately active and inactive respondents are provided in the appendix.

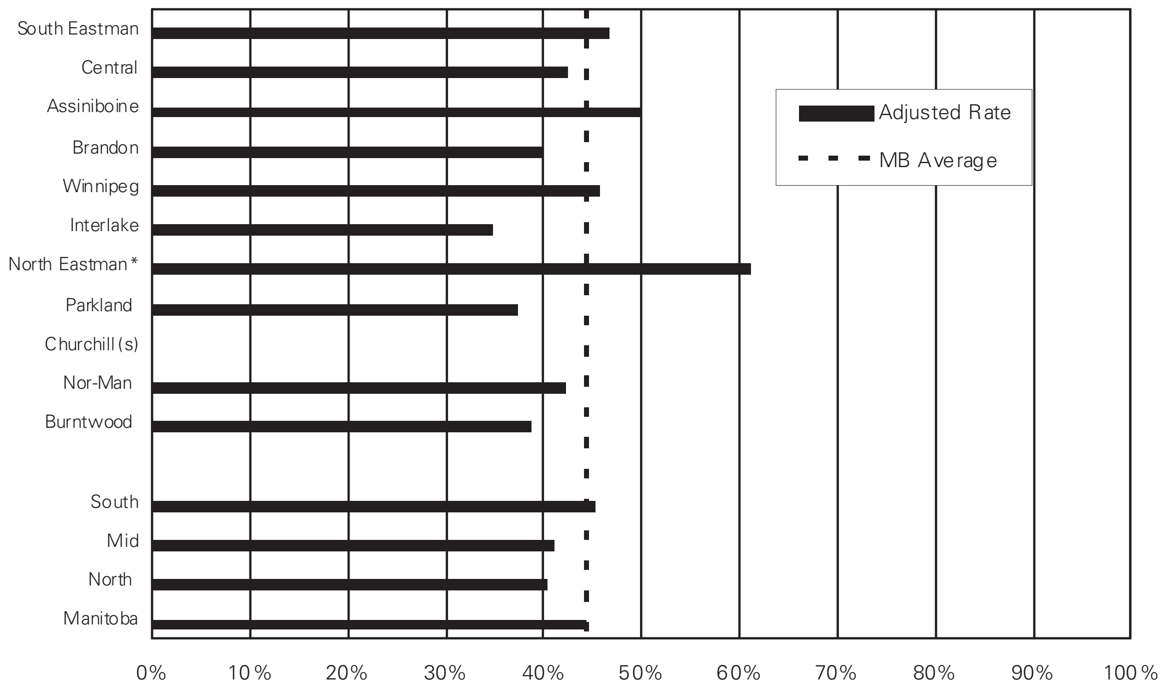
The graph shows that about 44% of Manitoba children who responded to the survey are considered to be active. A significantly higher percentage of children living in North Eastman (61.2%) were considered active compared to children in the rest of the province. National data from the 2004 CCHS indicate that the percentage of Manitoba children who participate in 7 to 13 hours of physical activity a week is similar to the Canadian average (39% for Manitoba, 41% for Canada), whereas a somewhat higher percentage of Manitoba children participate in 14 to 21 hours of physical activity a week compared to the Canadian average (37.6% for Manitoba, 32.4% for Canada) (Statistics Canada, 2008). However, despite having similar physical activity levels to the average for Canadian children and youth, as measured by the number of daily steps taken, Manitoba children and youth fall well short of the daily recommended activity levels (Active Healthy Kids Canada, 2008).

[54] Although cycle 2.2 also sampled younger children, the numbers of children at this age were too small for statistical analyses, so only the 12– to 19–year–old respondents from this cycle were included.

Figure 10.3: Percent of Children Who Are Active Based On The Total Daily Expenditure Values by RHA

Sex-adjusted percent of sample from the CCHS 1.1, 2.1, 2.2 & 3.1 cycles combined (2001, 2003, 2004 & 2005)

Children ages 12-19



'*' indicates that area's rate is significantly different from the Manitoba average

'w' indicates a warning - rates are highly variable; interpret with caution

's' indicates data suppressed due to small numbers

Total Manitoba sample size = 1387

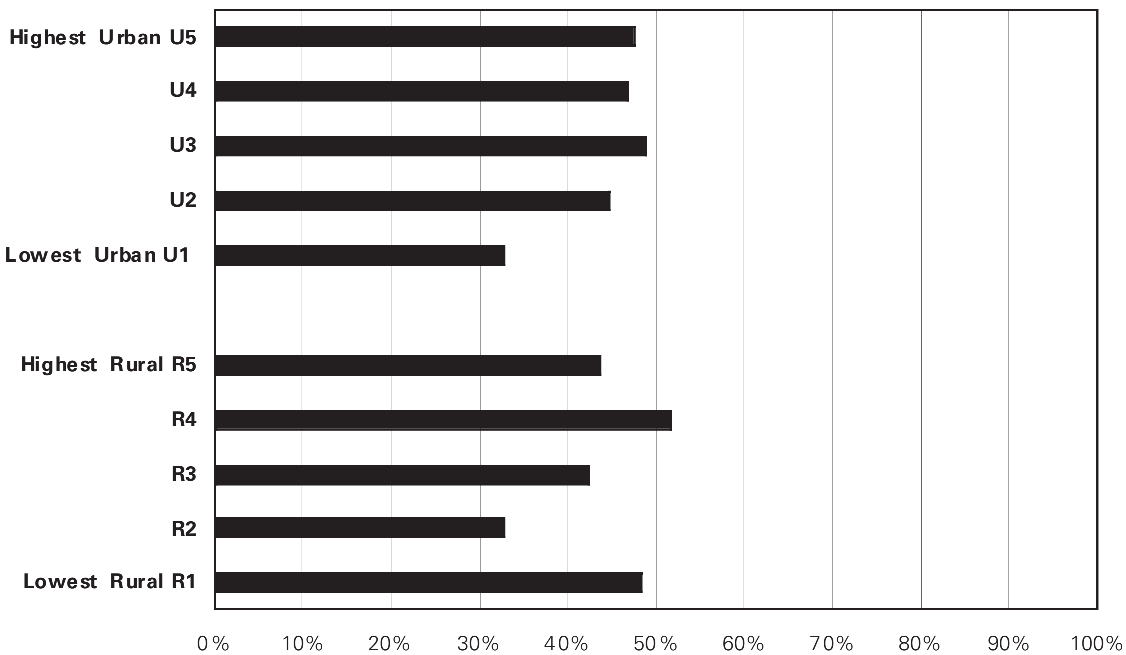
Source: Manitoba Centre for Health Policy, 2008

There were no significant differences across income quintiles in either urban or rural areas in the percent of children who were considered physically active. Graphs of the percent of respondents who were considered moderately active and inactive are provided in the Appendix. The only statistically significant difference was found for the percent of respondents considered inactive where 47.7% of respondents from the lowest urban income quintile neighbourhoods were inactive. This is significantly higher than the percents for other urban income quintiles (e.g., 23.6% of the respondents in the middle income quintile neighbourhoods were inactive).

Males (53.7%) were significantly more likely to be considered active than females (34.5%).

Figure 10.4: Percent of Children Who Are Active Based On The Total Daily Expenditure Values by Income Quintile

Sex-adjusted percent of sample from the CCHS 1.1, 2.1, 2.2 & 3.1 cycles combined (2001, 2003, 2004 & 2005)
Children ages 12-19



'*' indicates that area's rate is significantly different from the Manitoba average
'w' indicates a warning - rates are highly variable; interpret with caution
's' indicates data suppressed due to small numbers
Total Manitoba sample size = 1387

Source: Manitoba Centre for Health Policy, 2008

References

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10.3 Body Mass Index (BMI) and Obesity/Overweight

Information on obesity and overweight is derived from the height and weight measurements from four cycles (1.1, 2.1, 2.2, 3.1) of the Canadian Community Health Survey (CCHS), which sampled children 12–19 years of age.[55] For each child, the **Body Mass Index (BMI)** was calculated by taking the weight in kilograms and dividing by the square of the height in meters. For adults, a BMI of 25 to 29.9 is considered "overweight" and a BMI of 30 or more is considered "obese", however these values are not necessarily appropriate for children because BMI varies considerably with age. For many years, age– and sex–specific percentiles based on the National Health and Nutrition Examination Survey were used to determine overweight (85th percentile) and obesity (95th percentile) in children (Himes and Dietz, 1994; Hedley et al., 2004). These percentiles have been criticized as being arbitrary and their use internationally has been questioned given they are based solely on American children (Cole et al., 2000). The International Obesity Task Force recommended converting adult cut–offs using age– and sex–specific centiles from large nationally representative surveys from six countries[56] to form child–specific BMI cut–offs for overweight and obese (Cole et al., 2000). These cut–offs were used in our calculations. It should be kept in mind that children living in First Nations communities were not part of the CCHS survey. It should also be noted that the height and weight measurements were self–reported and thus may not necessarily be accurate (Shields, 2006).

The overall rate of obesity for Manitoba children aged 12 to 19 years was 6.6% (Figure 10.5). The obesity rates were too unstable for regional comparisons, so the figure in this section shows rates of obesity and overweight combined (for crude rates of normal/underweight, overweight and obese by RHA, see the appendix). Almost one quarter (23.7%) of Manitoba children aged 12 to 19 years were overweight or obese. This is slightly lower than the national rate for 12 to 17 year–old children of 28.8% from the most recent cycle of the CCHS (Statistics Canada, 2006). There was some regional variation with Burntwood (34.8%) RHA and the North aggregate region having significantly higher overweight/obesity rates than the Manitoba average. Boys had significantly higher overweight/obesity rates than girls, at 27.3% and 19.9% respectively. The national figures also show higher rates for boys (34.1%) than girls (23.1%, use with caution) (Statistics Canada, 2006).

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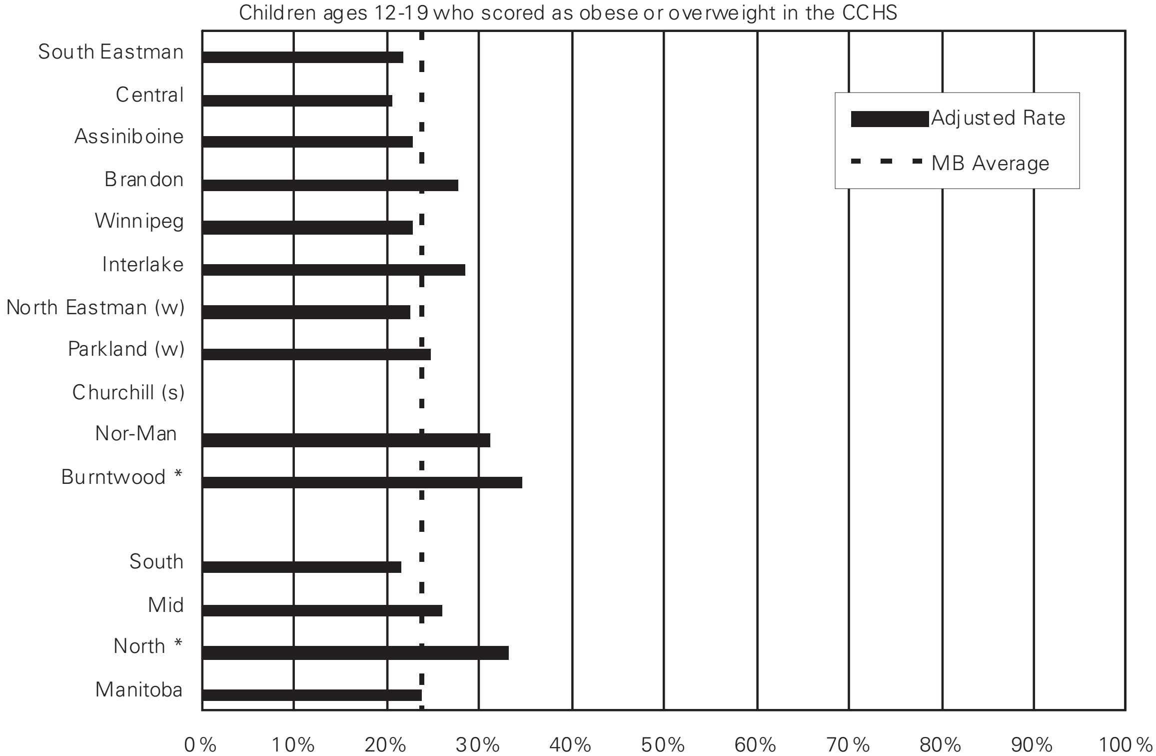
[55] Although cycle 2.2 also sampled younger children, the numbers of children at this age were too small for statistical analyses, so only the 12– to 19–year–old respondents from this cycle were included.

[56] The datasets came from the following six countries: Brazil, Great Britain, Hong Kong, the Netherlands, Singapore and the United States. Datasets from six other countries, including Canada, were considered, but were not included because they were either too small or not nationally representative. It should be noted that the centile curve for females in the Canadian dataset was considered an outlier during pre–puberty and puberty, showing a higher pattern of overweight between 6 and 16 years compared to the other countries (Cole et al., 2000).

Figure 10.5: Obese or Overweight Rates by RHA

Sex-adjusted percent of sample from the CCHS 1.1, 2.1, 2.2 & 3.1 cycles combined (2001, 2003, 2004 & 2005)
Children ages 12-19 who scored as obese or overweight in the CCHS



'*' indicates that area's rate is significantly different from the Manitoba average
'w' indicates a warning - rates are highly variable; interpret with caution
's' indicates data suppressed due to small numbers
Total Manitoba sample size = 815

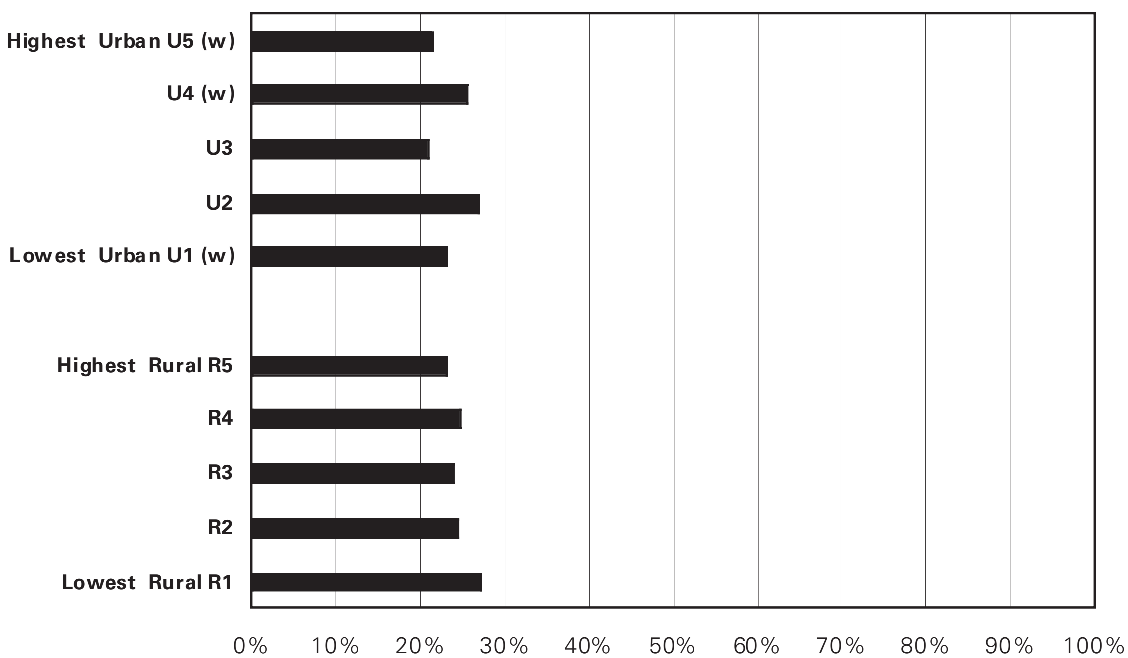
Source: Manitoba Centre for Health Policy, 2008

It is interesting to note that a recent report on the weight status of Manitoba children found rates of overweight and obesity that were considerably higher than those reported here (Manitoba Health and Healthy Living, 2007). Based on the CCHS cycle 2.2, the Manitoba Health and Healthy Living report found that 36.0% of adolescents 12 to 17 years of age were either overweight or obese, compared to the 23.7% we found using four cycles of the CCHS. Is this difference due to large increases in BMI in more recent years? Likely not. The difference seems to be driven by the way BMI is measured in each of the surveys. In cycle 2.2, about two–thirds of the BMI measurements collected were directly measured (i.e., an interviewer took height and weight measurements in order to calculate the BMI), whereas in cycles 1.1, 2.1 and 3.1 the measures were self–reported (i.e., the respondent reported their height and weight and BMI was then calculated). Other research has demonstrated that self–reported measurements yield overestimates of height and underestimates of weight, resulting in underestimating BMI (Shields, 2006). To explore this we looked at the percent of 12– to 19–year–old respondents who were classified as overweight/obese, broken down by the four CCHS cycles. Estimates of overweight/obese were markedly higher for cycle 2.2 than for the other cycles. For example, using only cycle 2.2 (which calculates BMI from directly measured height and weight), 32.5% of Manitoba respondents 12 to 19 years were categorized as overweight/obese, but in the very next year, cycle 3.1 (which calculates BMI from self–reported height and weight) found that only 19.8% of the respondents were classified as overweight/obese. Differences between directly measured and self–reported BMIs were greater for females compared to males. A table of the overweight/obese findings by CCHS cycles and by sex can be found in the Appendix.

There were no significant differences in rates across income quintiles in either urban or rural areas.

Figure 10.6: Obese or Overweight Rates by Income Quintile

Sex-adjusted percent of sample from the CCHS 1.1, 2.1, 2.2 & 3.1 cycles combined (2001, 2003, 2004 & 2005)
Children ages 12-19 who scored as obese or overweight in the CCHS



'*' indicates that area's rate is significantly different from the Manitoba average
'w' indicates a warning - rates are highly variable; interpret with caution
's' indicates data suppressed due to small numbers
Total Manitoba sample size = 815 Source: Manitoba Centre for Health Policy, 2008

Perhaps not surprisingly, Canadian research has found that overweight and obesity rates are strongly related to nutritional intake and leisure time activities. Specifically, children and adolescents who consume fruits and vegetables 5 or more times a day are much less likely to be overweight or obese than those who consume fewer fruits and vegetables, and the likelihood of being overweight or obese increases in children and adolescents as their time spent watching TV, playing video games or using computers rises (Shields, 2006).

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10.4 Exposure to Second–Hand Smoke

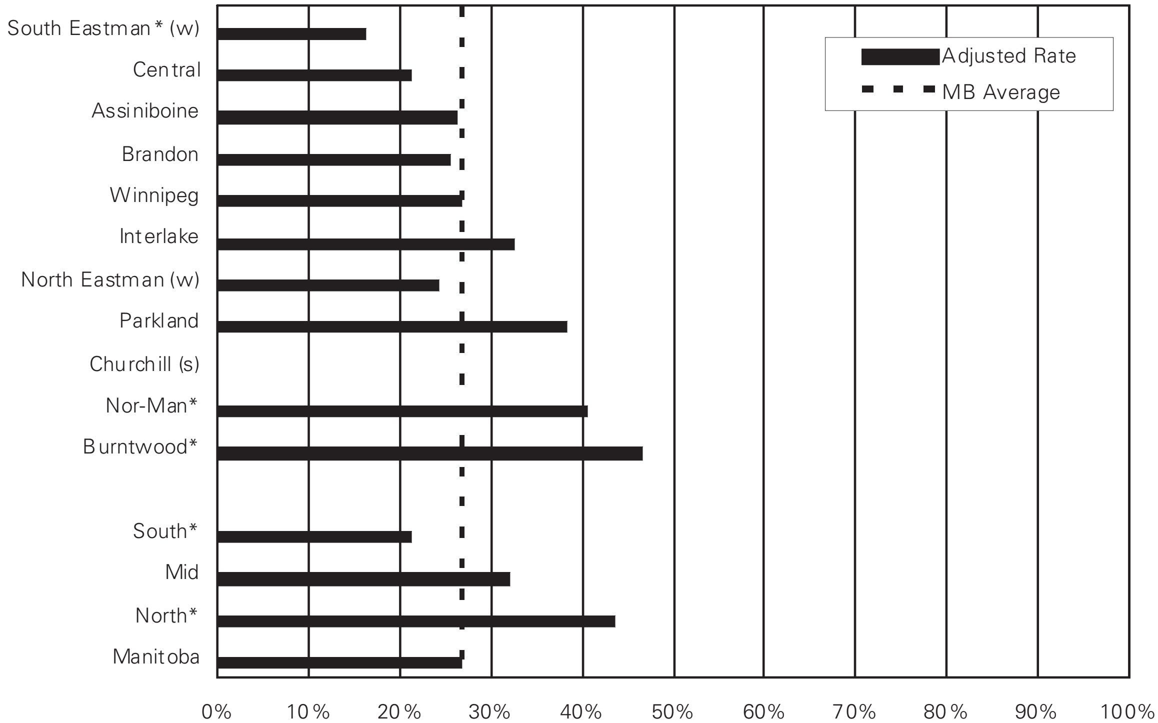
Exposure to second–hand smoke can have deleterious effects on health, and children are particularly vulnerable to the negative effects of this exposure (DiFranza and Lew, 1996; U.S. Department of Health and Human Services, 2006). Childhood second–hand smoke exposure has been linked to sudden infant death syndrome (Anderson and Cook, 1997; Gordon et al., 2002; McMartin et al., 2002), respiratory illnesses including asthma (Blizzard et al., 2003; Gergen et al., 1998; Mannino et al., 2002; Sturm et al., 2004; U.S. Department of Health and Human Services, 2006) and middle ear disease (Adair–Bischoff and Sauve, 1998). Information on exposure of Manitoba children to second–hand smoke was taken from three cycles (1.1, 2.1, 3.1) of the Canadian Community Health Survey (CCHS), which sampled children 12 to 19 years of age. Respondents were asked about regular exposure to smoke inside the home.[57] It should be kept in mind that children living in First Nations communities were not part of the CCHS survey.

The overall rate of exposure to second–hand smoke by Manitoba children age 12 to 19 years in 2001, 2003 and 2005 was 26.8% (Figure 10.7), somewhat higher than the national rate reported for 2005 of 21.3% (Statistics Canada, 2006). The Manitoba rate of children exposed to second–hand smoke appears to have dropped considerably since the first MCHP Child Health Report, which found 41% of Manitoba children exposed (Brownell et al., 2001). The regional variation in exposure to second–hand smoke suggests a relationship between this indicator and general health of the population: as PMR increases (as indicated by the ordering of the RHAs on the graph from top to bottom), so does the rate of second–hand smoke exposure. South Eastman RHA (16.2%, use with caution) had significantly lower rates of second–hand smoke exposure in children compared to the Manitoba average, whereas Nor–Man (40.5%) and Burntwood (46.7%) had significantly higher rates.

[57] As with other indicators in this report using the CCHS, three cycles (1.1, 2.1 and 3.1) of the survey were used for this indicator. The wording in cycle 1.1 differed slightly from the other two cycles. In cycle 1.1, respondents were asked "Does anyone in this household smoke regularly inside the house?" whereas in cycles 2.1 and 3.1 the questions was worded "Including both household members and regular visitors, does anyone smoke inside your home, every day or almost every day?"

Figure 10.7: Second-Hand Smoke Exposure at Home Ages 12-19 by RHA

Sex-adjusted percent of sample from the CCHS 1.1, 2.1 & 3.1 cycles combined (2001, 2003, & 2005)



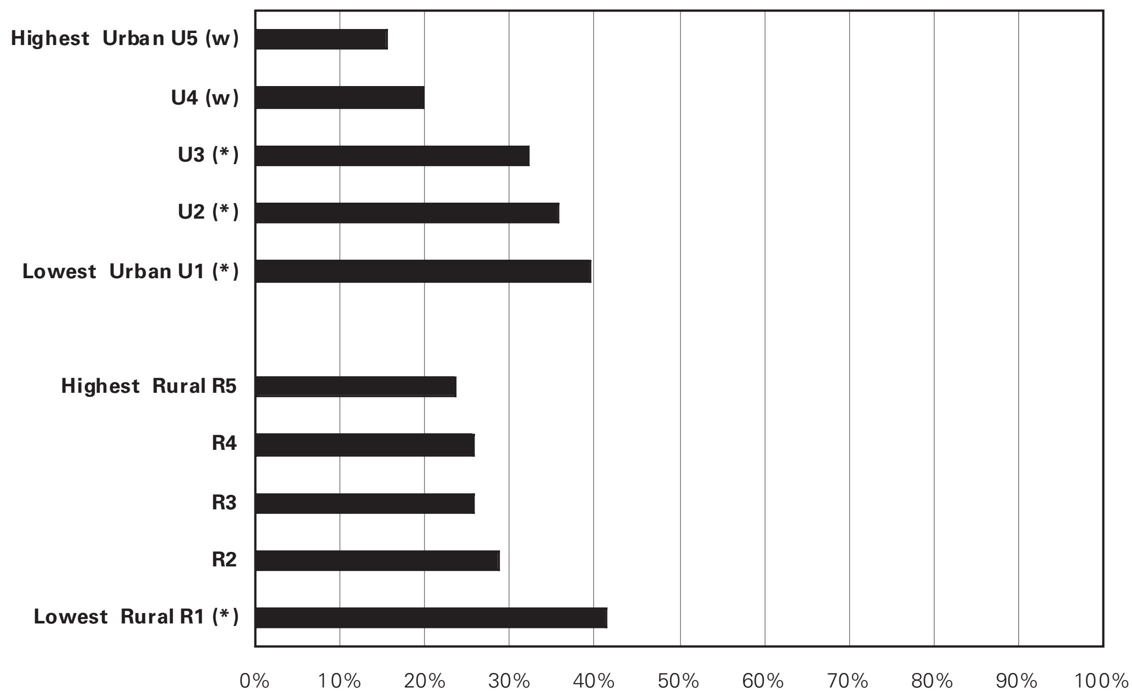
'*' indicates that area's rate is significantly different from the Manitoba average
'w' indicates a warning - rates are highly variable; interpret with caution
's' indicates data suppressed due to small numbers
Total Manitoba sample size = 811

Source: Manitoba Centre for Health Policy, 2008

The graph of second–hand smoke exposure by area–level income suggests that for both urban and rural areas, as income decreases the percent of children exposed increases. Statistically significant differences from the Manitoba average were found for the lowest rural income quintile (R1) and for the three lowest urban income quintiles (U1 through U3), with higher rates of second–hand smoke exposure in the home than average.

Figure 10.8: Second-Hand Smoke Exposure Rates for Ages 12-19 by Income Quintile

Sex-adjusted percent of sample from the CCHS 1.1, 2.1 & 3.1 cycles combined (2001, 2003, & 2005)



'*' indicates that area's rate is significantly different from the Manitoba average
'w' indicates a warning - rates are highly variable; interpret with caution
's' indicates data suppressed due to small numbers
Total Manitoba sample size = 811

Source: Manitoba Centre for Health Policy, 2008

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Chapter 11: Adolescent Health and Reproductive Health

11.1 Adolescent Smoking Rates

The short– and long–term health consequences associated with smoking are well known. Because most smokers begin smoking when they are in adolescence, there have been numerous campaigns aimed at discouraging teens from taking up the habit. A recent study from Statistics Canada, based on the Canadian Community Health Survey (CCHS), suggests that these efforts may be having an impact: between 1994 and 2003 the percentage of Canadians aged 12 years or over who smoked on a daily basis dropped from 29.3% to 22.9%, with some of the largest declines found in teenagers (Statistics Canada, 2004). For example, for girls aged 15 to 19 years, daily smoking dropped from 18.9% in 2000/01 to 13.6% in 2003.

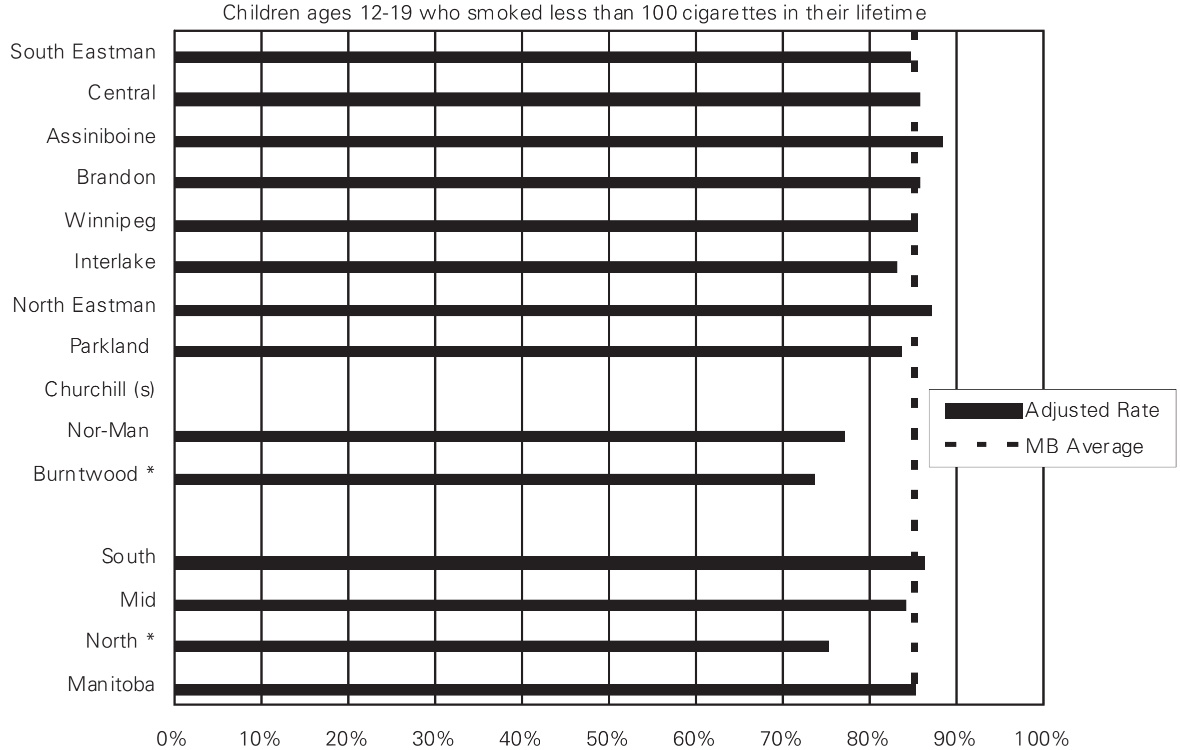
Information on **adolescent smoking** in the current report comes from four cycles (1.1, 2.1, 2.2, 3.1) of the CCHS which sampled children 12–19 years of age.[58] Respondents were asked about the number of cigarettes they had smoked in their lifetime, and responses were categorized into "never smoked a whole cigarette", "smoked at least 1 but less than 100 cigarettes", and "smoked 100 or more cigarettes". Because we didn't want to consider teens who had smoked only a few cigarettes in their lifetime as "smokers", we divided these categories into "smoked 100 or more cigarettes in lifetime" and "smoked less than 100 cigarettes in lifetime", the latter category including both non–smokers and those who hadn't smoked very much. It should be kept in mind that children living in First Nations communities were not part of the CCHS survey.

Almost 15% of Manitoba teens 12 to 19 years of age had smoked 100 or more cigarettes (Figure 11.1). Because the numbers of teens in this category were quite low, rates for several RHAs were highly variable; for this reason, we present the rates of Manitoba teens who smoked less than 100 cigarettes in their lifetime (rates of teens who smoked 100 or more cigarettes can be found in the Appendix). Just over 85% of Manitoba teens had never smoked or smoked less than 100 cigarettes. There was little variation across RHAs with the exception of Burntwood where there were significantly fewer teens (73.8%) in this category. Almost 87% of males had never smoked or smoked less than 100 cigarettes compared to 83.5% of females; this sex difference was not statistically significant.

[58] Although cycle 2.2 also sampled younger children, the numbers of children at this age were too small for statistical analyses, so only the 12– to 19–year–old respondents from this cycle were included.

Figure 11.1: Non-Smoker Rates by RHA

Sex-adjusted percent of sample from the CCHS 1.1, 2.1, 2.2 & 3.1 cycles combined (2001, 2003, 2004 & 2005)
Children ages 12-19 who smoked less than 100 cigarettes in their lifetime



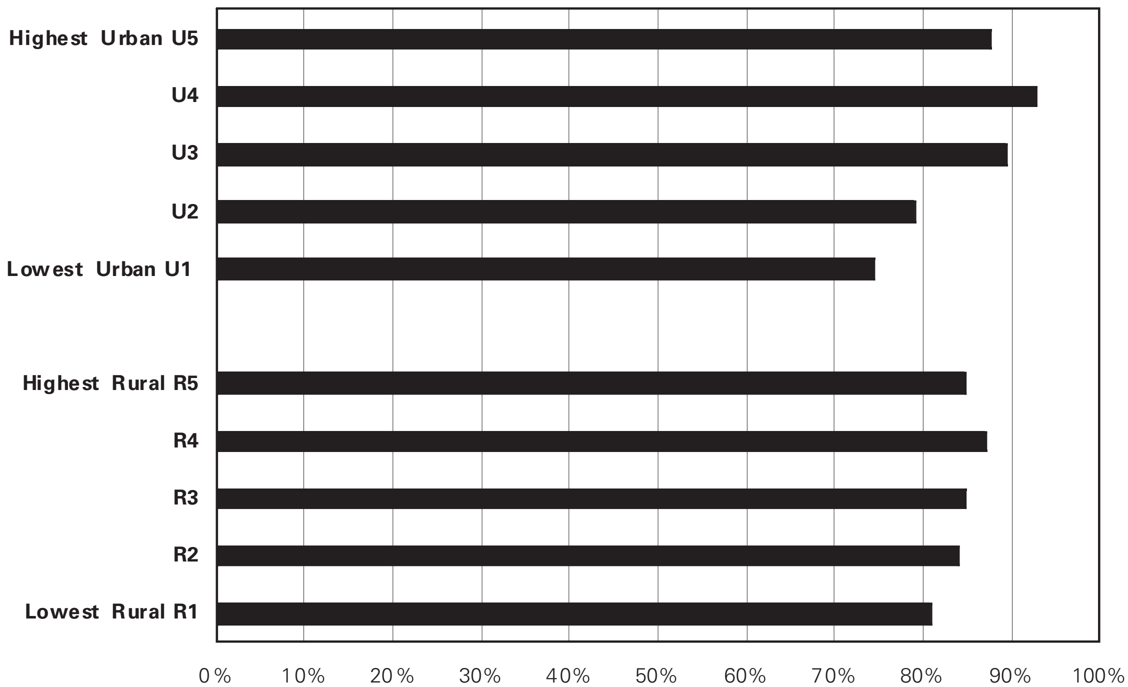
'*' indicates that area's rate is significantly different from the Manitoba average
'w' indicates a warning - rates are highly variable; interpret with caution
's' indicates data suppressed due to small numbers
Total Manitoba sample size = 2851

Source: Manitoba Centre for Health Policy, 2008

Although there appeared to be a gradient across income quintiles in both urban and rural areas in rates of teens who had never smoked or had smoked less than 100 cigarettes, the trends were not statistically significant.

Figure 11.2: Non-Smoker Rates by Income Quintile

Sex-adjusted percent of sample from the CCHS 1.1, 2.1, 2.2 & 3.1 cycles combined (2001, 2003, 2004 & 2005)
Children ages 12-19 who smoked less than 100 cigarettes in their lifetime



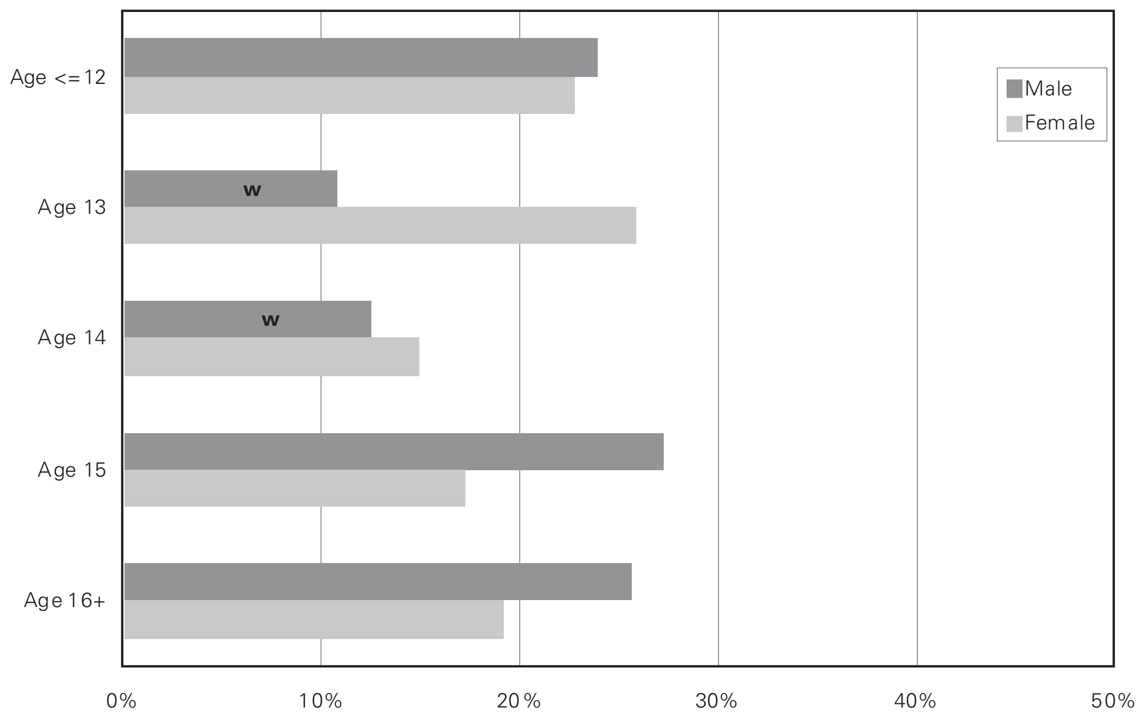
'*' indicates that area's rate is significantly different from the Manitoba average
'w' indicates a warning - rates are highly variable; interpret with caution
's' indicates data suppressed due to small numbers
Total Manitoba sample size = 2851

Source: Manitoba Centre for Health Policy, 2008

We were also able to examine the average age at first cigarette for those respondents who indicated that they smoked. Just over 23% of Manitoba youths aged 12 to 19 years who responded that they had smoked at least one cigarette began smoking at the age of 12 years or younger, and 55% (23.3 + 18.1 + 13.7) of them had smoked by the time they were 14 years of age. This percent is slightly lower than the 60.1% of respondents across Canada in 2003, who claimed they initiated smoking between 5 and 14 years of age (Statistics Canada, 2007). Children living in the Mid and Northern regions of the province appear to initiate smoking earlier, with 32.9% of respondents from the Mid regions and 47.6% of the respondents in the North regions reporting that they had initiated smoking at 12 years of age or younger (see Appendix for regional results). The average age of smoking initiation for Manitoba youths who indicated that they had smoked at least one cigarette was almost 14 years (13.9 years), with residents of Burntwood having a significantly younger age at smoking initiation (12.8 years) (Figure 11.4). There were no significant differences for age at smoking initiation between males and females or across urban or rural income quintiles.

Figure 11.3: Teen Smoking - Age at First Whole Cigarette by Age and Sex

Percentage of sample from the CCHS 1.1, 2.1, & 3.1 cycles combined (2001, 2003, & 2005)
Child smokers ages 12-19

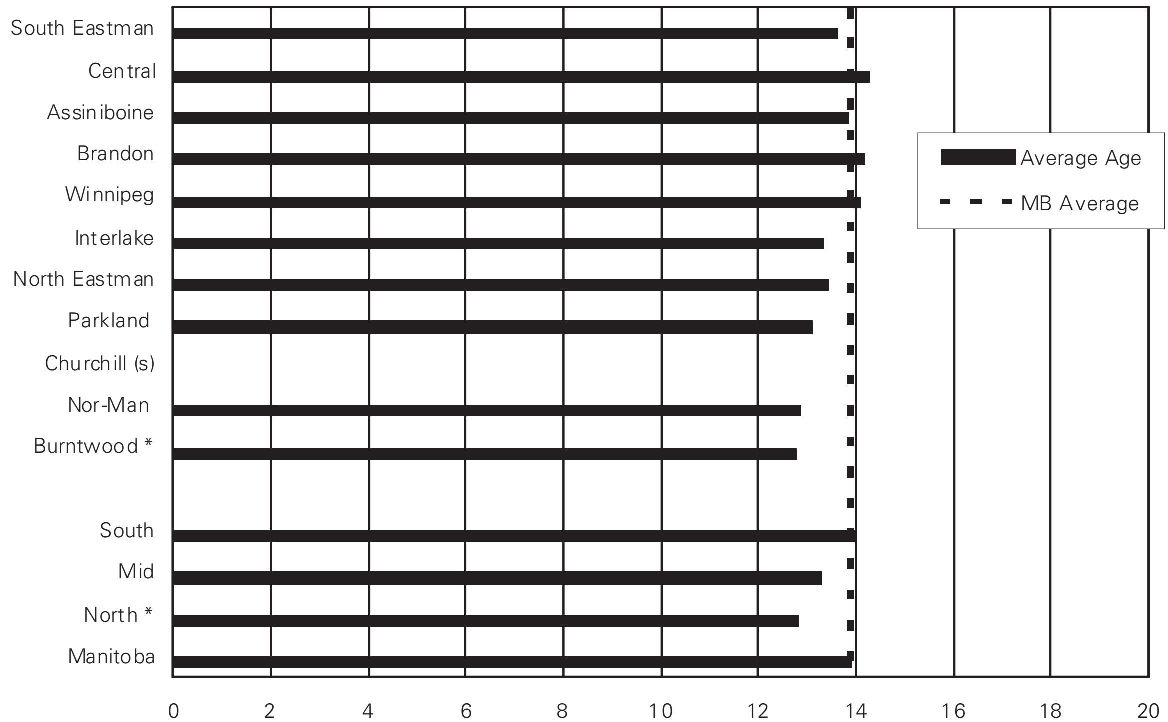


'*' indicates that area's rate is significantly different from the Manitoba average
'w' indicates a warning - rates are highly variable; interpret with caution
's' indicates data suppressed due to small numbers
Total Manitoba sample size = 802

Source: Manitoba Centre for Health Policy, 2008

Figure 11.4: Teen Smoking - Age at First Whole Cigarette by RHA

Crude rate of sample from the CCHS 1.1, 2.1, & 3.1 cycles combined (2001, 2003, & 2005)
Child smokers ages 12-19



'*' indicates that area's rate is significantly different from the Manitoba average
'w' indicates a warning - rates are highly variable; interpret with caution
's' indicates data suppressed due to small numbers
Total Manitoba sample size = 802

Source: Manitoba Centre for Health Policy, 2008

References

Statistics Canada. *Canadian Community Health Survey, 2004*. Available from URL: http://www.statcan.ca/Daily/English/040615/d040615b.htm. Accessed on: August 21, 2007.

Statistics Canada. *CANSIM database 105–0252.* Available from URL: http://cansim2.statcan.ca. Accessed on: January 18, 2008.

11.2 Adolescent Drinking Rates

There is a great deal of research about the effects of alcohol consumption, particularly excessive consumption, on adult health. Adolescent alcohol consumption tends to be discussed more in terms of social effects as excessive consumption is linked to vandalism, violence, traffic offences and school absenteeism (Pavis et al., 1997). Also of concern is the increased risk of unprotected intercourse and potential pregnancy associated with teen alcohol consumption (Coyle et al, 2001; Deardorff et al, 2005) which together would carry risks of fetal alcohol spectrum disorders if the alcohol consumption continued and the pregnancy was carried to term.

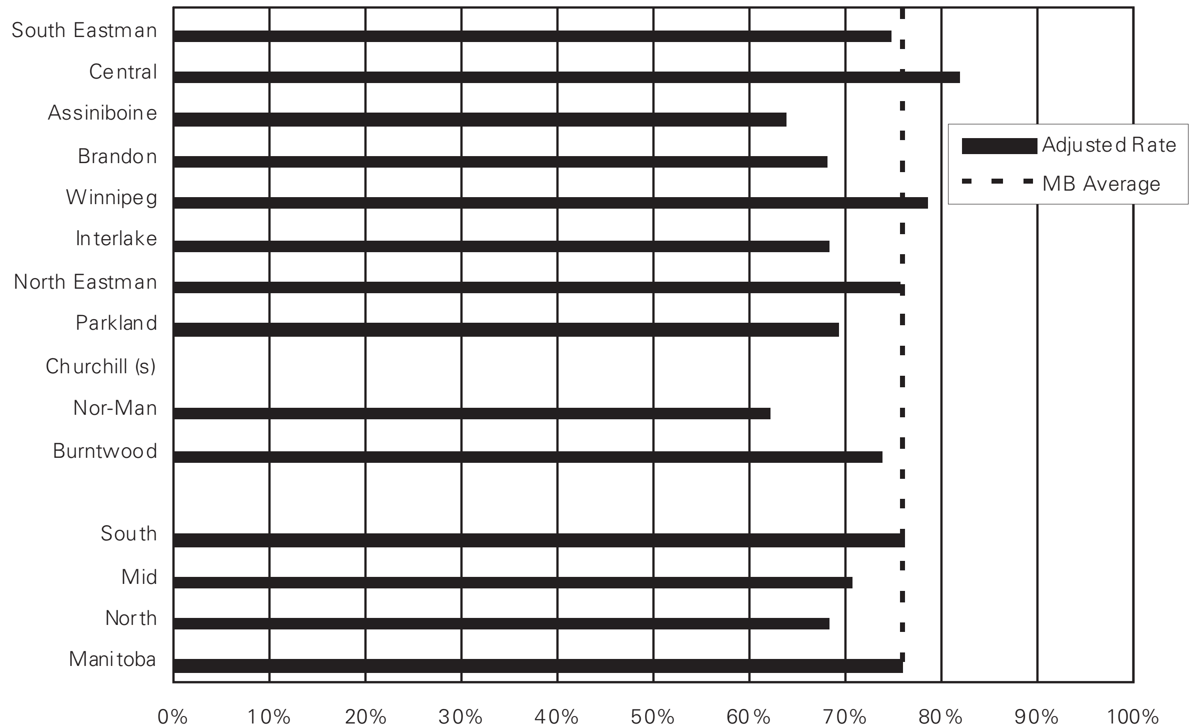
Information on alcohol consumption in Manitoba teens was taken from four cycles of the Canadian Community Health Survey (CCHS) (1.1, 2.1, 2.2, 3.1) which sampled children 12 to 19 years of age.[59] We divided respondents into two age groups for analysis: 12 to 15 years and 16 to 19 years. For the younger age group, we categorized respondents into those who had consumed alcohol in the past 12 months and those who had not. For the older age group we used the same two categories, however for those respondents who indicated that they had consumed alcohol in the past 12 months, we further categorized them according to volume: less than one drink per week and one or more drinks per week.

For Manitoba teens in the 12– to 15–year–old group, 24.1% had consumed alcohol in the past 12 months (Figure 11.5). Because the rates of non–consumers were higher than the rates of consumers, the figure displays the rates of those who had NOT consumed alcohol in the past year (the graph with rates of those who had consumed alcohol can be found in the Appendix). Some regional variation is evident, however none of the rates for the RHAs were statistically different from the provincial average. There were no significant differences in rates of young teens who had not consumed alcohol by urban or rural income quintiles (the income graph can be found in the Appendix).

[59] Although cycle 2.2 also sampled younger children, the numbers of children at this age were too small for statistical analyses, so only the 12– to 19–year–old respondents from this cycle were included.

Figure 11.5: Younger Adolescents Who Did Not Consume Alcohol in the Past Year Rates by RHA

Sex-adjusted percent of sample from the CCHS 1.1, 2.1 2.2 & 3.1 cycles combined (2001, 2003, 2004 & 2005)
Adolescents ages 12-15 who did not drink alcohol in the past 12 months

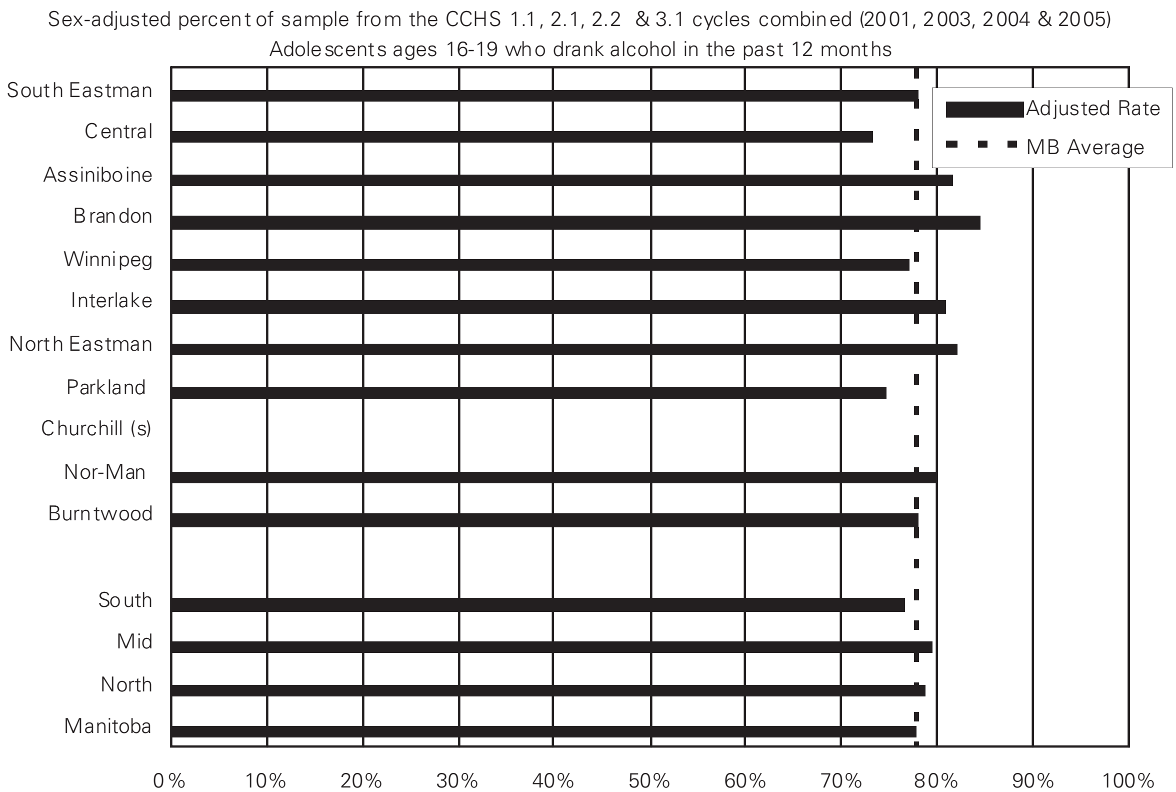


'*' indicates that area's rate is significantly different from the Manitoba average
'w' indicates a warning - rates are highly variable; interpret with caution
's' indicates data suppressed due to small numbers
Total Manitoba sample size = 1288

Source: Manitoba Centre for Health Policy, 2008

For Manitoba teens in the 16– to 19–year–old age group, 77.8% of the respondents indicated that they had consumed alcohol in the past 12 months. None of the RHAs differed significantly from the Manitoba average in the percent of older adolescents who drank.

Figure 11.6: Older Adolescent Alcohol Consumption in the Past Year Rates by RHA



'*' indicates that area's rate is significantly different from the Manitoba average
'w' indicates a warning - rates are highly variable; interpret with caution
's' indicates data suppressed due to small numbers
Total Manitoba sample size = 1307

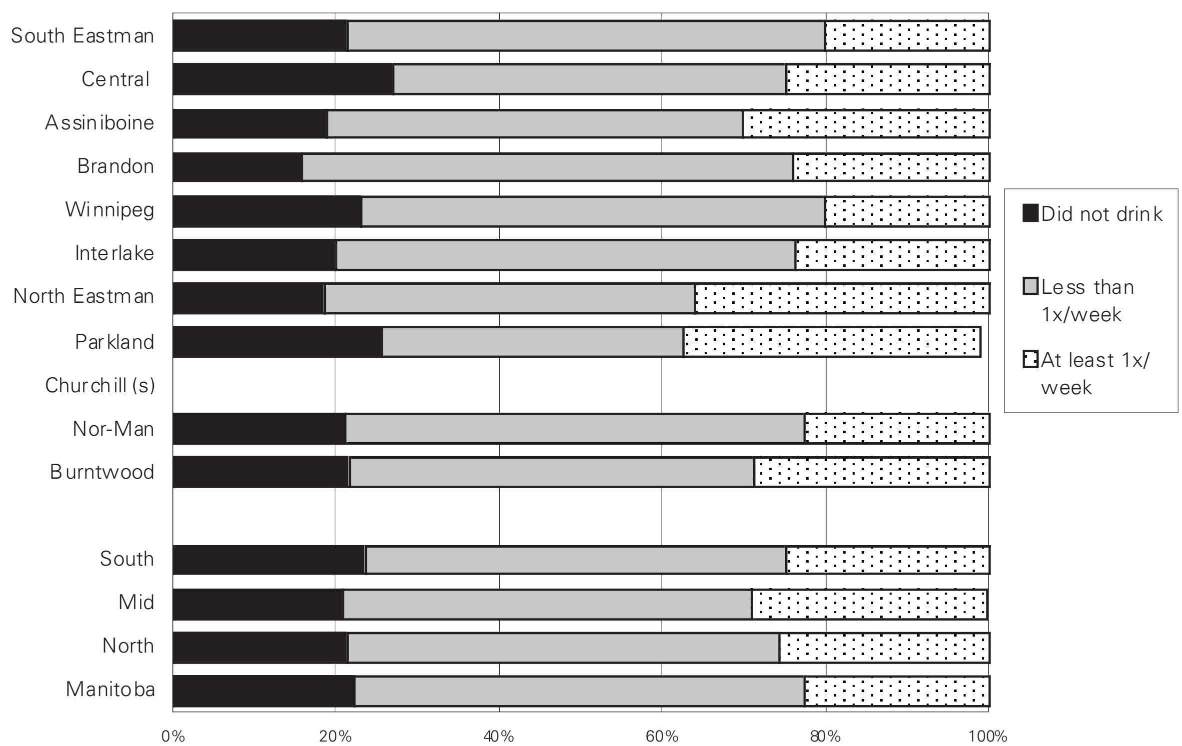
Source: Manitoba Centre for Health Policy, 2008

For those older teens (16 to 19 years) who indicated that they had consumed alcohol in the past year, they were also asked about how frequently they drank. The figure shows, for each RHA, the percent of teens who did not drink, and for those who did, whether they drank less than once per week or at least once per week.[60] Twenty–two percent of Manitoba 16– to 19–year–old respondents indicated that they had not consumed alcohol in the past year, 55% had consumed alcohol less than once per week, and 22.8% had consumed alcohol once or more per week. Put another way, close to 71% of Manitoba teens who indicated that they consumed alcohol, did so less than once per week. There were no sex differences in the percent of teens who indicated that they consumed alcohol in the past year (78.4% males, 77.1% females). There were, however, sex differences in frequency: females drinkers were more likely to drink less than once per week (59.7% females versus 50.5% males, $p<0.05$) whereas male drinkers were more likely to drink one or more times per week (27.8% males versus 17.4% females, $p<0.001$) (see Appendix). The only statistically significant difference across income quintiles was found for middle income teens in urban areas, who were less likely to have consumed alcohol in the past 12 months (see Appendix).

Figure 11.7: Older Adolescent Alcohol Consumption Rates by RHA

Crude percent of sample from the CCHS 1.1, 2.1 & 3.1 cycles combined (2001, 2003, & 2005)

Frequencies of drinking alcohol in the past year for adolescents ages 16-19



Percent respondents may not add to 100% due to incomplete responses on subsequent questions

Total Manitoba sample size = 1644

Source: Manitoba Centre for Health Policy, 2008

[60] Note that a small percentage of adolescents who indicated that they had consumed alcohol in the past 12 months then refused to answer the question on the frequency of alcohol consumption, and so they have been excluded from the percentage calculations; the reduced denominator in some cases slightly inflates the percent of respondents indicating that they had not consumed alcohol.

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Deardorff J, Gonzales NA, Christopher FS, Roosa MW, Millsap RE. Early puberty and adolescent pregnancy: The influence of alcohol use. *Pediatrics* 2005;116:1451–1456.

Pavis S, Cunningham–Burley S, Amos A. Alcohol consumption and young people: Exploring meaning and social context. *Health Educ Res* 1997;12(3):311–322.

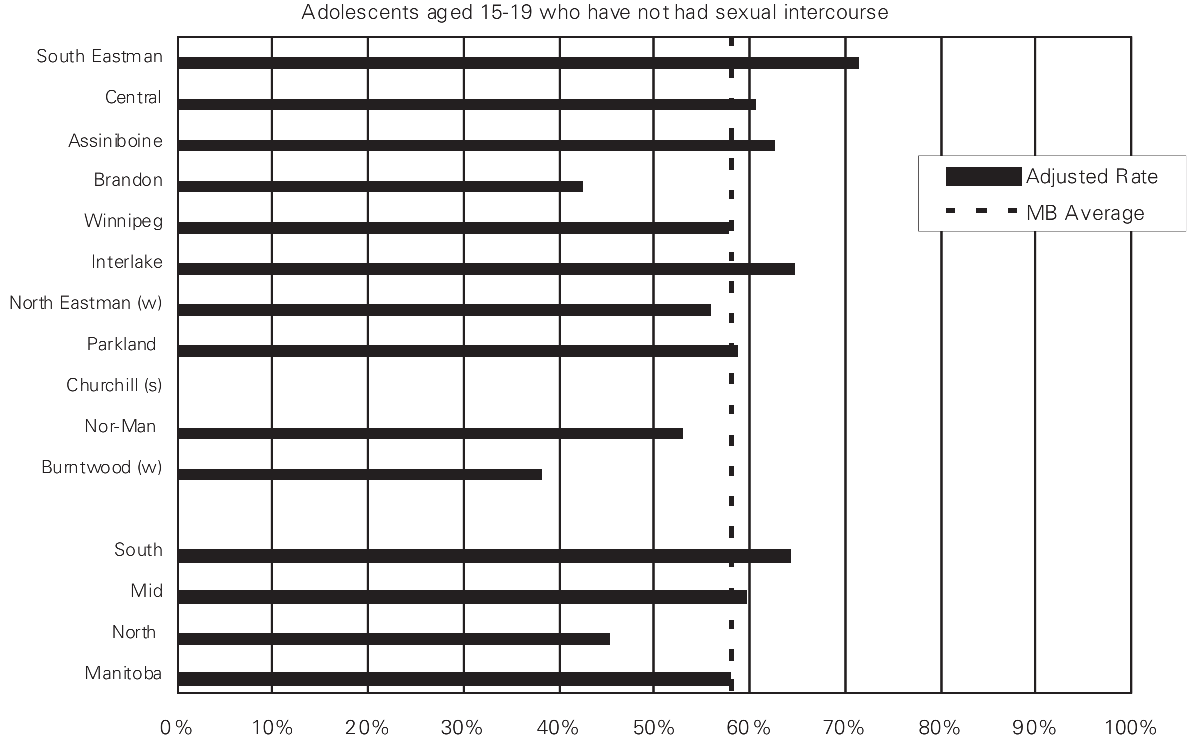
11.3 Adolescent Sexual Activity

Information on adolescent **sexual activity** comes from two cycles (2.1, 3.1) of the Canadian Community Health Survey (CCHS). Respondents aged 15 to 19 years were asked if they had "ever had sexual intercourse." If they responded "yes" to this question, they were also asked about their age at first sexual intercourse. It should be kept in mind that children living in First Nations communities were not part of the CCHS survey.

Close to 42% of Manitoba teens who were 15 to 19 years of age responded that they had had sexual intercourse. This is similar to the 43% reported for Canadian 15– to 19–year–olds in a recent report on data from the 2005 CCHS (Rotermann, 2008). Because of relatively low numbers in Manitoba, many of the rates at the RHA level were highly variable; for this reason we display here the rates of teens who had NOT had sexual intercourse (the rates of sexual intercourse by RHA can be found in the Appendix). There are some regional differences evident in the graph, however, none of these were statistically significant. Over 60% of males and 55% of females aged 15 to 19 years reported that they had not had sexual intercourse, however these differences were also not statistically significant. There were also no significant trends across urban or rural income quintiles (graph in Appendix)

Figure 11.8: Adolescents Who Have Not Had Sexual Intercourse by RHA

Sex-adjusted percent of sample from the CCHS 2.1 & 3.1 cycles combined (2003, 2005)
Adolescents aged 15-19 who have not had sexual intercourse



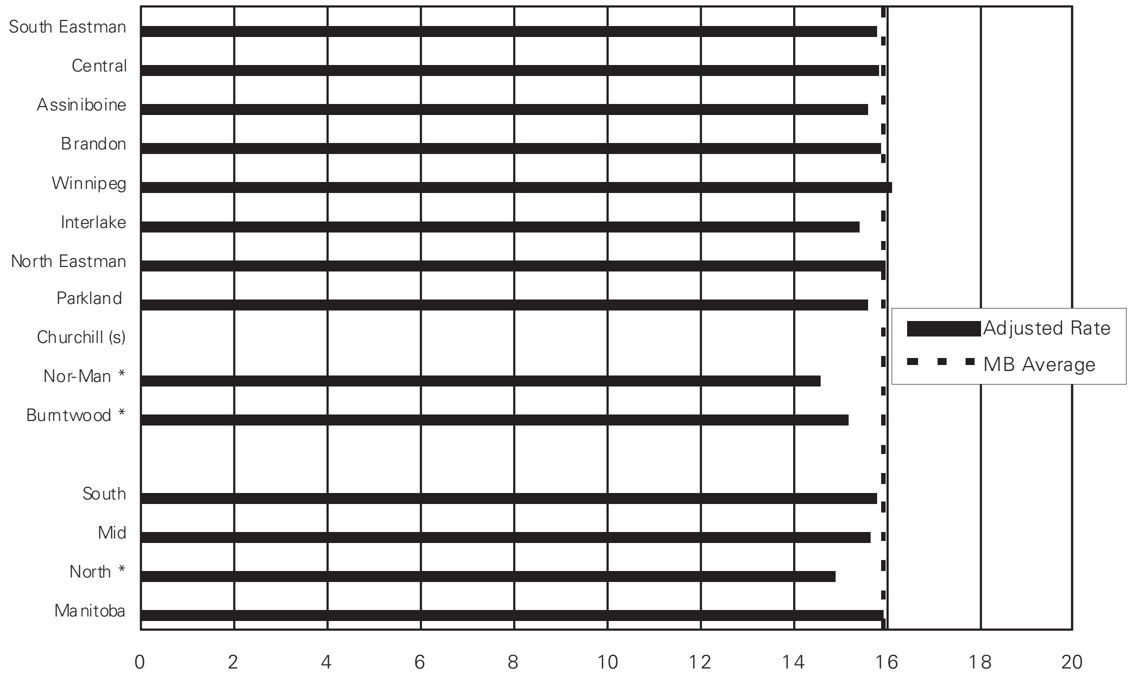
'*' indicates that area's rate is significantly different from the Manitoba average
'w' indicates a warning - rates are highly variable; interpret with caution
's' indicates data suppressed due to small numbers
Total Manitoba sample size = 497

Source: Manitoba Centre for Health Policy, 2008

Manitoba adolescents 15 to 19 years of age who responded that they had had sexual intercourse were also asked to report their age at first sexual intercourse. The average age of first sexual intercourse for these Manitoba teens was 15.9 years (Figure 11.9). This is younger than the Canadian average age at first sexual intercourse reported as 16.5, however the Canadian average was based on 15– to 24–year–olds, which could explain the difference from our Manitoba rates (Rotermann, 2005). The Canadian average age of first sexual intercourse has been declining over the last several years (Society of Obstetricians and Gynaecologists of Canada, 2008); however, Rotermann (2008) found that the proportion of teens who reported having their first sexual intercourse before the age of 15 years dropped from 12% in 1996/97 to 8% in 2005. In our analysis, Nor–Man and Burntwood RHAs both had significantly younger average ages of first sexual intercourse, at 14.6 and 15.2 years respectively. Overall in Manitoba, we found that the average age at first sexual intercourse did not differ for males and females, at 16.0 and 15.9 respectively. We also found that 14.2% of adolescents who have had sexual intercourse reported having their first sexual intercourse between the ages of 11 and 14 years, 22.8% at 15 years, 30% at 16 years and 33.1% at 17 years or older (Figure 11.10). There was some regional variation in age at first sexual intercourse, particularly for the youngest age category with teens from the North having a much higher percent of teens reporting sexual intercourse at 14 years or less, whereas teens from Winnipeg/Brandon reported a much lower percent of teens having their first sexual intercourse at this age (the graph of age at first intercourse by aggregate regions can be found in the Appendix). Many of the values for age at first intercourse by aggregate regions were based on low numbers and so the rates are highly variable and should be interpreted with caution. There was very little difference in age at first sexual intercourse by rural and urban income quintiles (Figure 11.11).

Figure 11.9: Average Age of First Sexual Intercourse by RHA

Sex-adjusted average age of sample from the CCHS 2.1 & 3.1 cycles combined (2003 & 2005)
Reported age of first sexual intercourse by sexually active adolescents ages 15-19

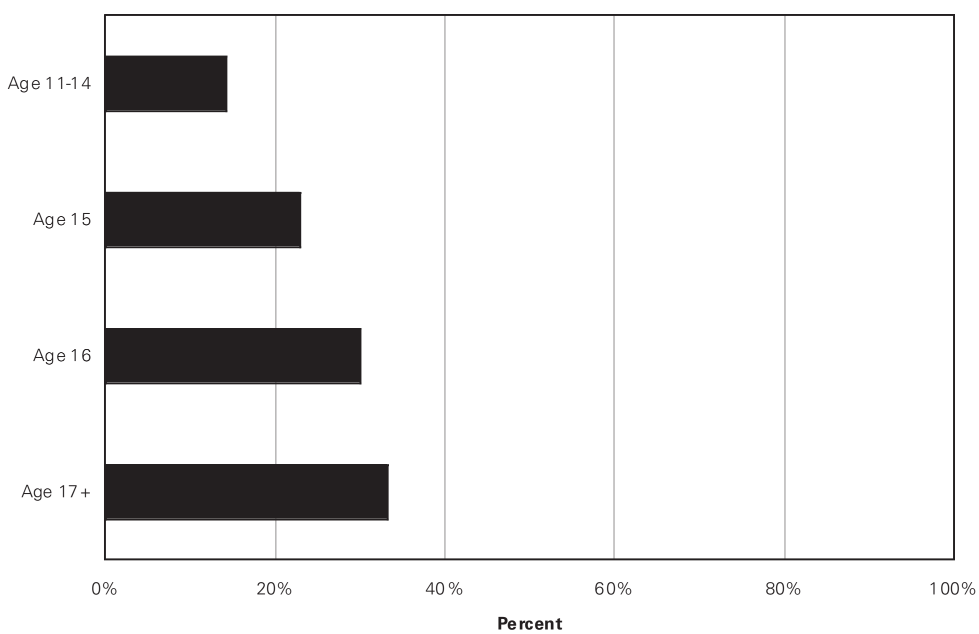


'*' indicates that area's rate is significantly different from the Manitoba average
'w' indicates a warning - rates are highly variable; interpret with caution
's' indicates data suppressed due to small numbers
Total Manitoba sample size = 422

Source: Manitoba Centre for Health Policy, 2008

Figure 11.10: Crude Reported Age of First Sexual Intercourse

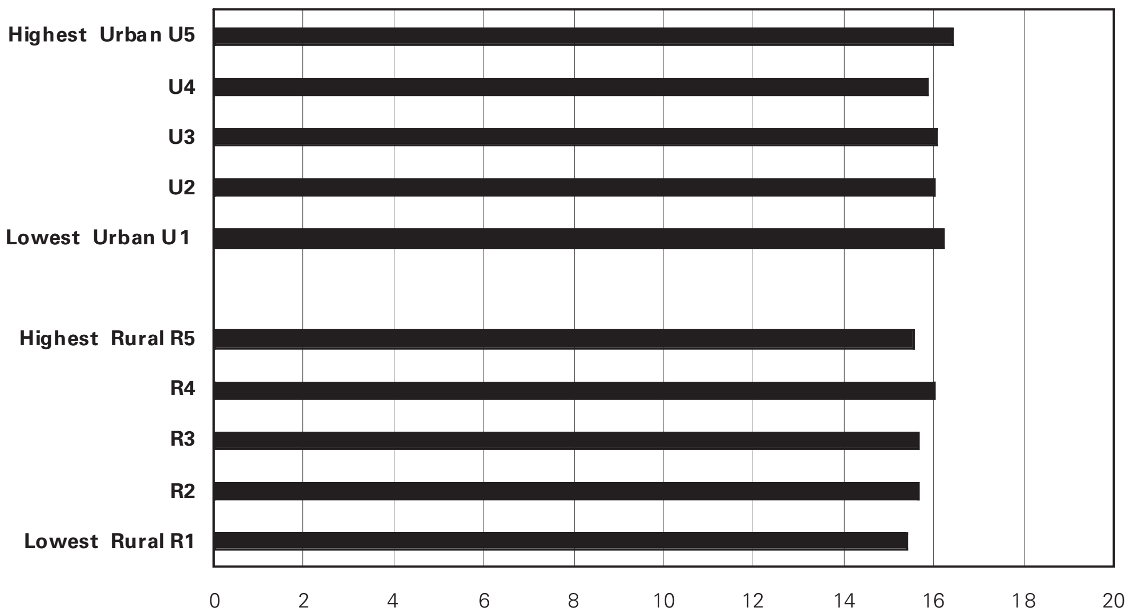
Percent of sexually active adolescents aged 15-19 by age at first intercourse from the CCHS 2.1 & 3.1 cycles combined (2003, 2005)



Source: Manitoba Centre for Health Policy, 2008

Figure 11.11: Average Age of First Sexual Intercourse by Income Quintile

Sex-adjusted average age of sample from the CCHS 2.1 & 3.1 cycles combined (2003 & 2005)
Reported age of first sexual intercourse by sexually active adolescents ages 15-19



'*' indicates that area's rate is significantly different from the Manitoba average
'w' indicates a warning - rates are highly variable; interpret with caution
's' indicates data suppressed due to small numbers
Total Manitoba sample size = 422 Source: Manitoba Centre for Health Policy, 2008

References

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Rotermann M. Trends in teen sexual behaviour and condom use. *Health Reports* 2008;19(3):1–5.

Society of Obstetricians and Gynaecologists of Canada. *Facts and Statistics: Sexual Health and Canadian Youth.* Available from URL: http://www.sexualityandu.ca/teachers/data–6.aspx. Accessed on: May 6, 2008.

11.4 Condom Use

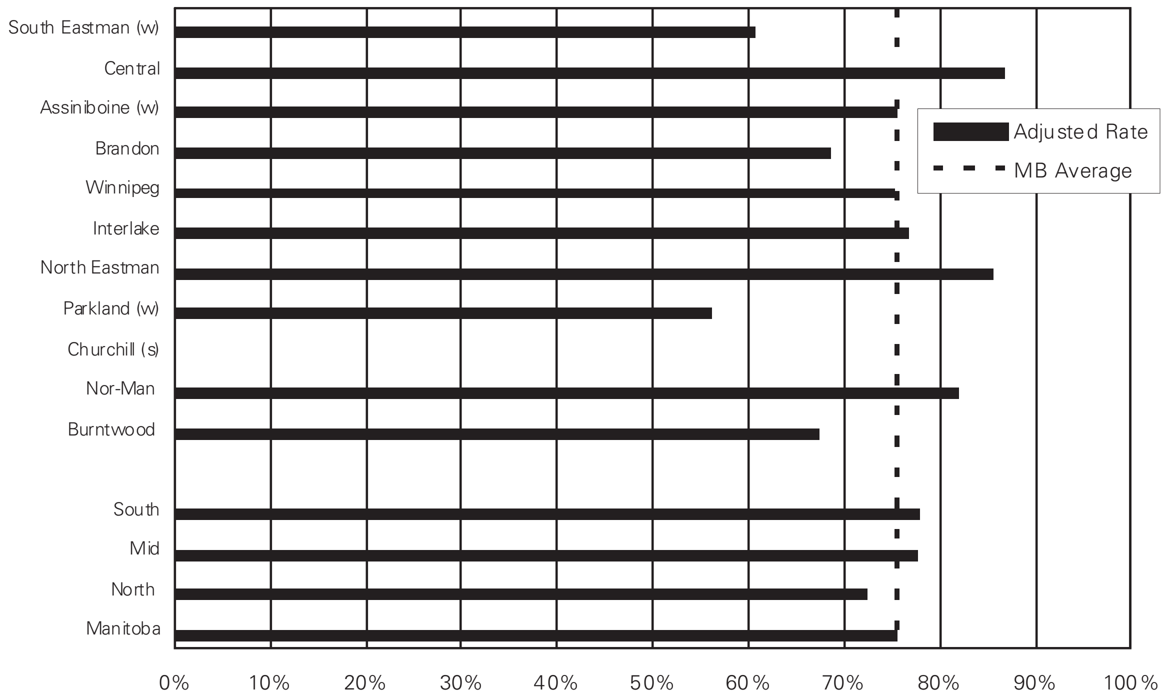
It is difficult to get accurate information on adolescent **contraceptive use** using data from the MCHP Repository. Many contraceptive methods can be purchased over the counter, so there is no record in the pharmaceutical database. Although birth control pills require prescriptions and should therefore be captured in the pharmaceutical database, many teen clinics and health centres provide birth control pills free and without prescription to adolescents. The Canadian Community Health Survey (CCHS) (cycles 2.1 and 3.1) does ask questions about contraceptive use and is the source for information on condom use by adolescents in this report. It should be kept in mind that First Nations communities were not included in the CCHS.

All respondents aged 15 to 19 years who reported having sexual intercourse in the past 12 months were asked whether they used a condom the last time they had sex. Over 75% of sexually active Manitoba teens reported that they had used a condom the last time they had sexual intercourse. This is similar to the Canadian rate, reported for 2005 at 75% (Rotermann, 2008), but is lower than the over 80% reported in the 2001 Child Health Report (Brownell et al., 2001). The current Manitoba rate compares favourably to a recent study of American teens, which found that 63% of teens who reported being sexually active in the last 3 months had used a condom (Federal Interagency Forum on Child and Family Statistic, 2008). Considering that condoms not only prevent pregnancy, but provide protection against sexually transmitted infections, the fact that almost one–quarter of sexually active respondents said they did not use a condom during their last sexual activity is of concern.

Some regional variation is evident in Figure 11.12, however none of these differences were statistically significant. More males than females reported using a condom (80% compared to 70%), but these differences were also not statistically significant. There were also no statistically significant differences across rural or urban income quintiles (see Appendix for graph of income quintiles).

Figure 11.12: Condom Use by RHA

Sex-adjusted percent of sexually active sample from the CCHS 2.1 & 3.1 cycles combined (2003 & 2005)
Adolescents ages 15-19 years who reported condom use during last sexual activity



'*' indicates that area's rate is significantly different from the Manitoba average
'w' indicates a warning - rates are highly variable; interpret with caution
's' indicates data suppressed due to small numbers
Total Manitoba sample size = 281

Source: Manitoba Centre for Health Policy, 2008

References

Brownell M, Martens P, Kozyrskyj A, Fergusson P, Lerfald J, Mayer T, Derksen S, Friesen D. *Assessing the Health of Children in Manitoba: A Population–Based Study.* Winnipeg, MB: Manitoba Centre for Health Policy, 2001.

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Rotermann M. Trends in teen sexual behaviour and condom use. *Health Reports* 2008;19(3):1–5.

11.5 Birth Control Pill Use

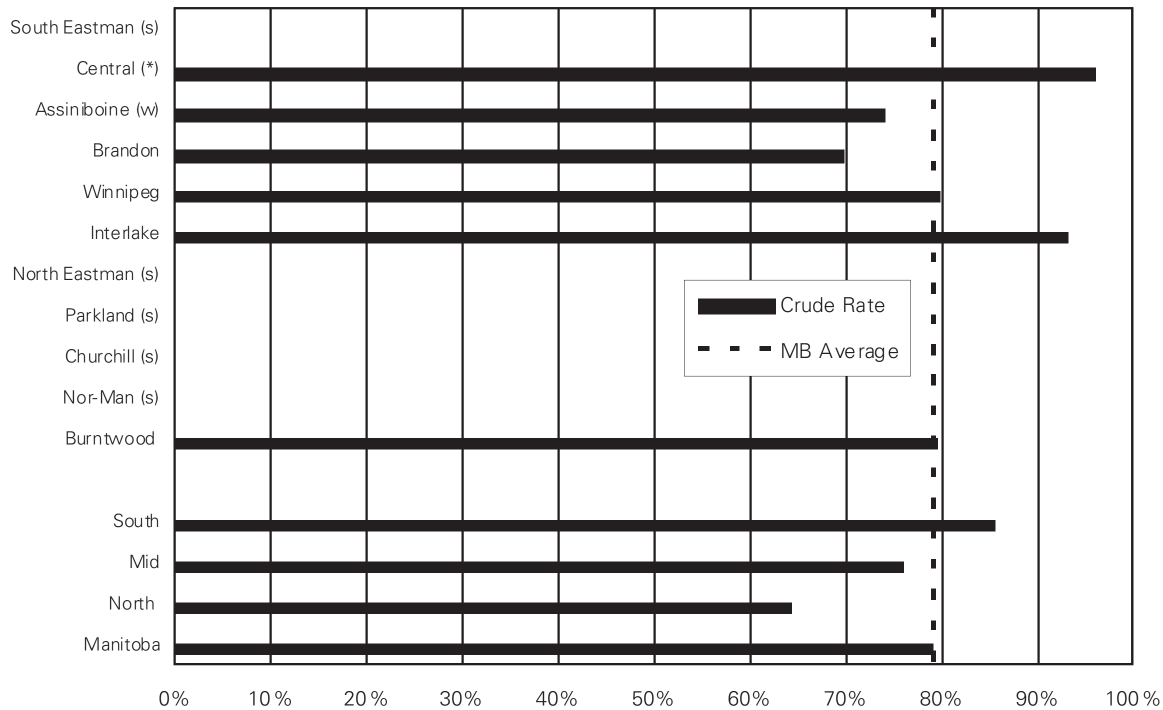
It is difficult to get accurate information on adolescent contraceptive use using data from the MCHP Repository. Many contraceptive methods can be purchased over the counter, so there is no record in the pharmaceutical database. Although birth control pills require prescriptions and should therefore be captured in the pharmaceutical database, many teen clinics and health centres provide birth control pills free and without prescription to adolescents. The Canadian Community Health Survey (CCHS) does ask questions about contraceptive use and is the source for information on birth control pill and birth control injection use by adolescents in this report (cycles 2.1 and 3.1). It should be kept in mind that First Nations communities were not included in the CCHS.

Adolescents 15 to 19 years of age who responded that they had had sexual intercourse in the last 12 months were asked what kind of birth control they usually used. To examine birth control pill use, we looked at the percent of sexually active 15– to 19–year–old females who responded "birth control pill" to this question. We also re–ran our analysis including both birth control pill use and birth control injection (e.g., Deprovera) use; the patterns of results were very similar between birth control pill use and birth control pill or birth control injection use, and so only the birth control pill use findings are presented here (the results of use of birth control pill or birth control injection can be found in the Appendix).

Almost 80% (79.1%) of sexually active teen females in Manitoba reported that the birth control pill was their usual method of contraception (Figure 11.13). Central RHA had significantly higher rates of birth control pill use than the Manitoba average with fully 96% of sexually active females reporting that their usual method of contraception was the birth control pill. Brandon and the aggregate North regions appeared to have lower percentages of sexually active females who used the birth control pill, however the values for these regions were not statistically different from the Manitoba average. There were no significant differences in birth control pill use across urban or rural income quintiles (graph in Appendix).

Figure 11.13: Reported Birth Control Pill Use by RHA

Crude percent of sexually active females from the CCHS 2.1 & 3.1 cycles combined (2003 & 2005)
Females aged 15-19 who reported birth control pill use



'*' indicates that area's rate is significantly different from the Manitoba average
'w' indicates a warning - rates are highly variable; interpret with caution
's' indicates data suppressed due to small numbers
Total Manitoba sample size = 137

Source: Manitoba Centre for Health Policy, 2008

GLOSSARY

Acronyms used in this report:

ADHD—Attention–Deficit/Hyperactivity Disorder
BMI—Body mass index
CA—Winnipeg Community Area
CCHS—Canadian Community Health Survey
FASD—Fetal Alcohol Spectrum Disorder
ICD–9–CM—International Classification of Diseases, 9th Revision, with Clinical Modifications
ICD–10–CA—International Classification of Diseases, 10th Revision, with Canadian Enhancements
LGA—Large–for–gestational–age
LRTI—Lower respiratory tract infection
MCHP—Manitoba Centre for Health Policy
NC—Neighbourhood cluster
NSAID—Non–Steroidal Anti–Inflammatory Drug
PMR—Premature mortality rate
RHA—Regional Health Authority
SES—Socioeconomic status
SIDS—Sudden Infant Death Syndrome
SGA—Small–for–gestational–age
SSRI—Selective Serotonin Reuptake Inhibitor
T/A—Tonsillectomy and/or adenoidectomy
TBI—Traumatic brain injury
VBAC—Vaginal birth after Caesarean section
WRHA—Winnipeg Regional Health Authority

Age. Age calculations differ for numerators and denominators. Age for the numerator is the age of an individual at some point in time (i.e., age at admission, age at time of claim date, age as of December 31), usually measured in years. Age for denominator is usually calculated at the end of December of the year, e.g., for **fiscal year** 1996/97, Age = 1996–birth year.

Adjusted Rates. These rates mathematically remove the effects of different population structures that influence overall rates. In this report, most rates comparing health indicators across regions or **SES** (income quintiles), where all children aged 0 to 19 years are included, have been adjusted, or age– and sex–standardized. This procedure mathematically removes the effects of different population structures that influence overall rates of use of healthcare.

Adolescent Alcohol Consumption. The consumption of one or more alcoholic beverages by an adolescent aged 12 to 19 years in the span of one year. A typical alcoholic drink is equal to 12–ounces of beer, 5–ounces of wine, or 1.5 ounces of liquor (gin, rum, vodka, whisky, etc.; Centers for Disease Control and Prevention, 2008). For this project, adolescents were divided into two groups: ages 12–15 and ages 16–19 years. The older group was then further categorized according to volume: less than 1 drink per week and one or more drinks per week.

Adolescent Smoking. Adolescents aged 12 to 19 years who have smoked 100 or more tobacco cigarettes in their lifetime are categorized as "smokers". Those having smoked only a few cigarettes in their lifetime (i.e., less than 100 cigarettes) or who have never smoked a whole cigarette are considered to be non–smokers.

Alternate Payment Plan. Type of compensation for physicians who are not paid on a **fee–for–service** basis but are either salaried, sessional, or hired on contract. These physicians submit claims for administrative purposes only.

Ambulatory Visits. Almost all contacts with physicians: office visits, walk–in clinics, home visits, personal care home (nursing home) visits, visits to outpatient departments, some emergency room visits (where data are recorded), and in northern/remote nursing stations. Services provided to patients while admitted to hospital, and most visits for prenatal care are excluded. Also known as Ambulatory Physician Visits and **Physician Visits**.

Antidepressant Medications. Medications (including **Selective Serotonin Reuptake Inhibitors**) used for the treatment or prevention of depression.

Antipsychotic Medications (children). Medications that traditionally have been used to treat children with conditions such as psychoses or Tourette Syndrome, and in some cases to lessen severe self–injurious or aggressive behaviours which can be associated with **autism** and mental retardation (Cooper et al., 2004).

Anxiolytic Medications. Medications used to treat anxiety disorders and symptoms.

Asperger's Disorder. Pervasive developmental disorder, causing problems in social interactions and communication, and involves repetition and limited interests. Problems are not evident for language or cognitive skills.

Asthma. A disease in which inflammation of the airways causes airflow into and out of the lungs to be restricted. In this report, this has been defined on the basis of the presence of **ICD–9–CM** diagnoses code 493 (or **ICD–10–CA** diagnosis code J45) in any diagnosis field, one or more **physician claims** with diagnosis code 493, or one or more prescription drugs for asthma over the study period.

Attention–deficit/hyperactivity disorder (ADHD). A neurobehavioral developmental disorder that is characterized by inattention, hyperactivity, and impulsivity. The disorder is often identified during school ages and symptoms may continue into adulthood (American Psychiatric Association, 2000). In this report, children were defined as having an ADHD diagnosis if they had any of: 1) one or more hospitalizations or physician visits with a diagnosis of "hyperkinetic syndrome of childhood" (**ICD–9–CM**=314.xx **ICD–10–CA** code F90) in one year; 2) two or more prescriptions for a **psychostimulant medication** within one **fiscal year** without a corresponding diagnosis of conduct disorder (ICD–9–CM=312.xx, ICD–10–CA code F91–F94) or narcolepsy (ICD–9–CM=347, ICD–10–CA code G47) in one year; or 3) one prescription for a psychostimulant in the **fiscal year** and a diagnosis of hyperkinetic syndrome of childhood in the previous three years.

ICD code	Description of Exclusion Criteria for ADHD
F91	Conduct disorders
F92	Mixed disorders of conduct and emotions
F93	Emotional disorders with onset specific to childhood
F94	Disorders of social functioning with onset specific to childhood and adolescence
G47	Sleep disorders

Autism Spectrum Disorder (ASD). A pervasive developmental disorder that typically affects a person's social interactions and ability to communicate, and may be evident by repetitive behaviours or a strong attachment to a routine. The severity ranges from mild to severe and it includes diagnoses of Autistic Disorder, **Pervasive Developmental Disorder—Not Otherwise Specified**, and **Asperger's Disorder** (Autism Society Canada, 2005). For this report, children with ASD were identified using diagnoses on hospital and physician records and information from education records on special school funding received for students with ASD.

Band–Operated Schools. Band–operated schools are located in Manitoba, but are not part of the provincial education system. Rather, they are operated by the **First Nations communities** in which they are located. Enrolment data for band–operated schools is only partially reported to the provincial Education Information System.

Body Mass Index (BMI). A measure of health risk that is correlated with body fat based on height and weight that applies to all individuals. BMI is calculated as follows: weight in kilograms divided by height in metres squared.

Breastfeeding Initiation. When a mother begins to feed her infant milk from her breast. In this study, rates are calculated by the ratio of live born babies born in a Manitoba hospital with a Manitoba postal code or municipality code who were exclusively or partially breast fed (information recorded on the **hospital discharge abstract**), to the number of live born babies born in a Manitoba hospital with a Manitoba postal code or municipality code.

Caesarian Section (C–Section). A procedure in which a baby, rather than being born vaginally, is surgically extracted (removed) from the uterus.

Canadian Community Health Survey (CCHS). The CCHS was conducted by Statistics Canada to provide regular and timely cross–sectional estimates of health determinants, health status and health system utilization for 136 health regions in Canada, including the territories. Survey respondents were sampled from 11 regions in Manitoba. Respondents were 12 years of age and older; the sampling methodology was designed to ensure over–representation of youth under 19 years of age and seniors 65 years of age and older. The survey excludes populations living in Indian Reserves, on Canadian Forces Bases, and in some remote areas, and those not living in households.

Census. Official count of a population, often including demographic information such as age, sex, employment and income. Statistics Canada conducts a Census every five years. It takes account of all persons living in Canada, including any individuals residing in Canada on a temporary basis. The Census also includes Canadians abroad on military missions or on merchant vessels that are registered in Canada (Statistics Canada, 2006).

Child Care Spaces. Spaces in a licensed centre or home for child supervision at 0–12 years of age. The license ensures that the child care centres and homes meet the government standards on several subject matters (e.g., staff qualifications, behaviour management policies, daily activities, sanitization, lighting, heating, and compliance with the Manitoba Fire Code) (Manitoba Laws, 2007).

Child Maltreatment. Child maltreatment includes both child abuse and child neglect. Child abuse is the physical or psychological mistreatment of a child by his or her parents (including adoptive parents), guardians, or other adults. Child neglect is the inaction of not doing what is necessary to ensure proper care of the child.

Children with Disabilities. Children whose daily activities or normal functioning are restricted because of a condition or health problem. For this report, we identified children with disabilities as those aged 6 to 17 years receiving Level II or Level III funding support through the Department of Education, Citizenship and Youth. These are children with at least one diagnosis of a sensory or mental handicap or an emotional or behavioural disorder.

Cleft Palate and Lip. Birth defects affecting the roof and/or upper lip of the mouth. These defects may appear together or separately. The defect can range from a small notch in the lip to a vertical fissure that runs into the roof of the mouth and nose.

Congenital Anomaly. An abnormality of structure, function or body metabolism that is present at birth (even if not diagnosed until later in life) and results in physical or mental disability, or is fatal. **ICD–9–CM** and **ICD–10–CA** codes used to identify congenital anomalies in this report can be found in the Appendix (section 12.1).

Contraceptive Use. Method used to prevent a sexually active female from becoming pregnant. Examples include the use of condoms, birth control pills, diaphragms, spermicides, or birth control injection (Depovera).

Continuity of Care (Ambulatory). The extent to which individuals see a given healthcare provider (versus one or more other providers) over a specified period of time. A provider may be defined either as an individual physician, a physician group practice, or a clinic. Continuity of care can be calculated in several different ways. In this report, continuity of care was observed when at least half of a child's **physician visits** were to the same practitioner in a two–year period. Children with less than three physician visits during the time period were excluded from the analyses.

Congenital Heart Defect. A problem with the structure or function of the heart at birth.

Dental Extraction. 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. 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).

Diabetes. 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. In this report, diabetes is identified through one hospitalization or two **physician visits** or two prescriptions for diabetes over a three–year period.

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. Dissemination Areas (DAs) cover all the territory of Canada. The DA replaces the Enumeration Area (EA) as a basic unit for dissemination.

Down Syndrome. A genetic disorder characterized by mental retardation and other physical defects resulting from the presence of an extra copy of chromosome number 21.

External Cause of Injury Codes (E–Codes). E–codes are used to define environmental events, circumstances and conditions as the cause of injury, poisoning, and other adverse effects related to injury **hospitalizations** and mortality. The **ICD–9–CM E–code** on the hospital claim may be in any one of the 16 diagnosis code positions and the first one found going from 1 to 16 is used. The vital statistics record has ICD–9–CM E–codes listed in the cause of death. See the Appendix section 12.2 for a table of the E–codes used in this report. Excluded from this list and from our definition of injuries are injuries resulting from misadventures during surgical or medical care, and adverse drug reactions.

Exclusions. During research, certain types of data may not be used in the analysis, depending on the type of study being performed. These data are called exclusions. Examples include: records falling outside the time frame of the study, non–residents of Manitoba based on postal codes or municipal codes, postal codes indicating an address at Public Trustee offices or at Child and Family Services offices, and records from out–of–province hospitals.

Families First. Healthy Child Manitoba recently combined the *BabyFirst* and Early Start programs into one program known as Families First. Families First offers home visiting supports to families with children, from pregnancy to school entry.

Families First Screening Form. A brief measure of biological, social, and demographic risk factors. This is used by public health nurses to screen all postpartum referrals in Manitoba. The Families First (previously known as *BabyFirst*) screening form is the first of two screening stages for Manitoba's Families First program.

First Nations Community. Indian and Northern Affairs Canada's (INAC's) legal list of First Nations communities includes the following Census Sub Division (CSD) types: Indian Government Districts, Reserves, Indian Settlements, Terre Reservées, Nisga'a Lands, Nisga'a Villages and Teslin Lands. By definition, INAC's complete list of First Nations communities includes:

- Land reserved under the Indian Act
- Land set aside for the use and benefit of Indian people
- Areas where activities on the land are paid or administered by INAC or
- Areas listed in the Indian Lands Registry System held by Lands and Trust Services at INAC

This broader definition of a First Nation community includes a selection of the following CSD types: Chartered Community (CC), Hamlet (HAM), Northern Hamlet (NH), Northern Village (NV), Settlement (SET), Town (T), and Village (VL).

Fiscal Year. For most businesses, healthcare institutions included, the fiscal year is defined as starting April 1 and ending the following year at March 31. For example, the 2007/08 fiscal year would be April 1, 2007 to March 31, 2008, inclusive.

Fragile Infant. In this study, a live–born infant with an extremely low birth weight (less than 500 grams) or an extremely short gestational age (less than 22 weeks). Survival rates of these infants may be unstable compared to other live–born infants.

Fee–for–service. A method of payment whereby physicians bill for each service rendered, according to a pre–arranged schedule of fees and services. Physicians who are paid on a fee–for–service basis file a claim for each service rendered and are responsible for their operating costs. Other physicians are compensated under the **alternate payment plan** (**APP**).

Generalized Linear Model. A unified class of models for regression analysis of independent observations of a discrete or continuous response. A characteristic feature of generalized linear models is that a suitable non–linear transformation of the mean response is a linear function of the covariates. Generalized linear models provide a unified method for analyzing diverse types of univariate responses (e.g., continuous, binary, counts). Generalized linear models are actually a collection of regression models and they include as special cases the standard linear regression for normally distributed continuous outcomes, logistic regression models for a binary outcome, or Poisson regression models for counts.

High School Completion (Graduation). Level of educational attainment. Graduated students are identified in the student record or with 28 or more credits earned during high school. Attainment of Grade 12 by a certain age (17) provides a similar measure.

Hospital Episode. In this study, a single, continuous stay in the hospital system, irrespective of transfers between hospitals.

Hospital Discharge Abstract. A computerized record containing information taken from a person's medical chart that is created at the time the person is discharged from an acute care hospital.

Hospitalization. Admission to a hospital as inpatient (i.e., with at least one overnight stay).

ICD–9–CM. The 9th revision of the International Classification of Disease (ICD) coding system (with Clinical Modifications), developed by the World Health Organization that is used to classify diseases, health conditions and procedures. As of 2004, this is replaced by **ICD–10–CA** in Manitoba hospitals.

ICD–10–CA. The 10th revision of the International Classification of Disease (ICD) coding system, developed by the World Health Organization that is used to classify diseases and related health problems. As of January 1, 2000, ICD–10 is used by Vital Statistics. As of April 1, 2004, ICD–10 is used in the hospital abstract system.

Immunization Coverage. The Public Health Agency of Canada recommends that each individual receives all vaccinations to complete the appropriate schedule for their current age. Completing the Manitoba Childhood Immunization Schedule is voluntary, but is important as it helps to protect the individual against serious diseases. See Appendix section 12.3 for the recommended immunization schedule by Manitoba Health and Healthy Living. For more information, contact Manitoba Health and Healthy Living, Public Health Division, Communicable Disease Control (CDC) Branch or visit: http://www.gov.mb.ca/health/publichealth/cdc/schedule.html

Income Assistance. A provincial program of last resort for people who need help to meet basic personal and family needs. Wherever possible, the program is aimed at helping people find a job or get back to work. Eligibility for income assistance is determined by a test of need. The total financial resources of the household are compared to the total cost of basic necessities as defined in the Employment and Income Assistance Act and Regulation. Applicants must be in financial need for the monthly cost of: basic needs such as food, clothing, personal needs and household supplies; some medical costs; and housing (rent) and utilities; and some special costs if you are an adult with a disability.

Income Quintile. A method to measure the average (mean) household income of residents, ranking them from poorest to wealthiest, and then grouping them into 5 income quintiles (1 being poorest and 5 being wealthiest), each quintile containing approximately 20% of the population. The income quintile measure is derived from Statistics Canada **Census** data by aggregating household income to the **dissemination area (DA)** and then ranking neighbourhoods by income quintile. Income quintiles are available for both urban (Winnipeg and Brandon) and rural populations. Income quintiles are often used as a proxy measure of **socioeconomic status (SES)**.

Infant Mortality. An indicator of death among infants within one year of birth. This may exclude very low birth weight babies (< 500 g) and those with very short gestations (< 22 weeks), who are more likely to die. Infant mortality is seen as an indicator of health status, level of healthcare in an area, and the effectiveness of prenatal care.

Injury Hospitalization. Hospitalizations lasting one day or longer that resulted from an injury as indicated by the presence of one of the **ICD–9–CM E–Codes** or **ICD–10–CA** V, W, X, Y–Codes listed on the **hospital discharge abstract**. Excluded from analyses are Newborn hospitalizations with E–codes and brain deaths. In this report, injury hospitalization rates are expressed as per 10,000 children.

Injury Mortality. Death due to injury. In this report, we identify children aged 1 to 19, with a death due to injury, as defined by the presence of one of the **ICD–9–CM E–Codes** or **ICD–10** V, W, X, Y codes on the vital statistics record, and expressed as per 100,000 children.

Large–for–gestational–age (LGA). Infants that are at or above the 90^{th} percentile in birth weight, from an infant population of the same sex and gestational age. See Kramer et al. (2001) for more information.

Lower Respiratory Tract Infection (LRTI). Infection affecting the lower part of the breathing system (the breathing tubes and lungs). In this report, the diagnosis–based definition for five years of age and older is at least one diagnosis over one year for LRTI. The definition for age less than five years of age is at least one diagnosis over one year for LRTI, as defined above, or **Asthma**.

Modeling and Estimation of Rates. To estimate and compare rates of events in this report, the count of events for each indicator was modeled using a Poisson or negative binomial distribution, depending on which distribution provided the best model fit. Relative risks were estimated for each region and for each time period. Parameters included in the model consisted of region, sex, age, a region by sex interaction, and if age was modeled as a continuous variable, then both the linear and quadratic terms were included. The reference group for region was Manitoba. If age was modeled as a categorical variable, then the oldest age group was used as a reference group. To estimate relative risks of rates rather than events, the log of the population count in each region by sex by age stratum was included in the model as an offset.

Contrasts were calculated from the parameter estimates of the model to calculate relative risks for each region. These contrasts also compared the relative risk for each region to the overall provincial relative risk. The values obtained from the contrasts were actually a linear combination of the natural logarithm of the parameter estimates, so an exponential transformation was necessary to obtain a tangible relative risk of events. Finally, the estimated rates were calculated by multiplying the Manitoba overall crude rate by the appropriate relative risk estimate.

Non–Steroidal Anti–Inflammatory Drug (NSAID). Medication used to reduce pain, inflammation and fever.

Narcotic Analgesic Medications. Medications used to control or relieve pain.

Neighbourhood Clusters (NCs). Winnipeg can be divided into 25 Neighbourhood Clusters (NCs) based on **Census** Divisions, 23 of which are within the boundaries of the City of Winnipeg and 2 additional divisions (East and West St. Paul) just outside the city boundaries.

Neural Tube Defects. Birth defects of the brain and spinal cord.

Pervasive Developmental Disorder—Not Otherwise Specified. Problems in areas related to **Autism Spectrum Disorder (ASD)** or other developmental disorders, but the criteria for an official diagnosis has not been met.

Physical Activity. Any activity that increases the heart rate. Physical activity is measured as KKD: Kilocalories expended/Kilogram of body weight/Day. According to the **Canadian Community Health Survey (CCHS),** a value of 3 or more is "active" (the equivalent to walking approximately one hour per day). A value from 1.5 to 2.9 is "moderately active" and a value of less than 1.5 KKD is "inactive".

Physician Claims. Claims that are submitted to the provincial government by individual physicians for services they provide. **Fee–for–service** physicians receive payment based on these claims, while those submitted by physicians on **alternate payment plans** are for administrative purposes only. The physician claims data file is part of the **Population Health Research Data Repository (Repository).**

Physician Visits. See **Ambulatory Visits**.

Population Health Research Data Repository (Repository). A comprehensive collection of administrative, registry, survey and other databases primarily comprising residents of Manitoba housed at the Manitoba Centre for Health Policy (MCHP). It was developed to describe and explain patterns of healthcare and profiles of health and illness, facilitating inter–sectoral research in areas such as healthcare, education, and social services. The administrative health database, for example, holds records for virtually all contacts with the provincial healthcare system, the Manitoba Health Services Insurance Plan (including physicians, hospitals, personal care homes, home care, and pharmaceutical prescriptions) of all registered individuals. MCHP acts as a steward of the information in the Repository for agencies such as Manitoba Health and Healthy Living.

Premature Mortality Rate (PMR). The rate of deaths of residents aged 0–74 years, per 1,000 residents aged 0 to 74 years. The values are standardized to account for age/sex differences in populations. The rate is usually expressed as a number per thousand, in order to provide an indicator that is comparable among different areas or regions. PMR is an important indicator of the general health of a population; high PMR indicates poor health status.

Preterm Birth. Live birth where the gestational age of the infant is less than 37 weeks.

Psychostimulant Medications. Medications used to treat **attention–deficit/hyperactivity disorder (ADHD)** in children.

Regional Health Authority (RHA). Regional governance structure set up by the province to be responsible for the delivery and administration of health services in specified areas. In Manitoba, as of July 1, 2002, there are 11 Regional Health Authorities (RHAs): Winnipeg, Brandon, South Eastman, Assiniboine, Central, Parkland, North Eastman, Interlake, Burntwood, Nor–Man and Churchill.

Regional Health Authority (RHA) Districts. Subdivisions of **Regional Health Authorities (RHAs)** defined primarily based on municipal code and some postal codes for analysis purposes. Districts were created collaboratively by individual RHAs, Manitoba Centre for Health Policy (MCHP), and Manitoba Health and Healthy Living.

Retention. In this report, students who were enrolled in the same grade for two consecutive years, and who did not have an aberrant pattern of promotion any other year (for example, retention one year and promotion of two grades the next, or a progression backwards).

School Changes. In this report, the number of times a student changes schools that was not part of an expected progression through the grades. Expected progressions were identified when a student reached the highest grade of a school and the next year transferred to a different school (i.e., graduating from grade 6 in one school and starting grade 7 in another school).

Selective Serotonin Reuptake Inhibitor (SSRI). Medication used to treat a mood disorder by helping to increase the level of available serotonin in the brain.

Sexual Activity. In this report, adolescents aged 15–19 who answered “yes” to ever having sexual intercourse as reported in the **Canadian Community Health Survey (CCHS)**, cycles 2.1 and 3.1.

Small–for–gestational–age (SGA). Infants that are at or below the 10^{th} percentile in birth weight, from an infant population of the same sex and gestational age. See Kramer et al. (2001) for more information.

Socioeconomic Status (SES). Characteristics of economic, social and physical environments in which individuals live and work, as well as demographic characteristics. Measures of SES include: Income and Education quintiles/quartiles and Socioeconomic Risk Indicators (SERI) or Socioeconomic Factor Index (SEFI) scores. It is often ranked from 1 (poor) to 5 (wealthy), based on **income quintiles** that measure mean household income, and grouped into five income quintiles, each quintile assigned to 20% of the population.

Standards Test. A test written by students in Manitoba in certain grades. For Grade 12 students, Manitoba has had a provincial testing system in place since 1993, with the tests counting for 30% of students' final course mark. The current 'Standards Tests' are curriculum–based and mandatory for all students, with adaptations available for many special needs students (and exemptions for individual students as required). The annual Standards Tests are 'locally marked' by the school divisions, and assess Mathematics and Language Arts in separate tests.

Stillbirth. Death of a baby before delivery. In this report, stillbirth rates are calculated for gestational ages as early as 20 weeks.

Sudden Infant Death Syndrome (SIDS). Sudden and unexpected death of an apparently healthy baby under one year of age. Such deaths usually occur while the child is sleeping and remain unexplained even after a full investigation (Health Canada, 2005).

Tonsillectomy and/or Adenoidectomy (T/A). The surgical removal of tonsils and/or adenoid glands. In this study, this has been defined using a combination of the following procedure codes: **ICD–9–CM**: 282–2829, **ICD–10–CA**: 1FR89LA–1FR89LAAK (tonsillectomy without adenoidectomy), ICD–9: 283–2839, ICD–10: 1FR89WJ–1FR89WJAK (tonsillectomy with adenoidectomy), and ICD–9: 286–2869, ICD–10: 1FR87LA (adenoidectomy without tonsillectomy).

Traumatic Brain Injury (TBI). Damage to the brain due to a sudden head trauma (e.g., an object striking the head or puncturing the brain). Some symptoms of a mild TBI are headache, confusion, dizziness, blurred vision, fatigue, and impaired memory or concentration. Some symptoms of a moderate or severe TBI include mild TBI symptoms, nausea, seizures, an inability to regain consciousness, slurred speech, and poor coordination (National Institute of Neurological Disorders and Stroke, 2008).

Vaccine–Preventable Infections. Infectious diseases that may be prevented through **immunization coverage.**

Winnipeg Community Areas (CAs). The 12 planning districts within the **Winnipeg Regional Health Authority (WRHA)**, which have similar population numbers to the rural and northern **Regional Health Authorities (RHAs)**.

Winnipeg Regional Health Authority (WRHA). Formed in February 2000 through the amalgamation of the Winnipeg Community and Long Term Care Authority and the Winnipeg Hospital Authority. The WRHA is responsible for coordinating health services based on the needs of people in Winnipeg, including hospital, community health, home care and long term care services. Since it comprises about half the population of Manitoba, the WRHA has created 12 planning districts called the **Winnipeg Community Areas (CAs)**.

Withdrawn. In this report, a high school student who is not currently enrolled in school and has not been enrolled for the last two years.

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