

# Inequalities in child health: Bringing together new data sources to assess the roles of family, community, education and health care

Noralou P. Roos, Marni Brownell, Diane E. Watson

## Objectives

The goal of this Research Program is to identify determinants of variability in health and functioning of children, and factors that support resilience. Our analyses will focus on informing policy on ways to reduce inequities and improve the health and functioning of children in Canada. Questions to be addressed include: To what extent do children's health and functioning differ across Manitoba's educational and health jurisdictions? To what extent do individual, family, school and community characteristics, as well as the delivery of medical care across jurisdictions contribute to, or buffer against, inequities in children's health and functioning? Which policy options have the greatest potential for reducing inequalities in child health and functioning?

## Methodology

A cross-sectional methodology, using population-based data for Manitoba, will be adopted. Small area variation techniques will be used to describe individual characteristics, family circumstances, school environments, community contexts, and medical care utilization, as well as health and educational achievement of Manitoba's children. The entire Manitoba child population will be used to calculate expected health and functioning values for each region, given the region's socioeconomic characteristics. These values will be compared to the observed values to highlight which regions' outcomes are higher or lower than expected.

We will examine factors that attenuate or protect against inequities in health and educational achievement across socioeconomic levels during two periods of childhood: early in elementary school and late in high school. A longitudinal, population-based analysis will be used to evaluate the additive and cumulative effects of individual characteristics, family circumstances, school environments, and community context on child health and functioning, educational achievement, and the inequalities in health and education across socioeconomic groups.

A matched cohort design using a neighbourhood-level measure of household income will be used to compare familial and community characteristics of families that move out of the lowest income neighborhoods with those that remain in these neighborhoods. Differences in children's health and functioning will be examined for the two groups. Differences in the cost of health services for these two groups will be used to estimate the potential size of savings in health care spending due to upward movement in a family's socioeconomic status.

This Research Program builds on the existing population-based, anonymized research data repository at the Manitoba

Centre for Health Policy and Evaluation. The expanded infrastructure will include education, family services as well as health data. Anonymized individual-level data from a local school division, the Department of Genetics, and a preschool cohort study will be added as part of this Research Program. We are exploring the potential use of student data from post secondary institutions. See Table 1 for a listing of the various data sources which are being brought together for this project.

Figures 1 through 4 illustrate why bringing together these datasets hold such promise. The planning areas for the city of Winnipeg have been ordered according to their score on our frequently used measure of population health and need for health care, the premature mortality rate (deaths before age 75 per 1000 residents adjusted for age/gender differences across the areas). Areas at the bottom of the chart are those with the highest premature mortality rate: the areas whose populations are in the poorest health. These are also the areas whose residents have the poorest socioeconomic status (Figure 1). Figure 2 illustrates the substantial differences across these areas in the rate at which children are hospitalized; those areas which have the poorest health overall, and the poorest socioeconomic status, have the highest rates of children's hospitalization. As can be seen in Figure 3, the teenage pregnancy rates are highly correlated with the area ranking on premature mortality, those areas with the poorer health status and the poorer socioeconomic status having the highest teenage pregnancy rates. Finally, Figure 4 illustrates how closely children's scores on the province wide math test track area scores on health and socioeconomic status.

Having these data sources together and linkable in one place presents a unique and exciting opportunity to research basic relationships around the determinants of health, and to identify policy options for reducing health inequities and supporting resilience.

## Table 1 Data Sources for Understanding the Inequalities in Child Health

### The Current Population Health Research Data Repository

The following data are currently available to address the proposed research agenda:

#### *Registry Data*

Anonymized, individual-level identifiers for Manitoba residents eligible for provincial health care. Family identifiers. These data span 30 years, and include Vital Statistics data on births and deaths.

*Health service utilization data*

Population-based administrative and clinical information derived from contacts with physicians, home care and hospitalizations, as well as pharmaceutical use. These data have been used to derive indicators of child health status (e.g., acute/chronic diseases, intentional and unintentional injury, teen pregnancy, etc.).

Maternal serum screen results derived from the province-wide screening program have been used as a potential indicator of fetal well-being.<sup>(1)</sup>

*Socio-economic data*

Public use Census data from Statistics Canada can be used to characterize neighbourhoods and school catchment areas (e.g., household income and educational levels).

Community resource inventories. Neighbourhoods are characterized using community-level, electronic data derived from agencies (e.g., Winnipeg Police Department), as well as from neighborhood surveys (e.g., Winnipeg's Community Data Initiative). Examples of the types of community resources include youth drop-ins, day cares, pre-school centres, community centres, library book circulation, churches, criminal offenses against people or property, calls made to the Winnipeg Police Service.

Census data derived from the 20 percent of Manitobans who completed the 1986 census 2B questionnaire. MCHPE has an agreement with Statistics Canada and Manitoba Health by which we are able to link these data at the individual-level to profile the social, economic, cultural and health circumstances of a family at one point in time.

Current holdings from Manitoba Family Services and Housing data includes information on children residing in households that receive income assistance (e.g., duration of assistance).

**Expanding the Repository in Support of this CPHI Research Program***Education and social services data*

Province-wide, individual-level, linkable data from the Manitoba Department of Education, Training and Youth and Advanced Education will be made available, including student academic performance on standards examinations and high school courses, participation in apprenticeship programs and financial assistance. These data provide the opportunity to measure child functioning.

Province-wide school division/district-level (and where possible school-level) data on family characteristics (i.e., Census data related to ethnicity, language spoken at home, family income, etc.) financing education delivery, student mobility, student-teacher ratios, and entrance into post-secondary upon completion of high school. These data will provide measures of school environment and educational policy.

Winnipeg School Division No.1 has comprehensive, individual-level data on family characteristics (e.g., ethnicity, language spoken at home), participation in public and community

programs (e.g., daycare), university entrance, as well as the degree of parental participation in educational programming. These data show marked variability in socioeconomic and educational outcomes between the schools. Across non-vocational high schools, 13 to 52% of students attend university; across elementary schools, 3% to 71% of students are from lone-parent households, and median family incomes range from \$15,800 to \$74,600.

Survey data have been collected by educators in Winnipeg School Division No. 1, and will be available for this proposed research. This survey data collection was funded, in part, by the Understanding the Early Years federal initiative in sites across Canada. Data include measures of child health and family circumstance as measured by the National Longitudinal Survey of Children and Youth, and child well-being as measured by a developmental index for children entering school in September 2000.

Higher education data from Red River College. The College is the largest comprehensive community college in Manitoba with over 6,000 regular certificate and diploma students, 1,700 apprenticeship students and over 23,000 part time students annually. The College has a comprehensive database of enrolled full time students that has been developed over the last several years and a comprehensive survey database of graduate outcomes that spans the last several years.

Province-wide data on licensed public daycare use.

*Other data sources*

Individual- and family-level, linkable data from the BabyFirst and Early Start early intervention programs implemented by Healthy Child Manitoba, including developmental milestones, extent of parental participation (e.g., playing and reading with children), and language development.

A longitudinal data set based on the 1997 birth cohort of approximately 800 preschoolers living in the South Eastman RHA is currently being compiled, and will include detailed information on child development measures, child self-esteem, parental background and caregiver arrangements collected this Spring. These same children will become part of the Understanding the Early Years study in two years and the National Longitudinal Survey of Children and Youth two years after that, and the cohort will provide an unusually rich, population-based longitudinal data source. Parents have been asked permission for linkage of their responses to administrative data.

Table 1 provides examples of the data sources available and some of the key indicators and outcomes which will be developed. These measures will be derived from individual-level data that can be grouped and re-grouped to describe population-level characteristics at school district, health district and neighborhood levels.

Age / Measure	Prenatal	Birth-1 year	4/5 years	7/8 & 10/11years	12/13 & 16/17 years
Family Circumstance	Single-parent, income, mobility, income assistance	Single-parent, income, mobility, income assistance, type of care arrangement	Single-parent, income, mobility, parent employment, home language, income assistance	Single-parent, income, mobility, parent employment, home language, income assistance	Single-parent, income, mobility, parent employment, home language, school enrollment, income assistance
Data Source	PHRDR, SCC, FS	PHRDR, SCC, FS, TOTS	PHRDR, SCC, WSD, FS	PHRDR, SCC, WSD, FS	PHRDR, SCC, WSD, FS
School Context			School spirit & characteristics; counselors at school; students' readiness-to-learn	School spirit & characteristics; counselors at school; students' readiness-to-learn	School spirit & characteristics; counselors at school; students' readiness-to-learn
Data Source			WSD	WSD	WSD
Community Context	Parks, libraries, safety, housing conditions, day care availability, parent & child programs, income, ethnicity	Parks, libraries, safety, housing conditions, day care availability, parent & child programs, income, ethnicity	Parks, libraries, safety, housing conditions, day care availability, parent & child programs, income, ethnicity	Parks, libraries, safety, housing conditions, parent & child programs, income, ethnicity	Parks, libraries, safety, housing conditions, parent & child programs, income, ethnicity
Data Source	PHRDR, ET&Y, SCC, WSD	PHRDR, ET&Y, SCC, WSD, TOTS	PHRDR, E,T&Y, SCC, WSD	PHRDR, E,T&Y, SCC, WSD	PHRDR, E,T&Y, SCC, WSD
Health Care Utilization	Prenatal care, visits, hospitalizations, maternal serum screen	Visits, hospitalizations, immunization	Visits, hospitalizations, immunization	Visits, hospitalizations	Visits, hospitalizations
Data Source	PHRDR, prenatal & postpartum files, G	Immunization Registry, PHRDR	Immunization Registry, PHRDR	PHRDR	PHRDR
Child Health	Pregnancy disorder, maternal smoking, maternal serum screen	Birthweight, perinatal disorder, breastfed	Physical & mental health disorders, injury	Physical & mental Health disorders, injury	Physical & mental health disorders, injury, teen pregnancy
Data Source	PHRDR, postpartum Records, G	PHRDR	PHRDR	PHRDR	PHRDR
Child Education			Special needs status, school days attended	English/math standards test, school days attended, school mobility	English/math grades & standards test, school days attended, school mobility
Data Source			E,T&Y, WSD	E,T&Y, WSD	E,T&Y, WSD

**Table 1 Examples of Variables Available**

Note

E,T&amp;Y = Manitoba Ministry of Education, Training and Youth

FS = Manitoba Ministry of Family Services &amp; Housing

G = Department of Genetics, University of Manitoba

PHRDR = Population Health Research Data Repository at MCHPE

SCC = Statistics Canada Census

TOTS = South Eastman Regional Health Authority cohort

WSD = Winnipeg No. 1 School Division

**Acknowledgements**

This work was supported by the Department of Health of the Province of Manitoba under a contract with the University of Manitoba. The authors are indebted to Health Information Services, Manitoba Health, Manitoba Education, Training and Youth, and the Office of Vital Statistics in the Agency of Consumer and Corporate Affairs for the provision of data. . The results and conclusions are those of the authors and no official endorsement by Manitoba Health or Manitoba Education, Training and Youth is intended or should be inferred.

**References**

1 Chodirker BN, Evans JA. Maternal serum AFP screening programs: The Manitoba Experience. Current practice of prenatal diagnosis in Canada. Volume 13 of the research studies of the Royal Commission on New Reproductive Technologies. 1993.

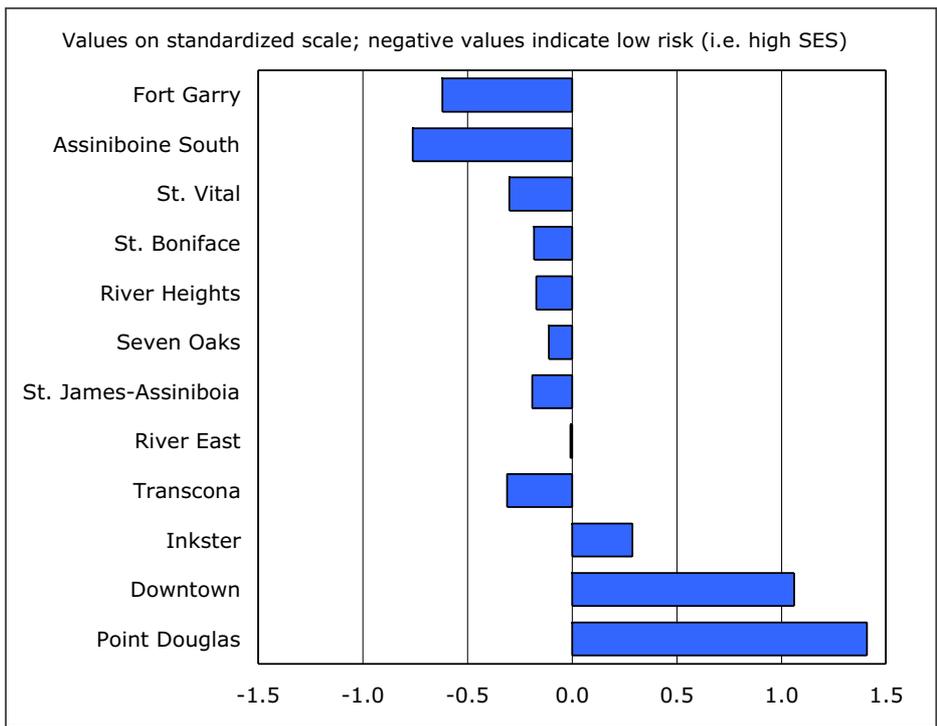


Figure 1: Socio-Economic Factor Index (SEFI) by Winnipeg Area, 1996

Figure 2: Rate of Hospitalization of Children Aged 0-19 Years Winnipeg Areas, 1998/99

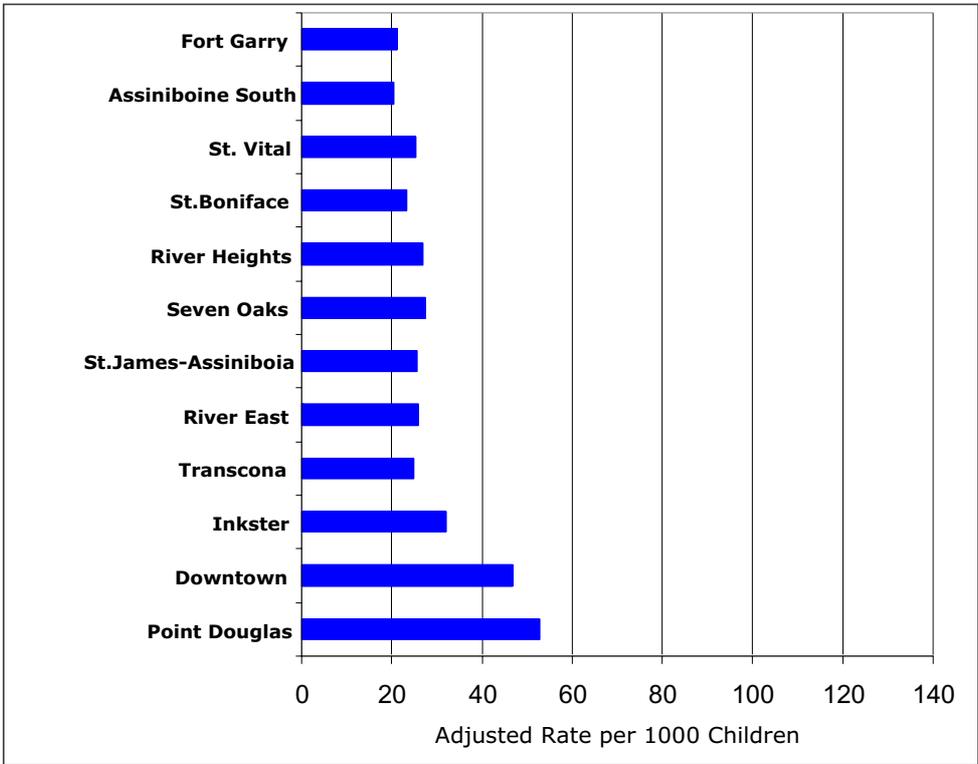


Figure 3: Teen Pregnancy Rate of Women Aged 15-19 Winnipeg Areas, 1994/95-1998/99

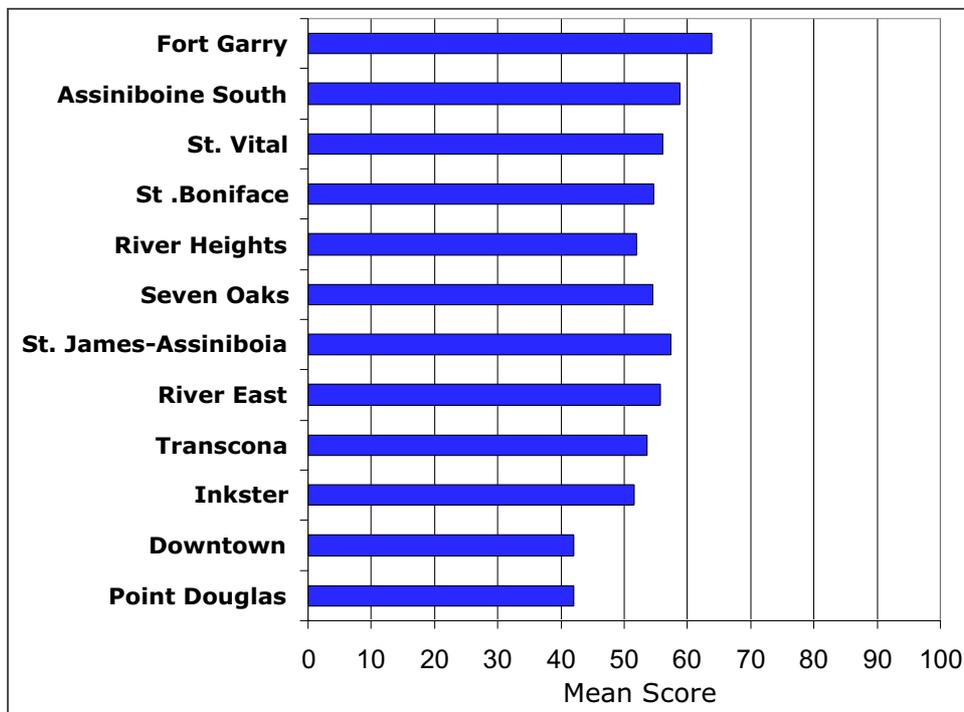
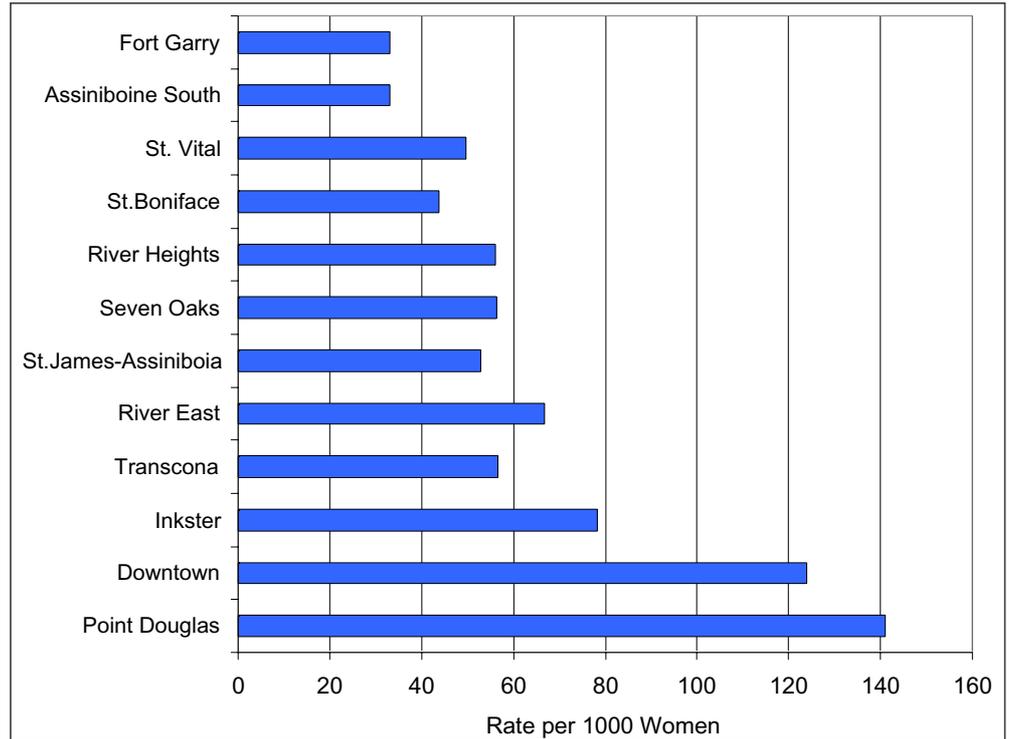


Figure 4: Grade 3 Mean Math Score, Winnipeg Areas, 1998