

*Methods & Technical Appendix*  
*Health Status Reporting Series 3*  
*Advancing Health Equity in Health Care*  
*Saskatoon Health Region*



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## Indicator Data Types

### Hospital Discharge (Hospitalization) Data

#### Time Frame

1995 - 2011

#### Data source

Saskatchewan Ministry of Health's year-end hospital files.

#### Definition

Data include all acute care inpatient and psychiatric inpatient hospitalizations. This data is based on total number of hospital discharges, irrespective of how many times the same individual is discharged. For example, one person could present five times in a year for a mental illness, and it would be counted as five discharges. As well, a resident may be admitted to one hospital, and be transferred to another hospital which would count as two discharges, even though the individual was hospitalized for the same event.

#### Indicators Included and Applicable ICD-9 and ICD-10 codes:

|  | ICD-9 Codes | ICD-10 Codes   |
|--|-------------|----------------|
| Cancer                                       | 160 – 238   | C00 – D49      |
| Chronic Obstructive Pulmonary Disease (COPD) | 490 – 496   | J40 – J47      |
| Diabetes                                     | 250         | E10 – E14      |
| Heart Disease                                | 410 – 414   | I20 – I25      |
| Injury                                       | E800 – E999 | V00 – Y98      |
| Intentional Self-Harm                        | E950 – E959 | X60 – X84, Y87 |
| Mental Illness                               | 290 – 318   | F00 – F99      |
| Stroke                                       | 430 – 438   | I60 – I69      |
| Teen Abortion <sup>1</sup>                   |             |                |

#### Limitations

ICD-9 codes are used for all hospital separations prior to 2000/01 fiscal year, and ICD-10 are used after this date. Differences between data coded in ICD-10 and ICD-9 occur for several reasons. The conversion tables are not perfect due to differences in the structure of the two coding systems.

#### Inclusion/Exclusion

All acute care inpatient and psychiatric inpatient hospitalizations of SHR residents in Saskatchewan and out-of-province/country hospitals.

### Physician Billing Data

#### Time Frame

1996 – 2009

#### Data Source

Saskatchewan Ministry of Health's Medical Services Branch.

<sup>1</sup> Includes abortions/miscarriages of women ages 15 to 19 years; in patient and day surgery cases included.

**Definition**

Data include diagnosis codes that physicians use when patients come to see them. Diagnosis is in ICD-9 format for all years.

**Indicators Included and Applicable ICD-9 codes:**

|  | ICD-9 Codes |
|--|-------------|
| Cancer                                       | 160 – 238   |
| Chronic Obstructive Pulmonary Disease (COPD) | 490 – 496   |
| Diabetes                                     | 250         |
| Heart Disease                                | 410 – 414   |
| Injury                                       | E800 – E999 |
| Intentional Self-Harm                        | E950 – E959 |
| Mental Illness                               | 290 – 318   |
| Stroke                                       | 430 – 438   |

**Limitations:**

Only one diagnosis code is captured.

**Inclusion/Exclusion**

Data is not captured for services by salaried physicians (approx. 30% of provincial physician supply).

## Mortality Data

**Time Frame**

1995 – 2009

**Data Source**

Saskatchewan Ministry of Health's Vital Statistics Branch.

**Definition**

Deaths are those that occur to SHR residents using data from Saskatchewan Vital Statistics, Alberta Vital Statistics, and CIHI hospital separations for deaths occurring in all other provinces. ICD-9 codes are used for all deaths before calendar year 2000 and after this date ICD-10 codes are used.

**Indicators Included**

All-Cause Mortality  
Infant Mortality

**Limitations**

Conversion between ICD-9 and ICD-10 codes can be problematic for certain disease conditions because the codes are not comparable. Vital Statistics data is based on the underlying cause of death, which is limited to one diagnosis. Readers should note that there may be more than one contributing cause of death, but that only the most responsible cause is used.

**Inclusion/Exclusion:**

Includes those persons with Saskatchewan recorded as their province of residence.

## Birth Data

### **Time Frame**

1995 – 2009

### **Data Source**

Saskatchewan Ministry of Health's Vital Statistics Branch.

### **Definition**

Births occurring to SHR residents from 1995 to 2009 using data from Saskatchewan Vital Statistics, Alberta Vital Statistics, and CIHI hospital separations for births occurring in all other provinces.

### **Indicators Included:**

High Birth Weight

Low Birth Weight

Teen Pregnancy<sup>2</sup>

### **Inclusion/Exclusion:**

Includes only those mothers who have put Saskatchewan as their province of residence.

## Communicable Disease Data

### **Time Frame**

2004 – 2010

### **Data Source**

Public Health Information System (PHIS) and Communicable Disease Control (CDC) Database  
Saskatchewan Ministry of Health's Vital Statistics Branch.

### **Definition**

All disease reportable under the Public Health Act is reported to the Regional Health Authority's Disease Control department of Population and Public Health with the exception of tuberculosis which is monitored by the Saskatchewan Tuberculosis Control Program. Reportable disease is entered in the Public Health Information System (PHIS) and CDC database.

### **Indicators Included**

Chlamydia

Gonococcal

Hepatitis C

### **Limitations**

Hepatitis C requires cross checking with provincial registries to ensure cases have not been previously reported in other jurisdictions. Annual case counts may change over time.

### **Inclusion/Exclusion**

Sexually transmitted infection counts are aggregated by confirmed case status and case status date; other reportable disease is aggregated by date reported (CDC database).

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<sup>2</sup> Includes births, stillbirths, and miscarriages of women ages 15 to 19 years; rates are compared to N of all pregnancies.

## Tuberculosis Data

### **Time Frame**

2004 – 2010

### **Data Source**

Saskatchewan Tuberculosis Information System (TBIS).

### **Definition**

Someone can be diagnosed with tuberculosis in one of two ways:

1. Positive culture for tuberculosis
2. Signs and symptoms of tuberculosis (e.g. x-ray of lung) plus a positive result on the Tuberculosis Skin Test (TST)

### **Indicators Included**

Incidence of tuberculosis (new cases only).

### **Inclusion/Exclusion**

Saskatoon Health Region residents only.

## Child Immunization Data

### **Time Frame**

2002 – 2011

### **Data Source**

Saskatchewan Immunization Management System (SIMS).

### **Definition**

Children turning two years of age in the years 2002 to 2011 that had received two doses of vaccine protective against measles, mumps and rubella by their second birthday.

### **Limitations**

Children immunized in First Nations clinics may not be updated in SIMS and this may lead to an underestimation of coverage percentages in some geographic areas. This underestimation is believed to be small.

### **Inclusion/Exclusion**

Children with an active Person Registry System (PRS) are included. All other PRS statuses are excluded.

## Life Expectancy at Birth<sup>3</sup>

### **Definition**

Life expectancy predicts the average number of years that an individual born today is expected to live, based on the death rate of today's population. This does not reflect the quality of those years, only quantity.

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<sup>3</sup> References for one pager can be found in the calculation description section.

## Calculation

Life expectancy calculations<sup>i</sup> were derived from the Association of Public Health Epidemiologists of Ontario. The abridged life table<sup>ii</sup> calculates life expectancy based on Chiang (1984)<sup>iii</sup>, adapted for local area use<sup>iv</sup>. For each data point, mortality data for five years was used as the numerator and one year worth of population data<sup>v</sup> was used as the denominator. For example, to calculate life expectancy in 2007, 2005 to 2009 mortality data was used as the numerator in each age group with 2007 population used as the denominator. In some cases, the number of deaths in a five year time period was 0, in which case, an average value of 0.2 (1 death divided by 5 years) was imputed for each age group where this occurred.

Where Canada values are shown, each data point has three years of mortality used in the numerator. For example, to calculate life expectancy in 2007, 2006 to 2008 mortality data was used in the numerator.

## Limitations

Reliable death data for Saskatoon Health Region residents from Vital Statistics is limited up to 2009.

## Inclusion/Exclusion

Includes those persons with Saskatchewan recorded as their province of residence.

## Methods

### The Deprivation Index

A deprivation index is a tool used to monitor socio-economic inequalities in health. The most widely used deprivation index for Canada is that developed by the Institute National de Santé Publique du Québec<sup>vi</sup>. There are material and social components to the index. Data for the deprivation index comes from the 2006 Census. Deprivation indices have been created since 1991 and all data is available online<sup>vii</sup>.

The variables included in the material component of the deprivation index are:

- The proportion of people aged 15 years and older with no high school diploma
- The employment to population ratio of people aged 15 years and older
- The average income of people aged 15 years and older

The variables included in the social component of the deprivation index are:

- The proportion of individuals aged 15 years and older living alone
- The proportion of individuals aged 15 years and older who are separated, divorced or widowed
- The proportion of single-parent families

The deprivation index is calculated at the Census dissemination area (DA) level. A DA is composed of one or more adjacent dissemination blocks, and is the smallest standard geographic area for which all Census data are released. A DA has a population of 400 to 700 persons<sup>viii</sup>.

Factor scores for both the material and social components were calculated via Principal Component Analysis for each dissemination area across Canada. The dissemination areas were then ranked by factor score and assigned to a quintile (approximately 20% of the population), where quintile 1 is the most affluent (least deprived) quintile and quintile 5 is the least affluent (most deprived) quintile. This was done separately to create the material and social indices. DAs with no or sparse population, with a high proportion of collective households or institutionalized persons, or location on First Nations reserves are not classified. The breakdown of Saskatoon by the **national index** (a.k.a. "national cut-offs") is seen in table 1.

Table 1. Saskatoon Population by Quintile, National Index.

| Quintile                                 | Material | %    | Social  | %    | Total   | %    |
|--|----------|------|---------|------|---------|------|
| 1  | 63 514   | 31.4 | 35 624  | 17.6 | 50 861  | 25.1 |
| 2  | 56 910   | 28.1 | 27 003  | 13.3 | 33 508  | 16.6 |
| 3  | 31 490   | 15.6 | 27 868  | 13.8 | 43 977  | 21.7 |
| 4  | 18 633   | 9.2  | 40 448  | 20   | 24 710  | 12.2 |
| 5  | 26 432   | 13.1 | 66 036  | 32.6 | 43 923  | 21.7 |
| Null                                     | 5 361    | 2.6  | 5 361   | 2.6  | 5 361   | 2.6  |
| Total Saskatoon population (2006 Census) | 202 340  |      | 202 340 |      | 202 340 |      |

In order to examine relative deprivation at the Saskatoon level (i.e. where quintile 5 represents the most deprived 20% of Saskatoon, rather than the most deprived 20% of Canada), the Public Health Observatory developed quintiles in-house using only factor scores for DAs within the city of Saskatoon. The 2006 Census population for the city of Saskatoon was divided into fifths. The DAs were ranked on material deprivation scores and categorized into quintiles, and the process was repeated on the social deprivation scores.

A total deprivation index was also developed, combining the results of the material and social quintiles. The total deprivation 'quintile' is used to represent a combination of material and social deprivation. These calculations were completed by the PHO on the advice of the Canadian Institute for Health Information, using the matrix in Figure 1. For example, if a particular dissemination area fell in the second quintile on the material component and in the fourth quintile of the social component, it would rank in the third category of total deprivation. Due to the nature of the categorization, these do not represent true quintiles. The breakdown of city of Saskatoon by the total local deprivation index is seen in Table 2.

Table 2. Saskatoon Population by Quintile, Total Local Index.

| Quintile        | Material | %    | Social  | %    | Total   | %    |
|-----------------|----------|------|---------|------|---------|------|
| 1               | 39 353   | 19.4 | 39 572  | 19.6 | 47 012  | 23.2 |
| 2               | 39 418   | 19.5 | 39 690  | 19.6 | 34 503  | 17.1 |
| 3               | 39 536   | 19.5 | 39 612  | 19.6 | 35 444  | 17.5 |
| 4               | 39 528   | 19.5 | 39 366  | 19.5 | 36 460  | 18   |
| 5               | 39 144   | 19.3 | 38 739  | 19.1 | 43 560  | 21.5 |
| null            | 5 361    | 2.6  | 5 361   | 2.6  | 5 361   | 2.6  |
| Total Saskatoon | 202 340  |      | 202 340 |      | 202 340 |      |



For the purposes of the Achieving Equity in Health Care report, the **total local deprivation index** was used for Saskatoon data only. The map of Saskatoon with the respective quintile breakdown can be found in Figure 2. Postal code information available in each of the aforementioned data sources allow individual clients to be assigned to the quintiles.

Figure 1. Combining material and social deprivation quintiles into total deprivation.

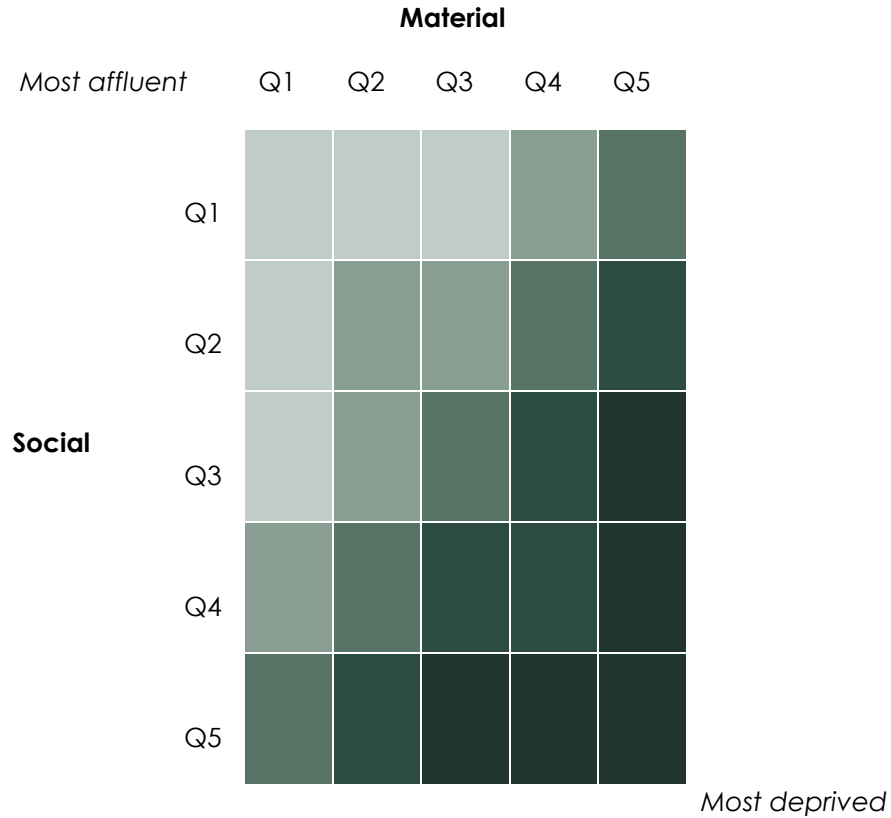
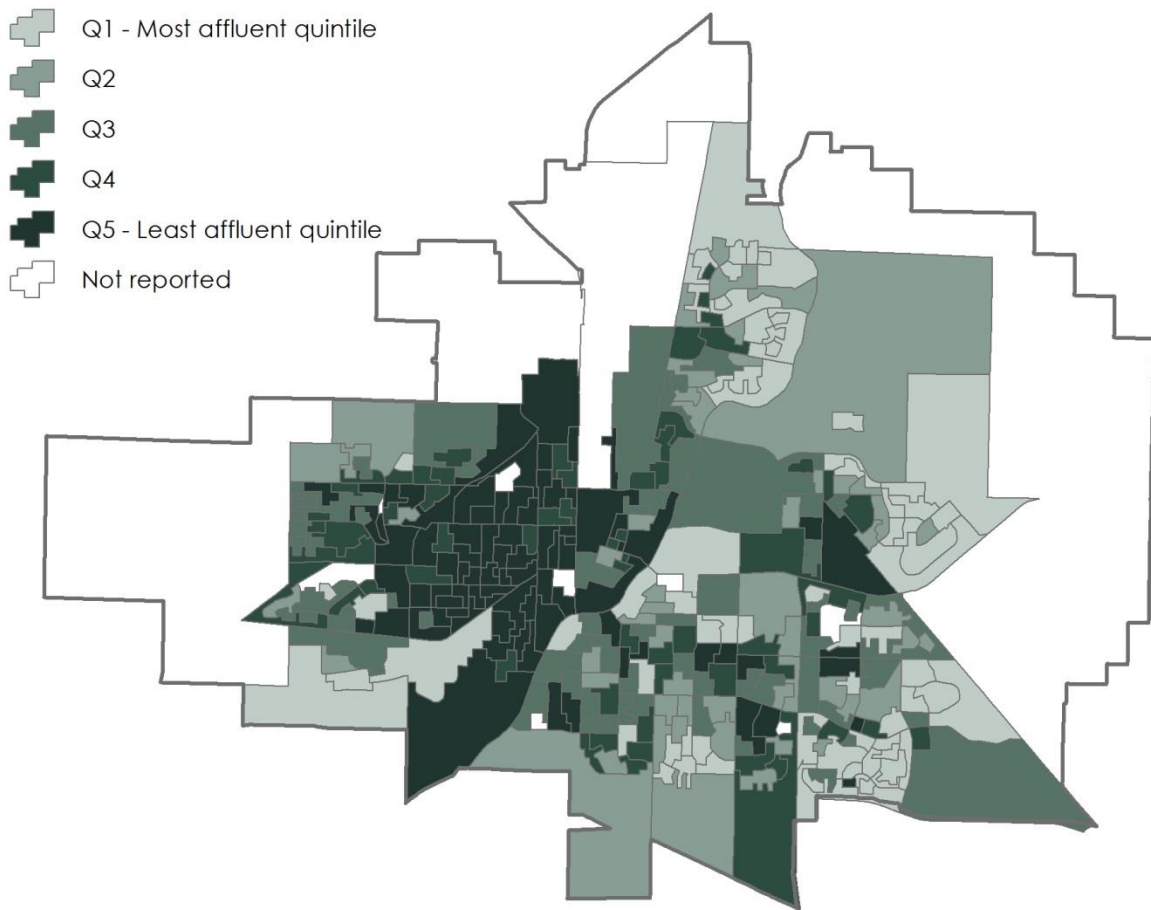


Figure 2. Local total deprivation, Saskatoon, 2006.



### Equity Measures

Methods used to measure disparity typically include absolute and relative measures. Absolute measures of disparity examine differences in two population rates, whereas relative measures of disparity examine differences in ratios (ratio of “worst” group to “best” group)<sup>x</sup>. Therefore, since absolute and relative measures of disparity are different, caution should be used when interpreting the results from such methods, as both yield different interpretations (differences in rates, compared to differences in rate ratios). Absolute measures of disparity may be easier to communicate, especially when presenting research to policy makers<sup>x</sup>.

Some<sup>x</sup> suggest that while both absolute and relative measures of disparity can be used, both may provide different conclusions about changes over time. Both measures can be

complementary. The best indication of a decrease in disparity is when both absolute and relative measures of disparity show decreases. A benefit of using relative measures of disparity is that changes in the reference group are accounted for.

In consideration of this, health equity indicators should use both relative and absolute measures of disparity. Table 3 shows an overview of the three main calculations that are used throughout the Achieving Equity in Health Care report.

Table 3: Summary Measures of Disparity

| Index                           | Calculation  | Type of Measure  | Interpretation   |
|---------------------------------|--|--|--|
| Disparity Rate Ratio (DRR)      | $(\text{Quintile 5}) / (\text{Quintile 1})$  | <i>Relative (proportional) difference in occurrence of health problems</i> | Represents relative increase or decrease in the inequality gap between the lowest and highest deprivation quintile groups.             |
| Disparity Rate Difference (DRD) | $(\text{Quintile 5}) - (\text{Quintile 1})$  | <i>Absolute difference in occurrence of health problems</i>                | Represents a way to express how many "more" (or "less") events occur in the highest deprivation quintile group compared to the lowest. |
| Gini Coefficient                | A summary measure of inequality created from the area between the Lorenz curve and the hypothetical line of absolute equality, expressed as a single number between 0 & 1. | <i>Inequality – e.g. income inequality, health inequality, etc.</i>        | A Gini coefficient of 0 would indicate no inequality. As the number gets closer to 1, it indicates greater inequality.                 |

## Disparity Rate Ratio (DRR)

### Definition

A relative measure of the gap between those living in the areas of highest deprivation (Q5) and lowest deprivation areas (Q1).

### Limitations

Due to the relative nature of the measure, both groups could be declining equally with undesirable outcomes and show no difference in the DRR.

### Calculation

Divide the rate of the lowest deprivation area group (Q1) by the rate of the highest deprivation area group (Q5) at a given time period.

### **Example**

The all-cause mortality rate in the highest deprivation quintile in 1995 was 8.23 and was 3.61 the lowest deprivation quintile, giving a DRR in 1995 of 2.28 ( $8.23 / 3.61 = 2.28$ ). The DRR for all-cause mortality in 1995 shows that there are 2.28 times or 128% more deaths per thousand people in the highest areas of deprivation compared to the lowest deprivation areas. We can then examine the change in DRR over time by taking the percentage change from the DRR in 1995 of 2.28 and 2009 of 2.34, which is an increase of 3%.

## **Disparity Rate Difference (DRD)**

### **Definition**

An absolute measure of the gap between those living in the areas of highest deprivation (Q5) and lowest deprivation areas (Q1).

### **Limitations**

Due to the absolute nature of the measure, it is sensitive to small numbers and can exaggerate differences when viewed as a percentage.

### **Calculation**

Subtract the rate of the lowest deprivation area group (Q1) by the rate of the highest deprivation area group (Q5) at a given time period.

### **Example**

The all-cause mortality rate in the highest deprivation quintile in 1995 was 8.23 and was 3.61 the lowest deprivation quintile, giving a DRD in 1995 of 4.61 ( $8.23 - 3.61 = 4.61$ ). The DRD for all-cause mortality in 1995 shows that there are 4.61 more deaths per thousand people in the most deprived neighbourhoods compared to the least deprived neighbourhoods. We can then examine the change in DRD over time by taking the percentage change from the DRD in 1995 of 4.61 and 2009 of 5.38, which is an increase of 17%.

## **Lorenz Curve**

### **Definition**

A Lorenz Curve is the graphical representation of inequality. Lorenz curves are commonly used to measure income inequality.

### **Calculation**

A Lorenz curve graphs the cumulative distribution of an outcome, cases of different health outcomes in this report, and the cumulative distribution of the population. If there were equality in the population, then the outcome would be equally distributed by the population size, so 20% of the population would have 20% of the outcome, 40% would have 40% of the outcome, continuing to 100%. Typically the Lorenz curve bends due to inequality in the data. When the

Lorenz curve bends a greater portion of the disease outcome is present for a given population percentage.

Typically, the Lorenz curve is a plot of the cumulative proportion of total population versus the cumulative proportion of total disease cases. Our method differed slightly in that we calculated and plotted the cumulative proportion of population by deprivation quintile versus the cumulative proportion of a health outcome by quintile of deprivation.

### **Example**

The Lorenz curve for all-cause mortality shows that 41% of the deaths occurred for those residing in the highest deprivation areas who represent 24% of the population. For the second quintile of area deprivation 23% of the deaths are represented in 18% of the population. For those residing in the lowest deprivation areas 9% of the deaths occur in 23% of the population. A Lorenz curve that is above the equidistribution line represents more disease cases among the highest deprivation areas (Q5) in the population. A Lorenz curve below the equidistribution line represents more disease cases among the lowest deprivation areas (Q1) in the population. However, some indicators are not diseases, such as immunization. In this case, a Lorenz curve below the equidistribution line represents less immunization in the most deprived group.

### **Gini Coefficient**

#### **Definition**

A Gini coefficient is a summary measure of the Lorenz curve. For our purposes the Gini coefficient quantifies the degree of inequality in the distribution of disease in the population by deprivation quintile.

It gives a single number that represents the degree of inequality in the population. A Gini coefficient can have a value between zero and one. Zero means no inequality and one means maximal inequality with those residing in the most deprived neighbourhoods having every case of the outcome.

The Manitoba Center for Health Policy<sup>xi</sup> suggests that Gini coefficients of less than 0.06, between 0.06 and 0.20, and greater than 0.20 represent low, medium and high degrees of inequality, respectively. We have adopted this approach.

#### **Limitations**

The same value may result from many different distribution curves as the area under the curve can stay the same while taking a different shape. Thus, the gini coefficient is a measure of the degree of inequality in the total population, not of the gap simply between the most and least deprived quintiles.

#### **Calculation**

The Gini coefficient is equal to the area between under the plotted Lorenz Curve and the Line of Equality.

### **Regression Analysis**

In order to adjust beyond age and sex, regression analysis was utilized in this report. For each of the indicators, negative binomial regressions were conducted and included age, sex, year, quintile of deprivation and a year\*quintile of deprivation interaction term as dependent

variables. The model is offset by the log of population size and robust standard errors were estimated. Regression results can be found in the detailed analysis of each indicator.

**A complete summary table of calculations for all indicators can be viewed in Appendix A.**

## Data Interpretation

The Inequalities Prioritization Matrix (IPM)

To make policy and planning recommendations in a meaningful way, an Inequalities Priority Matrix (IPM) was developed which combines the results from the rate ratio, rate difference, Gini coefficient, changes in rate ratio and difference, and overall rate for each outcome. The IPM does not act as a formal statistical test, but rather as a guide for identifying priorities based on changes over time and absolute inequality. The IPM uses measures of inequality and provides a method for assigning value judgments about the equitable distribution of health outcomes by deprivation quintiles.

The IPM is a seven step process:

1. Outcomes are sorted, in descending order, by most recent Gini coefficients available and given a ranked score in descending order. Because the gini coefficient is sensitive for inequalities across the quintiles (unlike the DRR and DRD), it is used to categorize the indicators into low, moderate, and high inequality right from the beginning. This categorization is retained as the other steps are conducted. Therefore, the outcomes with the highest degree of inequality have the lowest rank score.
2. Outcomes are sorted, in descending order, by disparity rate ratio in the most recent time period and given a ranked score in descending order.
3. Outcomes are sorted, in descending order, by disparity rate difference in the most recent time period and given a ranked score in descending order.
4. The percent change in DRR between the oldest to most recent year is ranked, in descending order and given a ranked score in descending order.
5. The percent change in DRD between the oldest to most recent year is ranked, in descending order and given a ranked score in descending order.
6. Outcomes are sorted, in descending order, based on overall rate and given a ranked score in descending order.
7. Scores for each ranking are then summed and sorted in ascending order. Thus, the lower the final score based on the 6 rankings the higher the level of priority for the given outcome.

Tables 4, 5, 6, and 7 show the results. The IPM analysis was conducted separately for each data source. This reflects the fact that physicians, hospitals and provincial health departments have different priorities both in terms of addressing the most inequitable outcomes and potential

intervention leavers. Also, the data sources have different limitations, which make comparisons across data sources inappropriate.



Table 4: Inequalities Priority Matrix (IPM) steps and final rankings for Hospital Discharges in Saskatoon, SK, Canada.

|                              | STEP 1: Sort Descending & Rank by Gini score |            | STEP 2: Sort Descending & Rank by absolute DRR for T5^ |           | STEP 3: Sort Descending & Rank by absolute DRD for T5^ |           | STEP 4: Sort Descending & Rank by % DRR Change for T1 to T5^ |                  | STEP 5: Sort Descending & Rank by % DRD Change for T1 to T5^ |                  | STEP 6: Sort Descending & Rank by absolute rate per 1000 at T5^ |                     | STEP 7: Sum scores from step 1 to 6 & Sort Ascending |               |
|------------------------------|--|------------|--|-----------|--|-----------|--|------------------|--|------------------|---|---------------------|--|---------------|
| Outcome                      | Gini   | Gini Score | DRR  | DRR Score | DRD  | DRD Score | Change in DRR  | DRR Change Score | Change in DRD  | DRD Change Score | Rate per 1000   | Rate per 1000 Score | FINAL SCORE  | PRIORITY RANK |
| Injury                       | 0.20   | 3          | 2.35   | 5         | 5.11   | 1         | 29   | 3                | 18   | 2                | 5.79  | 1                   | 15   | 1             |
| COPD                         | 0.28   | 1          | 3.42   | 2         | 2.19   | 3         | 32   | 2                | -16  | 5                | 1.71  | 5                   | 18   | 2             |
| Diabetes                     | 0.19   | 4          | 2.75   | 3         | 1.31   | 5         | 58   | 1                | 116  | 1                | 1.16  | 7                   | 21   | 3             |
| Mental Disorders             | 0.18   | 5          | 2.44   | 4         | 3.28   | 2         | -16  | 7                | -48  | 7                | 3.48  | 3                   | 28   | 4             |
| Heart Disease                | 0.16   | 6          | 1.75   | 7         | 1.43   | 4         | 24   | 4                | -13  | 4                | 2.37  | 4                   | 29   | 5             |
| Cancer                       | 0.04   | 8          | 1.18   | 8         | 0.84   | 6         | -4   | 6                | -9   | 3                | 4.66  | 2                   | 33   | 6             |
| <b>Intentional Self-Harm</b> | <b>0.23</b>                                  | <b>2</b>   | <b>3.58</b>  | <b>1</b>  | <b>0.48</b>  | <b>8</b>  | <b>-36</b>   | <b>8</b>         | <b>-63</b>   | <b>8</b>         | <b>0.39</b>   | <b>8</b>            | <b>35</b>  | <b>7</b>      |
| Stroke                       | 0.16   | 7          | 2.03   | 6         | 0.76   | 7         | 21   | 5                | -39  | 6                | 1.19  | 6                   | 37   | 8             |

Table 5: Inequalities Priority Matrix (IPM) steps and final rankings for Physician Billings in Saskatoon, SK, Canada.

| Outcome          | Gini | Gini Score | DRR  | DRR Score | DRD   | DRD Score | Change in DRR | DRR Change Score | Change in DRD | DRD Change Score | Rate per 1000 | Rate per 1000 Score | FINAL SCORE | PRIORITY RANK |
|------------------|------|------------|------|-----------|-------|-----------|---------------|------------------|---------------|------------------|---------------|---------------------|-------------|---------------|
| Mental Disorders | 0.38 | 3          | 9.05 | 3         | 81.44 | 1         | 33            | 5                | 57            | 4                | 41.95         | 2                   | 18          | 1             |
| Diabetes         | 0.39 | 1          | 9.91 | 1         | 22.73 | 4         | 20            | 7                | 165           | 1                | 11.20         | 4                   | 18          | 1             |
| COPD             | 0.37 | 5          | 9.26 | 2         | 38.05 | 3         | 49            | 1                | 6             | 5                | 20.91         | 3                   | 19          | 3             |
| Injury           | 0.33 | 6          | 7.41 | 4         | 71.43 | 2         | 42            | 3                | -17           | 7                | 44.52         | 1                   | 23          | 4             |
| Heart Disease    | 0.37 | 4          | 7.29 | 5         | 11.20 | 5         | 45            | 2                | 62            | 3                | 5.96          | 6                   | 25          | 5             |



|        |      |   |      |   |       |   |    |   |     |   |      |   |    |   |
|--------|------|---|------|---|-------|---|----|---|-----|---|------|---|----|---|
| Cancer | 0.28 | 7 | 5.56 | 7 | 11.09 | 6 | 42 | 4 | 81  | 2 | 7.54 | 5 | 31 | 6 |
| Stroke | 0.38 | 2 | 6.16 | 6 | 2.26  | 7 | 27 | 6 | -13 | 6 | 1.19 | 7 | 34 | 7 |

Table 6: Inequalities Priority Matrix (IPM) steps and final rankings for Communicable Disease in Saskatoon, SK, Canada.

| Outcome             | Gini        | Gini Score | DRR        | DRR Score | DRD        | DRD Score | Change in DRR | DRR Change Score | Change in DRD | DRD Change Score | Rate per 1000 | Rate per 1000 Score | FINAL SCORE | PRIORITY RANK |
|---------------------|-------------|------------|------------|-----------|------------|-----------|---------------|------------------|---------------|------------------|---------------|---------------------|-------------|---------------|
| <b>Tuberculosis</b> | <b>0.56</b> | <b>1</b>   | <b>N/A</b> |           | <b>N/A</b> |           | <b>N/A</b>    |                  | <b>N/A</b>    |                  | <b>0.06</b>   | <b>4</b>            | <b>5</b>    | <b>1</b>      |
| Hepatitis C         | 0.51        | 2          | 11.14      | 1         | 1.54       | 2         | 42            | 1                | -21           | 2                | 0.37          | 3                   | 11          | 1             |
| Chlamydia           | 0.25        | 4          | 2.96       | 3         | 5.24       | 1         | -30           | 2                | 6             | 1                | 4.85          | 1                   | 12          | 2             |
| Gonorrhea           | 0.47        | 3          | 4.79       | 2         | 0.73       | 3         | -43           | 3                | -21           | 3                | 0.40          | 2                   | 16          | 3             |

Table 7: Inequalities Priority Matrix (IPM) steps and final rankings for Vital Statistics in Saskatoon, SK, Canada.

| Outcome             | Gini | Gini Score | DRR  | DRR Score | DRD    | DRD Score | Change in DRR | DRR Change Score | Change in DRD | DRD Change Score | Rate per 1000 | Rate per 1000 Score | FINAL SCORE | PRIORITY RANK |
|---------------------|------|------------|------|-----------|--------|-----------|---------------|------------------|---------------|------------------|---------------|---------------------|-------------|---------------|
| Teen Pregnancy      | 0.25 | 1          | 8.63 | 1         | 114.25 | 1         | 106           | 1                | 1             | 2                | 56.64         | 4                   | 10          | 1             |
| All-Cause Mortality | 0.23 | 2          | 2.34 | 2         | 5.38   | 3         | 3             | 4                | 17            | 1                | 5.88          | 6                   | 18          | 2             |
| Low Birth Weight    | 0.06 | 6          | 1.53 | 4         | 27.79  | 2         | -33           | 5                | -49           | 3                | 61.49         | 3                   | 23          | 3             |
| Teen Abortion       | 0.21 | 3          | 0.93 | 6         | -      | 6         | 49            | 2                | -89           | 6                | 195.61        | 1                   | 24          | 4             |
| High Birth Weight   | 0.08 | 5          | 0.95 | 5         | -6.54  | 5         | 30            | 3                | -81           | 5                | 134.82        | 2                   | 25          | 5             |
| Infant Mortality    | 0.17 | 4          | 1.61 | 3         | 3.39   | 4         | -44           | 6                | -69           | 4                | 8.36          | 5                   | 26          | 6             |

Note. **Bold = Special focus (low prevalence, high inequality)**

## Stakeholder Consultations

The Achieving Health Equity in Health Care series is a special focus on how the health care system can contribute to better health for all, as well as an examination of a range of health inequalities. In an effort to move beyond the data, staff from the Public Health Observatory, together with the Medical Health Officers, brought this data to 39 meetings with internal health region partners and key external health organizations in the community (see table 8 for summary). The data was presented during which staff shared what they were learning and generated ideas from stakeholders about what they were seeing and why. Key to facilitating this process was the inclusion of questions specifically targeted to equity issues. This helped everyone explore possible barriers to equity within the health care system and identify what might be done to address those barriers. Questions included:

- Are there any barriers to access or uptake of services and facilities amongst any particular population group or area that you frequently encounter?
- Are there any already existing priorities for action that contribute to improve health equity?
- What programmes, services, approaches/practices already exist in your areas which might help in reducing gaps in equity?
- What further action is required from existing services or structures to address gaps in equity?
- How can health equity principles be embedded into existing work?
- Is more targeted action with specific groups and areas required?
- Are the supports and resources available in the system to adequately address health inequities in your area? What other resources would be helpful?

Table 8: Stakeholder Consultations List of Internal and External Participants, N = 39

| Saskatoon Health Region                            | Outside Saskatoon Health Region                              |
|--|--|
| Adult Medicine and Complex Care                    | Canadian Diabetes Association                                |
| Communications                                     | College of Physicians & Surgeons                             |
| Ethics   | Global Gathering Place                                       |
| First Nations and Metis Health Services            | Heart and Stroke Foundation                                  |
| Homecare   | Individual Physicians  |
| Kaizan Promotion Office (KPO)                      | Pharmacists' Association of Saskatchewan                     |
| Maternal and Children's Services                   | Physician Advisory Committee                                 |
| Mental Health and Addiction Services               | Saskatchewan Cancer Agency                                   |
| Office of the Chief Medical Health Officer         | Saskatchewan Ministry of Health                              |
| Operations Management Committee                    | Saskatchewan Mental Health Commission                        |
| Organizational Learning and Leadership             | Saskatchewan Prevention Institute                            |
| Population and Public Health                       | Saskatchewan Registered Nurses Association                   |
| Primary Health Care and Chronic Disease Management | Saskatoon Community Clinic                                   |
| Surgery Services                                   | Student Wellness Initiative Toward Community Health (SWITCH) |
|  | The Lung Association   |

Consultations were booked for one and a half hours per group. While most meetings were one and a half hours in duration, they ranged from thirty minutes to two hours. Some stakeholder groups were met with on more than one occasion to continue the conversation and provide follow up information. A comprehensive list of stakeholders was developed prior to beginning the process and additional consultations were on an ad hoc basis. Consultations ranged from one on one format to addressing a large group of up to 30 people.

Information gathered during the consultation process was collated and themed. This information was then used to help interpret the data and draft key messages and recommendations.

## Appendix A

Table 9. Complete Summary Table of Equity Measures, Local Total Deprivation, 2006.

|                                  | Rate per 1000 | Rate per 1000 | % Change in Rate | Disparity Rate Ratio | Disparity Rate Ratio | DRR % change | Disparity Rate difference | Disparity Rate difference | DRD % change | Gini Coefficient | Gini Coefficient | % Change in Gini |
|----------------------------------|---------------|---------------|------------------|----------------------|----------------------|--------------|---------------------------|---------------------------|--------------|------------------|------------------|------------------|
| <b>Hospitalization Discharge</b> |               |               |                  |                      |                      |              |                           |                           |              |                  |                  |                  |
|                                  | 1995          | 2011          | 1995 to 2011     | 1995                 | 2011                 | 1995 to 2011 | 1995                      | 2011                      | 1995 to 2011 | 1995             | 2011             | 1995 to 2011     |
| Cancer                           | 7.20          | 4.66          | ↓ 35% *          | 1.13                 | 1.18                 | ↓ 4%         | 0.92                      | 0.84                      | ↓ 9%         | 0.13             | 0.04             | ↓ 68% *          |
| Suicide                          | 0.84          | 0.39          | ↓ 54% *          | 5.58                 | 3.58                 | ↓ 36%        | 1.28                      | 0.48                      | ↓ 63%        | 0.28             | 0.23             | ↓ 17% *          |
| COPD                             | 2.82          | 1.71          | ↓ 39% *          | 2.59                 | 3.42                 | ↑ 32% *      | 2.61                      | 2.19                      | ↓ 16%        | 0.33             | 0.28             | ↓ 15% *          |
| Mental Disorders                 | 6.17          | 3.48          | ↓ 44% *          | 2.9                  | 2.44                 | ↓ 16%        | 6.35                      | 3.28                      | ↓ 48%        | 0.20             | 0.18             | ↓ 10%            |
| Heart Disease                    | 4.9           | 2.37          | ↓ 52% *          | 1.41                 | 1.75                 | ↑ 24% *      | 1.64                      | 1.43                      | ↓ 13%        | 0.15             | 0.16             | ↑ 10%            |
| Diabetes                         | 1.13          | 1.16          | ↑ 3%             | 1.74                 | 2.75                 | ↑ 58% *      | 0.6                       | 1.31                      | ↑ 116%       | 0.18             | 0.19             | ↑ 8%             |
| Injury                           | 6.91          | 5.79          | ↓ 16%            | 1.82                 | 2.35                 | ↑ 29% *      | 4.35                      | 5.11                      | ↑ 18%        | 0.17             | 0.2              | ↑ 14%            |
| Stroke                           | 2.41          | 1.19          | ↓ 51% *          | 1.67                 | 2.03                 | ↑ 21% *      | 1.24                      | 0.76                      | ↓ 39%        | 0.23             | 0.16             | ↓ 28% *          |
| <b>Physician Billing</b>         |               |               |                  |                      |                      |              |                           |                           |              |                  |                  |                  |
|                                  | 1996          | 2009          | 1996 to 2009     | 1996                 | 2009                 | 1996 to 2009 | 1996                      | 2009                      | 1996 to 2009 | 1996             | 2009             | 1996 to 2009     |
| Stroke                           | 1.62          | 1.19          | ↓ 27% *          | 4.85                 | 6.16                 | ↑ 27%        | 2.6                       | 2.26                      | ↓ 13%        | 0.42             | 0.38             | ↓ 9%             |
| Diabetes                         | 5.21          | 11.2          | ↑ 115% *         | 8.28                 | 9.91                 | ↑ 20%        | 8.38                      | 22.73                     | ↑ 165%       | 0.40             | 0.39             | ↓ 4%             |
| Heart Disease                    | 4.7           | 5.96          | ↑ 26%            | 5.02                 | 7.29                 | ↑ 45% *      | 6.93                      | 11.2                      | ↑ 62%        | 0.36             | 0.37             | ↑ 1%             |
| Mental Disorders                 | 31.87         | 41.95         | ↑ 32% *          | 6.81                 | 9.05                 | ↑ 33% *      | 51.86                     | 81.44                     | ↑ 57%        | 0.35             | 0.38             | ↑ 10%            |
| Injury                           | 62.41         | 44.52         | ↓ 29% *          | 5.23                 | 7.41                 | ↑ 42% *      | 85.49                     | 71.43                     | ↓ 17%        | 0.30             | 0.33             | ↑ 12%            |
| Cancer                           | 5.66          | 7.54          | ↑ 33%            | 3.91                 | 5.56                 | ↑ 42%        | 6.13                      | 11.09                     | ↑ 81%        | 0.25             | 0.28             | ↑ 13%            |
| COPD                             | 26.65         | 20.91         | ↓ 22%            | 6.23                 | 9.26                 | ↑ 49% *      | 40.38                     | 38.05                     | ↑ 6%         | 0.32             | 0.37             | ↑ 13%            |
| <b>Communicable Disease</b>      |               |               |                  |                      |                      |              |                           |                           |              |                  |                  |                  |
|                                  | 2004          | 2010          | 2004 to 2010     | 2004                 | 2010                 | 2004 to 2010 | 2004                      | 2010                      | 2004 to 2010 | 2004             | 2010             | 2004 to 2010     |
| Chlamydia                        | 3.31          | 4.85          | ↑ 47%            | 4.22                 | 2.96                 | ↓ 30% *      | 4.94                      | 5.24                      | ↑ 6%         | 0.29             | 0.25             | ↓ 16%            |
| Tuberculosis                     | 0.013         | 0.064         | ↑ 392%           | N/A                  | N/A                  | N/A          | 0                         | 0.21                      | ↑ 763%       | 0.58             | 0.56             | ↓ 4%             |
| Gonorrhea                        | 0.46          | 0.40          | ↓ 13%            | 8.4                  | 4.79                 | ↓ 43%        | 0.93                      | 0.73                      | ↓ 21%        | 0.40             | 0.47             | ↑ 19%            |
| Hepatitis C                      | 0.81          | 0.37          | ↓ 54% *          | 7.84                 | 11.14                | ↑ 42%        | 1.94                      | 1.54                      | ↓ 21%        | 0.43             | 0.51             | ↑ 20% *          |
| <b>Vital Statistics</b>          |               |               |                  |                      |                      |              |                           |                           |              |                  |                  |                  |
|                                  | 1995          | 2009          | 1995 to 2009     | 1995                 | 2009                 | 1995 to 2009 | 1995                      | 2009                      | 1995 to 2009 | 1995             | 2009             | 1995 to 2009     |
| High Birth Weight                | 106.37        | 134.82        | ↑ 27%            | 0.73                 | 0.95                 | ↑ 30% *      | -33.71                    | -6.54                     | ↓ 81%        | 0.15             | 0.08             | ↓ 46% *          |
| Teen Abortion                    | 245.45        | 195.61        | ↓ 20%            | 0.63                 | 0.93                 | ↑ 49% *      | -119.36                   | -13.19                    | ↓ 89%        | 0.31             | 0.21             | ↓ 32% *          |
| All Cause Mortality              | 6.09          | 5.88          | ↓ 3%             | 2.28                 | 2.34                 | ↑ 3% *       | 4.61                      | 5.38                      | ↑ 17%        | 0.28             | 0.23             | ↓ 17%            |
| Infant Mortality                 | 10.73         | 8.36          | ↓ 22% *          | 2.87                 | 1.61                 | ↓ 44%        | 10.71                     | 3.39                      | ↓ 69%        | 0.18             | 0.17             | ↓ 5%             |
| Low Birth Weight                 | 65.95         | 61.49         | ↓ 7%             | 2.27                 | 1.53                 | ↓ 33%        | 54.5                      | 27.79                     | ↓ 49%        | 0.06             | 0.06             | → 0%             |
| Teen Pregnancy                   | 87.09         | 56.64         | ↓ 35% *          | 4.19                 | 8.63                 | ↑ 106% *     | 113.31                    | 114.25                    | ↑ 1%         | 0.17             | 0.25             | ↑ 50% *          |
| <b>Child Immunization</b>        |               |               |                  |                      |                      |              |                           |                           |              |                  |                  |                  |
|                                  | 2002          | 2011          | 2002 to 2011     | 2002                 | 2011                 | 2002 to 2011 | 2002                      | 2011                      | 2002 to 2011 | 2002             | 2011             | 2002 to 2011     |
| Child Immunization               | 624.9         | 745.87        | ↑ 19% *          | 0.58                 | 0.76                 | ↑ 13%        | -312.1                    | -202.86                   | ↓ 35%        | 0.09             | 0.07             | ↓ 22%            |

Note. \* Represents a statistically significant ( $p < 0.05$ ) change

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References for Additional "Advancing Health Equity in Health Care" Documents

### Measuring Health Equity In The Health System

<sup>1</sup>Braveman P. What are health disparities and health equity? we need to be clear. *Public Health Rep* 2014; 129 Suppl 2: 5-8.

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### Cultural Considerations

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## A Summary of Health Care Sector Consultations

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<sup>1</sup>Braveman P. What are health disparities and health equity? we need to be clear. Public Health Rep 2014; 129 Suppl 2: 5-8.

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### **Equity Measure Findings**

<sup>1</sup>Braveman P. What are health disparities and health equity? we need to be clear. Public Health Rep 2014; 129 Suppl 2: 5-8.

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### **Measuring Equity in Region Plans and Strategies**

<sup>1</sup>Braveman P. What are health disparities and health equity? we need to be clear. Public Health Rep 2014; 129 Suppl 2: 5-8.

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### **An Introduction to the Health Care Equity Audit Guide**

<sup>1</sup>Braveman P. What are health disparities and health equity? we need to be clear. Public Health Rep 2014; 129 Suppl 2: 5-8.

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### **What You Can Do as a Health Care Provider and Decision Maker**

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## What You Can Do as a Health Care Provider and Decision Maker

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