The Virtual Classroom

A Summary of Child Health Indicators

Patricia J. Martens, PhD

Marni D. Brownell, PhD

Anita Kozyrskyj, PhD

ABSTRACT

Objective: To provide an overview of child health indicators and health care utilization patterns in Manitoba by comparing child health outcomes for different income groups:

a) children from two different community areas of Winnipeg (Fort Garry and Point Douglas), and b) adolescents from two different parts of Manitoba (the North, and Winnipeg).

Methods: Various child health indicators derived from population-based administrative data and national surveys are reported in the articles within this supplement. Childhood morbidity and mortality, health care utilization patterns, pharmaceutical use, and regional demographic information discussed in the research articles in this supplement are summarized here using comparisons of outcomes in “virtual classrooms” of 100 children.

Results: Large gradients were observed in the comparison of the virtual classrooms of 100 high school students, including the following numbers of adolescents: females on birth control pills (Winnipeg 11, North 18); injury hospitalization annually (Winnipeg 1; North 4). Gradients are observed for some child outcomes of the virtual classroom of 100, but not for others. Examples include the following numbers of children: preterm at birth (FG 7, PD 7); breastfed at birth (FG 90, PD 66); hospitalized for lower respiratory tract infection in first year (FG 3, PD 8); parents having no high school (FG 11; PD 41).

Conclusion: Throughout Manitoba, child and adolescent health indicators and determinants of health show gradients by income as well as by geographical regions.

La traduction du résumé se trouve à la fin de l'article.

Manitoba Centre for Health Policy, Department of Community Health Sciences, Faculty of Medicine, University of Manitoba, Winnipeg, MB

Correspondence: Dr. Patricia J. Martens, Manitoba Centre for Health Policy, 4th Floor Brodie Centre, Room 408 – 727 McDermot Avenue, Winnipeg, MB R3E 0P5, Tel: 204-789-3791, Fax: 204-789-3910, E-mail: Pat_Martens@cpe.umanitoba.ca

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Greenwood,¹ a health statistician, once made the comment that “health statistics represent people with the tears wiped off.” Health statistics can, at times, distance a reader from the reality of the grassroots situation unless the data are translated into tangible word-pictures. This summary article attempts to translate the child health statistics from the various papers in the supplement into vivid word-pictures through the use of a “virtual classroom” image. One comparison focuses on differentials in adolescent health – a virtual high school of 100 students from northern Manitoba compared to the same age group in Winnipeg. The second virtual classroom comparison matches cohorts of children residing in two areas of Winnipeg – the community area with the most healthy population (Fort Garry) versus that with the least healthy population (Point Douglas). As well, our focus throughout this supplement has included two other concepts, or themes, that highlight child health differences – income level and the healthiness of the community in which the children reside. Not surprisingly, some recurring patterns emerge from many of the papers as to their effects.

The effect of income level on child health

For the majority of the indicators studied, we found that the higher the neighbourhood income level, the better the outcomes for the children. It was not just the case that those children living in poverty had poor health and the rest of the children were indistinguishable. With every increase in neighbourhood income level, there tends to be an increase in favourable outcomes. For example, at the perinatal stage, the lower the income level the greater is the likelihood that the infant will: be born at a low birthweight (which has multiple potential problems associated with it),² be readmitted to hospital,² be hospitalized for lower respiratory tract infections,³ and die in the first year of life.⁴ Even in terms of perinatal preventive health measures, the lower the income the less is the likelihood that the infant will be breastfed.²

As children grow and develop, the impact of income continues to be felt. The lower the income level, the greater the likelihood the child will be hospitalized for any reason,⁵ or be hospitalized or die from injury.⁶ In relationship to their health needs, the good news is that children from lower income groups are more likely to visit

a physician (urban children), but the downside is that they are less likely to have a usual provider for care and less likely to see a specialist.⁵ Decreasing income is also associated with an increase in a number of prescription medications: antibiotics (urban children only), iron supplements, pain relief drugs, antidepressants (urban children only), antipsychotics (urban children only) and anxiolytics (urban children only).⁷ During adolescence, decreasing income is associated with increasing teen pregnancies.⁸

Embedding child health within regional population health

Health outcomes and health care use also vary considerably across regions in Manitoba. And for many of the child health indicators examined, this regional variation is not random but related to characteristics within the regions themselves. How healthy the population is within a region is related to the socioeconomic conditions within that region, and both these in turn are related to many of the indicators of child health. The poorer the health of the population and the less favourable the socioeconomic conditions, the greater the likelihood of unfavourable child health outcomes. By ordering the graphs in this supplement by increasing premature mortality rate (PMR) down the y-axis, the regional graphs highlight the differences in child health associated with decreased regional population health and high socioeconomic risk (see Martens et al., this issue, explaining PMR and its relationship to the socioeconomic factor index SEFI).⁹ As well, many of the papers in this supplement provide correlations of the various child health indicators with PMR and SEFI. As an example, Figure 1 shows increased health risk (infant mortality) with decreasing healthiness and socioeconomic well-being regionally.

There are significant positive associations between the PMR and numerous child health indicators, including such diverse indicators as child mortality,⁴ not being breastfed,² teen pregnancy,⁸ injury hospitalization and mortality,⁶ overall hospitalization,⁵ lower respiratory tract infection,³ prescription rates for NSAIDs and antidepressants (at the RHA, but not at the Winnipeg area level),⁷ Grade 3 math scores,¹⁰ and percent of children transferred to different schools within a year.¹⁰ On the other hand, some of the anomalies are just as interesting – e.g., those child health indicators not

Figure 1. Regional proportion of infant mortality (excluding <500 g and <20 weeks gestation) versus regional premature mortality rate, RHAs and Winnipeg Community Areas

associated with the healthiness of the population, such as high birthweight rates,² some health conditions such as asthma, cardiovascular conditions, and seizure disorders,³ some prescription rates such as ADHD drugs, narcotic analgesics and antipsychotics,⁷ and availability of licenced day care spaces and library books.¹⁰

The virtual classrooms: Word-pictures of geographical disparities

How does all this information translate into the real world? Let's consider two different comparisons to illustrate the practical meaning of differences in child health indicators across regions. First, we compare two hypothetical high schools in two different regions of Manitoba, with 100 students in each (50 of each sex). Second, we compare two hypothetical cohorts of children in two different community areas within Winnipeg, looking at various measures over the childhood lifetime of 100 infants in each community area. The data for these comparisons are taken from various articles within this supplement.

High school comparison

For comparisons between a cohort of 100 adolescents in Winnipeg with 100 in the North, we used the averages of regional child health indicators applied to the cohort of 50 male and 50 female students in each. The North refers to the combined regional health authorities (RHA) of Burntwood, Churchill and Nor-Man. The

RHAs in northern Manitoba tend to have the highest regional PMRs in the province, indicating that the regional populations are at high socioeconomic risk and in poorer health. See Table I for an overview of the adolescent virtual classroom comparison.

Compared to Winnipeg, the virtual classroom of high school students in the North will report a slightly higher number having sexual intercourse within the past year compared to Winnipeg (46 versus 42), but fewer will use condoms at last coitus (30 versus 36), possibly explaining the elevated rates of chlamydia in both males (1 versus 0) and females (4 versus 1) in the North. More females in the North will use oral contraceptives (18 versus 11) in comparison to Winnipeg females, yet over double the number of teen pregnancies will occur in the North (6 or 7 versus 3).

Over three times the number of North students will be hospitalized (18 versus 5) overall, with about one third of those hospitalizations requiring relocation to Winnipeg from the northern area. Hospitalization due to injury would affect 4 North teens compared to less than 1 teen in Winnipeg. Violence to self is over 10 times more likely to be the reason for injury hospitalization for teens from the North compared to their Winnipeg counterparts.

The Winnipeg teens will make more visits to physicians – 3.4 visits per student compared to 2.1 for the students in the North – despite the North being a region of poor

TABLE I

The Virtual Classroom: Comparisons of a High School in Winnipeg and in Northern Manitoba**In a High School of 100 Students (50 male, 50 female):**

	Winnipeg	Northern RHAs
Sexual intercourse within the past year (d)	42	46
Used condoms the last time (d)	36 (86% of those sexually active)	29 (63% of those sexually active)
Females on birth control pill (d)	11	18
Teen pregnancy (d)	3 females	6 or 7 females
Chlamydia (d)	1 female, 0 male	4 females, 1 male
Injury hospitalization (f)*	1 (0.7)	4
Hospitalization for any reason (g) *	5 (almost all occurring in Winnipeg)	18 (about 1/3 of these are in Winnipeg)
Physician visits per person (g) *	4 per year (75% are with a GP)	2 per year (91% are with a GP)
Medications (h)	3 (2.5) on antidepressants, 1 on psychostimulants	1 (1.5) on antidepressants, 0 (0.25) on psychostimulants

Virtual classroom: comparisons of a high school in Winnipeg and in northern Manitoba

* this is age-specific data for ages 15 through 19 years, whereas the supplement article shows graphs for all ages.

a. Embedding child health within a framework of regional health: Population health status and sociodemographic indicators⁹

b. A matter of life and death for Manitoba's children: An overview of birth rates and mortality rates⁴

c. Being born in Manitoba: A look at perinatal health issues²

d. Factors affecting adolescent reproductive health in Manitoba⁸

e. Assessing health status in Manitoba children: Acute and chronic conditions³

f. Childhood injury rates in Manitoba: Socioeconomic influences⁶

g. Health service utilization by Manitoba children⁵

h. Prescription medications in Manitoba children: Are there regional differences?⁷

i. Community resources and determinants of the future health of Manitobans¹⁰

TABLE II

The Virtual Classroom: Comparisons of a Cohort of Young Children in Two Areas of Winnipeg Having the Poorest and Best Overall Healthiness**In a Cohort of 100 Children in Winnipeg:**

	Fort Garry (Region with the Healthiest Population)	Point Douglas (Region with the Poorest Population Health)
Preterm (c)	7	7
Low birthweight (<2500 g) (c)	6	6
High birthweight (>4000 g) (c)	14	12
Breastfed at birth (c)	90	66
Infant mortality (b)	0	1
Admitted to hospital within 6 weeks of discharge (c)	2 to 3	4 to 5
At least one health care contact (MD or hospitalization) for lower respiratory tract infection in first year (e)	30	54
Hospitalized for lower respiratory tract infections in first year (e)	3	8
Hospitalizations (g)	2	5
Physician visits per child (g)	3.7 (48% with a GP)	4.5 (64% with a GP)
1-4 antibiotic prescriptions, 5+ (h)	41 get 1-4, 3 get ≥5	46 get 1-4, 5 get ≥5
Asthma (5-9 years old) (e)	14	14
Hospitalized for injury 0-19 years old (f)	0 (0.2)	1 (0.8)
Living in the lowest income quintile grouping (a)	10	56
Living in lone parent family (a)	12	28
Parents unemployed (a)	4	14
Parents having no high school (a)	11	41
Access to day care spaces (i)	13	11
Access to library books (i)	2.5 books per person	0.6 books per person
Average Grade 3 Math mark (i)	64%	42%
Transferred to another school during the year (i)	4	28

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health. However, the northern teens may visit nursing stations for their health care needs and these visits are not captured in our database.¹¹ More of the Winnipeg teens will also be prescribed medications for mental health

problems: 2 or 3 of our Winnipeg teens will be prescribed psychostimulants compared to 1 or 2 in the North, and 1 Winnipeg teen will be prescribed antidepressants compared to none in the North. Note, however, that

dispensation of medications from nursing stations may lead to undercounting prescriptions for our northern students.

Winnipeg school comparison

Within Winnipeg, we have chosen two hypothetical virtual classrooms of younger children, one from the community area of Fort Garry which has the lowest PMR (and therefore the healthiest population and lowest socioeconomic risk), and the other from the community of Point Douglas with the highest PMR (the least healthy population and highest socioeconomic risk). The values shown in Table II for this comparison are for children of all ages.

Interestingly, about the same number in each classroom would be born with a low birthweight (6) or preterm (7), with only slight elevations in the Point Douglas area. The Fort Garry classroom would have 14 who had a high birthweight, compared to 12 in Point Douglas.

Once born, though, the differences for our two sets of children begin to emerge. Far fewer of the Point Douglas children were breastfed compared to the Fort Garry children (66 versus 90). And one of the children who would have gone to the Point Douglas school will die in the first year of life, whereas none of the Fort Garry children will die during this time period. Double the number of Point Douglas children will have been admitted to hospital as newborns within 6 weeks of discharge compared to Fort Garry (4 versus 2), and almost double will have a health care contact for a respiratory tract infection in their first year

of life (54 versus 30). More of the Point Douglas children will have been hospitalized for lower respiratory tract infection as an infant (8 versus 3). Clearly, in the first year of life, the disadvantages in terms of health and development for the Point Douglas children are already accruing.

Use of the health care system is somewhat related to overall population health disparity. In any given year, Point Douglas children will be hospitalized 2.5 times more than their Fort Garry counterparts (5 versus 2). Point Douglas children will also make more visits to physicians each year (4.5 visits each) compared to the Fort Garry children (3.7 visits each), however, a much higher percentage of Fort Garry children will see specialists. Considering the relative health disparity, it is surprising that the antibiotic prescription profiles are similar, with over 40 of the children in both classrooms having from 1 to 4 antibiotic prescriptions (46 Point Douglas, 41 Fort Garry), but more Point Douglas children will have had at least five prescriptions during the year (5 versus 3). One of the Point Douglas students will sustain an injury serious enough to be hospitalized, compared to none of the Fort Garry students. Interestingly, between 5 and 9 years of age, the number of students in each school with asthma will be the same (14).

Children in the Point Douglas school will experience socioeconomic conditions which put them at greater risk for poorer health, both in childhood and later in adulthood. Five times as many students in Point Douglas live in households where the income is in the lowest income quintile, compared with Fort Garry (56 versus 10). There are far more students in the Point Douglas classroom who live in lone parent families (28 versus 12), with unemployed parents (14 versus 4), and with parents who have not completed high school (41 versus 11). These factors may be related to the higher number of Point Douglas children who will transfer schools: 28 Point Douglas children will transfer schools at some point during the year, compared to only 4 Fort Garry children. It is no wonder that the performance of children from the two schools on Grade 3 Math tests also differs, with a mean score at the Point Douglas school of 42% compared to 65% at the Fort Garry school (scores are weighted for the number of students writing the exam).

Access to community resources also differs for the children at the two different schools. The children at the Fort Garry school have access to about 2.5 public library books per child, compared to less than 1 public library book for children at the Point Douglas school. There are also 13 day care spaces available to the 100 Fort Garry children, compared to 11 spaces for the Point Douglas children.

The last word

Health statistics do, indeed, implore the reader to look behind the numbers to the people. In this Epilogue, we have tried to bring to life the health statistics for the children of Manitoba by focussing on health indicators and health care use patterns of hypothetical groups of Manitoba children. By contrasting the extremes, we highlight the disparities by income, by neighbourhood, and by geographical region. The reader must also keep in mind, however, that child health within income groupings or geographical groupings is not always homogeneous. In every region and within every income level, there is room for improvement in child health. The child health indicators within this supplement enable us to call for action at the macro-level of policy and programs, addressing not only the individual health issues, but the socioeconomic well-being of the families, communities and regions in which our children reside.

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RÉSUMÉ

Objectif : Donner un aperçu des indicateurs de la santé des enfants et des modes d'utilisation des soins de santé au Manitoba en comparant les résultats de santé d'enfants pour différentes catégories de revenu : a) les enfants de deux communautés de la région de Winnipeg (Fort Garry et Point Douglas) et b) les adolescents de deux régions du Manitoba (le Nord et Winnipeg).

Méthode : Divers indicateurs de santé des enfants, dérivés de données administratives et d'enquêtes nationales représentatives, sont décrits dans les articles du présent supplément. La morbidité et la mortalité des enfants, les modes d'utilisation des soins de santé, la consommation de produits pharmaceutiques et les données démographiques régionales dont il est question dans le supplément sont résumés ici en comparant les résultats obtenus dans des « classes virtuelles » de 100 enfants.

Résultats : De hauts gradients ont été observés en comparant les classes virtuelles de 100 élèves du secondaire, notamment dans le nombre d'adolescentes prenant la pilule anticonceptionnelle (Winnipeg 11, Nord 18) et le nombre annuel d'élèves hospitalisés en raison de blessures (Winnipeg 1; Nord 4). Dans les classes virtuelles de 100 enfants, on a observé des gradients pour certains résultats, mais pas pour d'autres. Par exemple : nombre d'enfants nés avant terme (FG 7, PD 7); enfants allaités à la naissance (FG 90, PD 66); enfants hospitalisés pour des infections des voies respiratoires inférieures avant l'âge d'un an (FG 3, PD 8); et enfants dont les parents n'ont pas terminé leurs études secondaires (FG 11; PD 41).

Conclusion : Partout au Manitoba, les indicateurs et les déterminants de la santé des enfants et des adolescents montrent des gradients selon le revenu et la zone géographique.