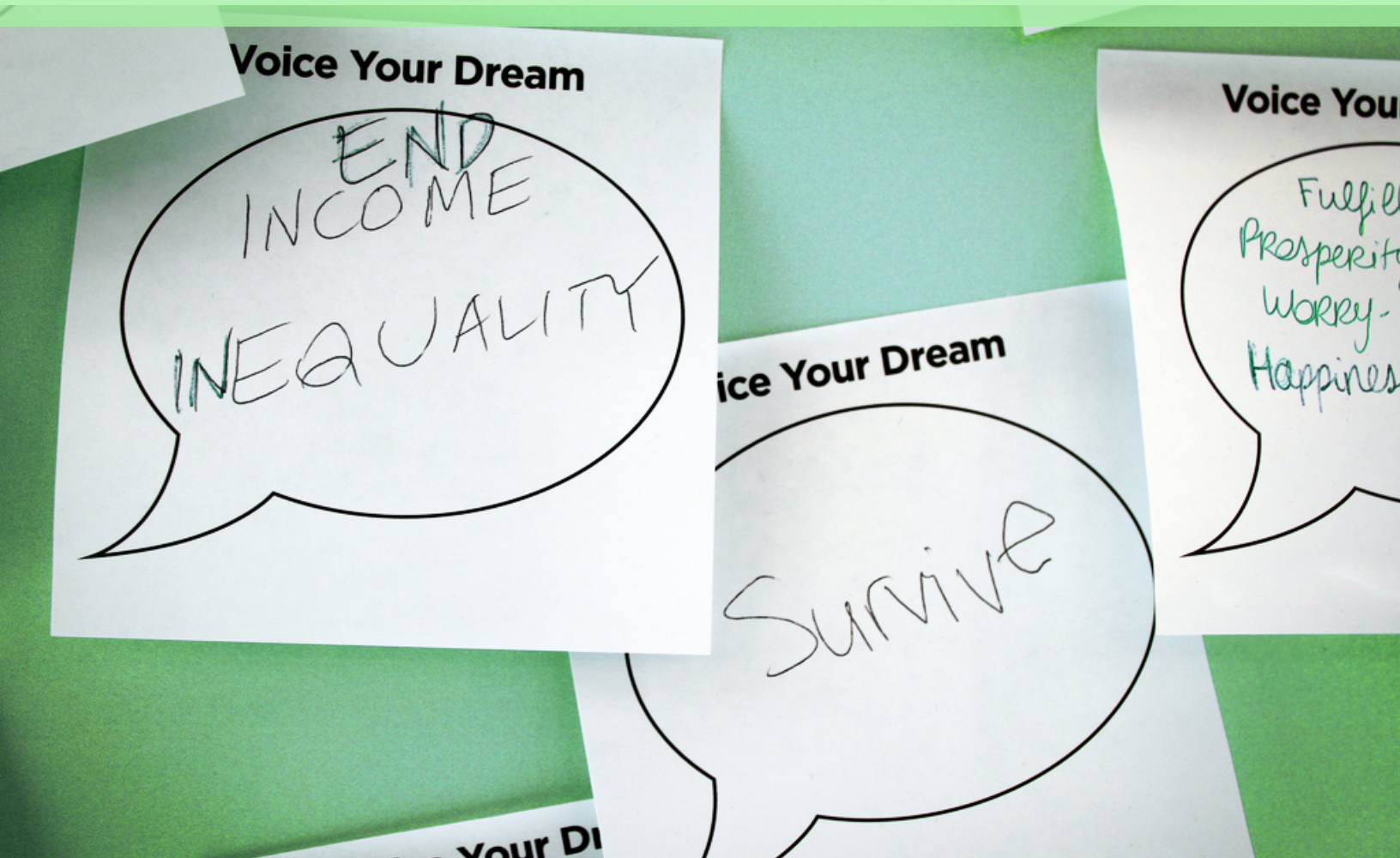


# Changes in Social Inequalities in Health Over Time in Saskatchewan



## Authors

Dr. Cordell Neudorf  
Mr. Joshua Neudorf  
Mr. Stuart Lockhart  
Mr. Charles Plante

Dr. Daniel Fuller  
Ms. Hazel Williams-Roberts  
Mr. Thilina Bandara  
Ms. Lisa Thurairasu

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## Disclaimer

1. This study was conducted, in part, with data provided by the Saskatchewan Ministry of Health to the Health Quality Council. The interpretations and conclusions herein do not necessarily represent those of the Saskatchewan Ministry of Health or Government of Saskatchewan.
2. The research and analysis are based, in part, on data from Statistics Canada and the opinions expressed do not represent the views of Statistics Canada.

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## The Social Determinants of Health

There is a growing recognition of the importance of measuring, and acting on the social determinants of health – in particular social inequalities in health. At the global level, the World Bank and the World Health Organization have singled out health inequalities as a crucial challenge for both developed and developing nations.<sup>1,2</sup> In their 2013 annual report the World Bank promotes 2 major goals “to decrease the percentage of people living on less than US\$1.25 a day (extreme poverty) to no more than 3 percent of the population by 2030 and to **foster the welfare and income growth of the bottom 40 percent of the population in every developing country (emphasis added).**”<sup>1</sup> The World Health Organization’s (WHO) landmark 2008 report *Closing the Gap in a Generation* outlines 3 priority areas for action. First, improving daily living conditions. Second, tackling the inequitable distribution of power, resources, and money. Third, measuring and understanding the problem and assessing the impact of action.<sup>2</sup>

At the World Health Assembly in May 2012, Canada endorsed a resolution which “urges member states: (1) to implement the pledges made in the Rio Political Declaration on Social Determinants of Health with regard to (i) better governance for health and development, (ii) promoting participation in policy-making and implementation, (iii) further reorienting the health sector towards reducing health inequities, (iv) strengthening global governance and collaboration, and (v) monitoring progress and increasing accountability”.<sup>3</sup> This resolution states that governments “need to safeguard the health of populations regardless of global economic downturns” and to acknowledge “that health equity is a shared goal and responsibility and requires the engagement of all sectors of government, all segments of society, and all members of the international community, in **all-for-equity** and **health-for-all** global actions”. The Rio declaration<sup>4</sup> outlines concrete actions that need to be undertaken within a country to decrease these inequities and the Canadian Council on the Social Determinants of Health advises the Federal government and partner agencies on how to make progress in these obligations from national to local levels.

Health is a complex interplay of factors, all influenced in some way by the social determinants of health. The World Health Organization defines the social determinants of health as “the conditions in which people are born, grow, work, live, and age, and the wider set of forces and systems shaping the conditions of daily life.”<sup>2</sup>



According to the Public Health Agency of Canada<sup>5</sup>, the key determinants of health are:

1. Income and Social Status
2. Social Support Networks
3. Education and Literacy
4. Employment/Working Conditions
5. Social Environments
6. Physical Environments
7. Personal Health Practices and Coping Skills
8. Healthy Child Development
9. Biology and Genetic Endowment
10. Health Services
11. Gender
12. Culture

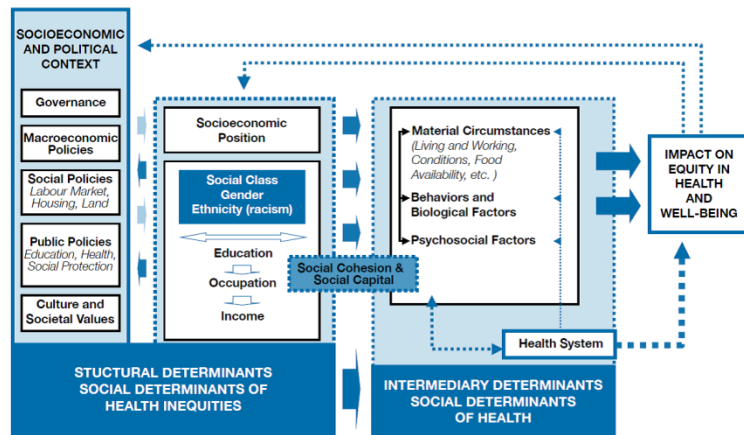


Figure 1. WHO Framework on the Social Determinants of Health 2010<sup>6</sup>

It is estimated that the social determinants of health are responsible for up to 40% of our health status, while the health care system is responsible for up to 20% of our health status.<sup>7</sup> As such, improvements in the social determinants can have a large and lasting impact on improving the health of a population, and reorienting health care services to achieve greater health care equity and improved population health is also very important. The health system improves immediate and long-term health outcomes of individuals and populations but often these improvements are not equitably distributed. Providing health care equity means that health care services should be available, accessible, and acceptable to everyone in the population, while also being of high quality.<sup>2</sup> There are differences in health care access and use between socioeconomic groups in Canada.<sup>2</sup> A review of 25 years (1978 to 2003) of health care research in Canada reports a recurrent inequitable relationship between socioeconomic status (SES) and both initial contact with the health care system, and access to specialist services, and it has been shown that reducing health inequalities can decrease the use of emergency and other health services<sup>3</sup>

## Health Inequality

Health equity is the principle of and commitment to incorporating fairness into health by reducing health inequalities. Health inequities are “differences that are unnecessary and avoidable and which are also considered unfair and unjust.”<sup>8</sup> In short, they represent differences in opportunity between populations caused by the social determinants of health and which result in unfair and unequal life chances. An equitable society permits all people to reach their full health potential and not be disadvantaged from attaining health and other goals.<sup>8</sup>



Saskatchewan has some of the most extreme health inequities in Canada, particularly when comparing urban and rural populations, and Aboriginals with non-Aboriginal populations.<sup>9</sup> The Ministry of Health’s Strategic and Operational Directions 2013-2014 identified a need for greater collaboration among communities, Ministries and different levels of government to close the gap in health inequalities and promote health equity.<sup>10</sup> However, specific measures or targets for evaluating health inequalities have not been developed, and systematic reporting on health inequalities in Health Status Reports is not done at the provincial level.<sup>5</sup> The 2014-2015 Ministry of Health and Health Systems Plan does not include explicit mention of health inequalities.<sup>11</sup> However, the reference to health disparities in the Better Health objective, “improve population health through health promotion, protection, and disease management/prevention, and collaborating with communities and other provincial and federal government organizations **to close the health disparity gap**” suggests that health inequalities are still a government priority.<sup>12</sup>

Despite the challenges in monitoring inequalities and targeting quality improvements toward greater equity, there is increasing national attention being paid to health inequalities.<sup>13</sup> Several reports have been released by the Canadian Institute for Health Information in 2015 examining trends in health inequalities, and inequalities in avoidable mortality in Canada. The Public Health Agency of Canada will be releasing a baseline report on health inequalities in Canada later in 2016. Within Saskatchewan, there has been considerable work examining health inequalities, primarily within the Saskatoon Health Region,<sup>14,15</sup> where monitoring and reporting on health inequalities has led to improvement initiatives within the health sector and by the Saskatoon Regional Intersectoral Committee. Other health regions in Saskatchewan recognized the need for similar analysis for the rest of the province which prompted this report, funded by research from the Saskatchewan Health Research Foundation.

## Objectives

This report aims to provide a baseline of trends in social determinants of health and health inequalities for the province of Saskatchewan that can be used to prioritize future initiatives and evaluate progress as we work to “close the gap”.

### The specific objectives of this report are

1. To examine trends over time in selected social determinants of health: income, education, employment.
2. To examine trends over time in health inequities for 15 health outcomes in Saskatchewan.



## Data Sources

A number of data sources were included for the analysis of health inequalities in Saskatchewan. Fifteen indicators of health status were analyzed and include data from the entire province. These indicators are asthma, coronary artery disease (CAD), congestive heart failure (CHF), chronic obstructive pulmonary disease (COPD), diabetes, injury, mental disorder, mood disorder and mortality. Self-reported indicators from the Canadian Community Health Survey (CCHS) were self-reported health, self-reported mental health, chronic stress, smoking status, food security, and fruit and vegetable consumption. Table 1 shows the health indicators included in the analysis. For each indicator the data source is identified. Further details about data definitions and inclusion/exclusion criteria are available in Supplement 1 found on our website ([Click here to download](#)).

### Canadian Survey of Labour and Income Dynamics (1976 to 2011)

The Canadian Survey of Labour and Income Dynamics (SLID) aims to understand the economic well-being of Canadians and the nature and extent of low income in the country. The SLID provides information about fluctuations in family or individual labour force activity and income over time, and is used to guide policy making at the federal and provincial levels in Canada. Individuals living in Yukon, the Northwest Territories and Nunavut, as well as residents of Indian reserves and institutions are excluded from the SLID (Statistics Canada, 2013).

### Saskatchewan Health Administrative Data (2001 to 2013)

Health indicator data are available in health administrative databases. Health indicators calculated using the Saskatchewan health administrative databases were:

1. All cause mortality
2. Asthma
3. Coronary Artery Disease
4. Congestive Heart Failure
5. Chronic Obstructive Pulmonary Disease
6. Diabetes
7. Injury
8. Mental Disorders
9. Mood Disorders

The hospital service database includes all acute hospital visits, day surgeries, and psychiatric visits for patients treated in hospitals. The medical service database includes physicians' fee-for-service claims. Vital statistics data from the Ministry of Health were available for all-cause mortality.



For each data source, the most responsible diagnosis (i.e., the most important medical condition which caused the person to stay in hospital) was used to calculate the numerator for each health indicator. Patients with multiple hospital visits in one day were counted only once. Transfers of the same patient between hospitals were removed to avoid double counting. The Saskatchewan Population Registry, which includes all residents eligible for Saskatchewan Health benefits, on June 30<sup>th</sup> of the study year, was used as the denominator.

## Canadian Community Health Survey (Cycles 4 to 9)

The Canadian Community Health Survey (CCHS) collects information on health-related behaviours, health care use and health status. The CCHS is a national cross-sectional survey conducted by Statistics Canada to provide estimates on health status, health determinants and health system usage for health regions across Canada.

Health outcomes calculated using the CCHS included:

1. Self-rated Health
2. Self-rated Mental Health
3. Chronic Stress
4. Smoking
5. Food Security
6. Fruit and Vegetable Consumption

## 2006 Canadian Census

Data from the 2006 Canadian Census were used to calculate a deprivation index for the province of Saskatchewan. Deprivation scores for each dissemination area (DA) in Saskatchewan were obtained from the *Institut National de Santé Publique du Quebec* (INSPQ) using the deprivation index developed by Pampalon et al. and calculated for Saskatchewan.<sup>16</sup> The material and social deprivation factors are derived using data from the 2006 Canadian Census. We used the 2006 census because of data quality concerns for the 2011 National Household Survey. The material deprivation factor includes the proportion of people age 15 years and older without a high school diploma, employment/population ratio of people aged 15 years and older, and the average income of people ages 15 years and older in the dissemination area. The social deprivation factor includes 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, and the proportion of single-parent families. Quintiles of total deprivation were calculated by combining quintiles of material and social deprivation using the matrix developed by the Canadian Institute for Health Information (CIHI), see Supplement 2 on our website (Click here to download).





**Table 1. Health indicators, data sources, and definitions included in the report**

Indicator	Source	Definition
All-cause mortality	Death master file and person registry system	Deaths from all causes, all ages
Asthma	Ambulatory Care Sensitive Conditions (ACSC) from HQC	Classified as asthma, all ages, at least 2 physician visits in 2 year period
Coronary Artery Disease (CAD)	Ambulatory Care Sensitive Conditions (ACSC) from HQC	Classified as CAD, age greater than 19, at least 2 physician visits in 1 year period
Congestive Heart Failure (CHF)	Ambulatory Care Sensitive Conditions (ACSC) from HQC	Classified as CHF, all ages
Chronic Obstructive Pulmonary Disease (COPD)	Ambulatory Care Sensitive Conditions (ACSC) from HQC	Classified as COPD, age greater than 34
Diabetes	Ambulatory Care Sensitive Conditions (ACSC) from HQC	Classified as diabetes, age at least 1 year, gestational diabetes excluded, at least 2 physician visits in 2 year period
Injury	Ambulatory Care Sensitive Conditions (ACSC) from HQC	Classified as injured, all ages
Mental Disorder	Ambulatory Care Sensitive Conditions (ACSC) from HQC	Classified as mental disorder including depression, anxiety, substance abuse, personality disorders, or schizophrenia, age at least 10 years
Mood Disorder	Ambulatory Care Sensitive Conditions (ACSC) from HQC	Classified as mood disorder including episodic mood disorders; anxiety, dissociative and somatoform disorders; and depressive disorder, not elsewhere classified, all ages
Self-rated Health	Canadian Community Health Survey (CCHS)	Question "GEN_01CAT": "Would you say your health is..."
Self-rated Mental Health	Canadian Community Health Survey (CCHS)	Question "GEN_02BCAT": Would you say your mental health is...
Chronic Stress	Canadian Community Health Survey (CCHS)	Question "GEN_07CAT": Thinking about the amount of stress in your life, would you say that most days are...?"
Smoking	Canadian Community Health Survey (CCHS)	Question "SMKDSTYCAT": Type of smoker based on smoking habits, including lifetime cigarette consumption.
Food Security	Canadian Community Health Survey (CCHS)	Question "FSCDHFS2": Household food security status – modified version.
Fruit and Vegetable Consumption	Canadian Community Health Survey (CCHS)	Question "FVCGTOTCAT": Total number of times per day eats fruits and vegetables



## Methods

Documenting health inequalities in Saskatchewan over time is an important objective. Different statistical measures were used to provide comprehensive quantitative information on health inequalities, and whether or not they changed over time. These methods were disparity rate ratios (DRRs), disparity rate differences (DRDs), and Area Level Concentration (ALC) curves and coefficients. The methods are replicable and provide sufficient information to evaluate policies to reduce health inequalities.

### Age and Sex Standardized Period Prevalence

The yearly age and sex standardized period prevalence of each health indicator was calculated. Period prevalence represents the number of cases of a health condition in the population in a given year using numerator data from the various health administrative databases expressed as a rate using denominator data from the Saskatchewan Population Registry. For example, if an individual were classified as diabetic in 2002 and 2004 they would be counted in 2002 and 2004 but not in any other year. Age and sex standardization was conducted using the direct method and the 1991 Canadian standard population.

### Disparity Rate Ratio (DRR)

Disparity Rate Ratio (DRR) measures socioeconomic gaps in health or social outcome, by dividing the period prevalence of the least advantaged group by the period prevalence of the most advantaged group in a given year and can also be referred to as the rate ratio. The time comparisons of the DRR, measuring the change in the DRR from the initial to the last time period can be interpreted as the relative increase or decrease in inequality between the lowest and highest deprivation quintile groups over time.

### Disparity Rate Difference (DRD)

Disparity Rate Difference (DRD) is another measure of a socioeconomic gap in a health or social outcome. It is calculated by subtracting the period prevalence of the least advantaged group from the period prevalence of the most advantaged group in a given year. The DRD can also be known as the “rate difference”, or “absolute difference.” DRDs state how many more events occur in the most deprived (or least advantaged) group compared to the least deprived group.



## Area level concentration (ALC) curves and ALC coefficients

ALC curves are a graphical representation of inequality. If no inequality exists in a population, disease outcomes are equally distributed, so that 20% of the population experiences 20% of the outcome, 40% experiences 40%, and so on up to 100%. Then the ALC curve is a straight line. However, if a greater portion of an outcome is concentrated in the more deprived population the curve will bend upward and to the left. The extent of the “bend” represents the extent of inequality in a population, and is captured mathematically by the ALC coefficient, which takes on values between zero and one. An ALC coefficient of zero represents no inequality and an ALC coefficient of one, maximum inequality, represents the situation that all of that disease occurred in the most disadvantaged group. Figure 2 shows example ALC curves and coefficients.

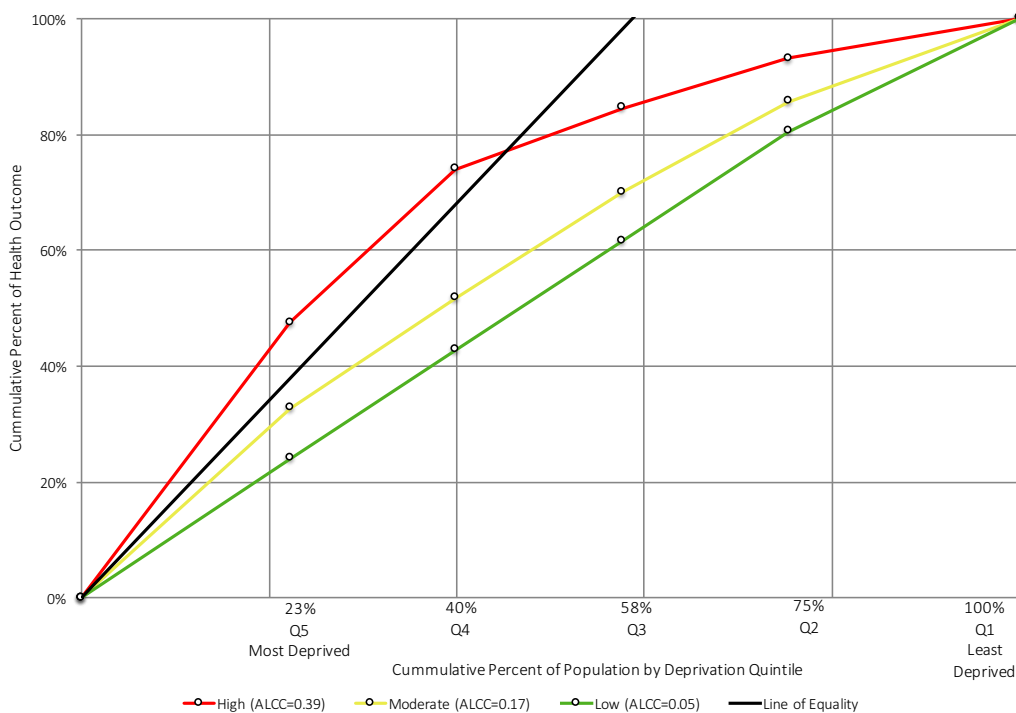


Figure 2. Example of area level concentration curves and coefficients representing high, moderate and low inequality.

## Limitations and Challenges

There are a number of general challenges that complicate the study of health inequities in Saskatchewan.<sup>17</sup> First, health administrative data does not include important social variables including, for example, income, education, ethnicity, housing status. As a result, we used area-level indicators to estimate individual-level deprivation. Second, many indicators of the social determinants of health are difficult to measure, such that there are several ways, each with unique strengths and weaknesses, to define social stratification<sup>18</sup>. Finally, evaluating action on



health inequalities must occur at many levels to be effective. Federal, provincial, health region, and local evaluations are required for health inequality reduction interventions to be evaluated.

There are a number of limitations to the analysis. First, data quality is an issue, particularly with respect to physician billing. In Saskatchewan, approximately 33% of general practitioners, and 38% of specialists shadow bill. Physicians typically don't shadow bill 100% of their work and there is no audit done in Saskatchewan on the accuracy of shadow billing. As well, billing does not represent disease, so physicians may systematically report a certain disease when presented with multiple patient complaints leading to differential rates by SES. Second, health seeking behavior differs between SES groups, which could lead to bias in the disparity calculations. Third, the analysis is subject to the ecological fallacy.<sup>19</sup> Ideally, health administrative datasets would include information regarding individual's socioeconomic status. Relatedly, assigning socioeconomic differences using census data is less precise in rural compared to urban areas. Rural areas may have larger variation in deprivation than was measured in this study. Fourth, deprivation data from the 2006 census was used. The analysis assumes no change in area-level deprivation over time in Saskatchewan, leading to potential misclassification bias. That is, if people moved to a more or less deprived DA than the one they were assigned in 2006 we cannot account for that move. Fifth, the Canadian Community Health Survey (CCHS) does not include First Nation populations living on Reserves, members of the Armed Forces, homeless individuals, or individuals living in institutions.<sup>20</sup> An important portion of Saskatchewan's Aboriginal population live on Reserves, the exclusion of First Nations Reserves results in underrepresentation of this group. Most of these limitations would likely have the effect of underestimating the degree of health inequality, so taken together, we feel that the estimates provided in this study are conservative. Finally, we only compare changes between the first and last available year of data. This comparison has the potential to over or under-estimate changes over time if the first or last year is an outlier.



## Changes in the Social Determinants of Health

To examine changes in health inequalities we first examined changes in the underlying social determinants of health. As noted above, the social determinants of health are the most important causes of health inequalities. First, we stratified the provincial population into 5 equal groups, or quintiles, based on their average household income. These income quintiles are not the same as deprivation quintiles used in the health inequalities analysis. We were not able to calculate deprivation quintiles using the SLID data. We then used data from the SLID to track changes in 6 determinants:

1. Household Income
2. Less than high school education
3. Not employed full time
4. Single, divorced, widowed
5. Living alone
6. Single parent family

We chose these 6 social determinants of health because they reflect the 6 indicators that are combined to create the deprivation index we use to quantify health inequalities in the next chapter. Data from the other three determinants are available on our website in Supplement 3 ([Click here to download](#)).

### Household Income

Adjusted for inflation, the SLID data show large income inequalities between groups, which have been increasing over time. The median income for those living in the most deprived areas of the province increased from \$15,186 to \$23,317 between 1976 and 2011. Despite a 54% increase in median income among the lowest income quintile since 1976, the low income cut-off before tax for Saskatchewan in 2011 ranged between \$29,802 and \$37,283 for a family of 4 depending on community size.<sup>21</sup> Meaning that a large proportion of the population are living below the poverty line. Evidence suggests economic prosperity in Saskatchewan has benefited some groups far more than others, and has resulted in increased income inequality starting in approximately 2001. By 2011, the most recent data available from this source, the least deprived group made 7 times more than the most deprived group.



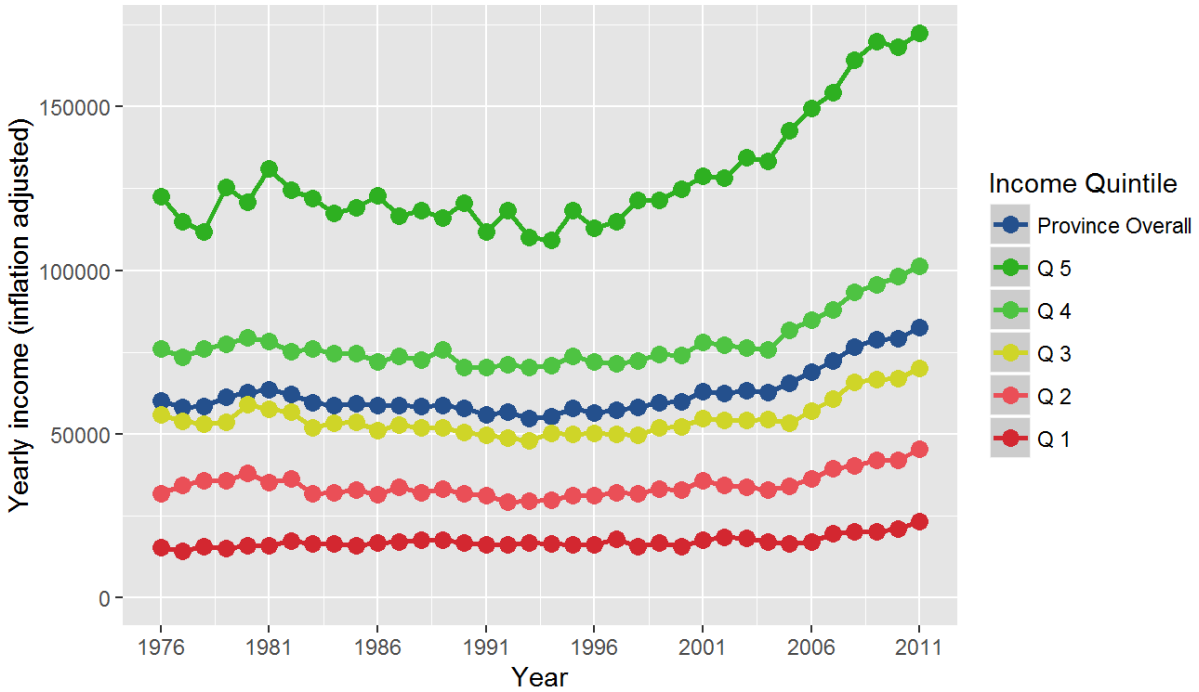


Figure 2. Inflation adjusted income by deprivation quintile in Saskatchewan between 1976 and 2011 estimated using data from the Survey of Labour and Income Dynamics.

## Education

In Saskatchewan as a whole the percent of people not achieving a high school education has decreased from 59% in 1976 to 19% in 2011. In contrast to income inequalities, inequalities in education have decreased somewhat over time. In 2011 33% of those residing in the most deprived areas did not complete high school compared with 13% of those residing in the least deprived areas. There was also a large spike not completing high school from 2007 to 2010 for those in the lowest income quintile which partially recovered in 2011. Despite these improvements, education inequalities remain a concern.



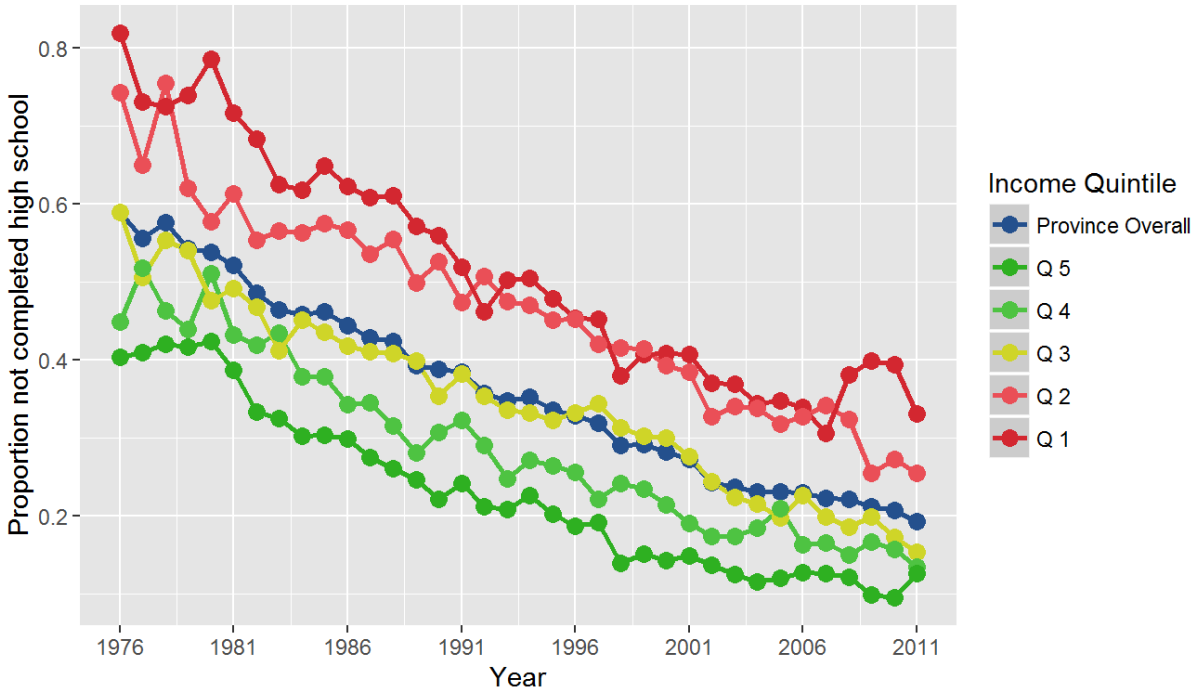


Figure 3. Percent of the population without a high school education by deprivation quintile in Saskatchewan between 1976 and 2011 estimated using data from the Survey of Labour and Income Dynamics.

## Employment

In Saskatchewan as a whole the percent of people not being employed full time decreased from 56% in 1976 to 32% in 2011. Inequalities in full time employment have increased over time. In 2011 56% of the lowest income quintile do not have full time employment compared with 24% of the highest income quintile.



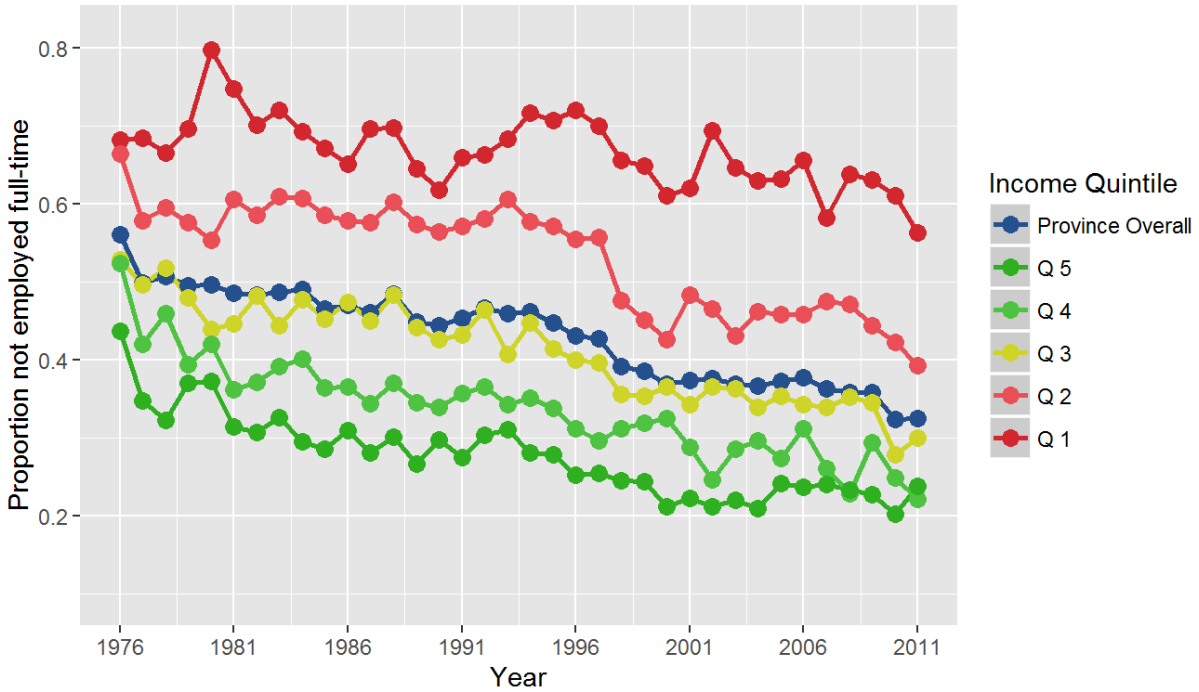


Figure 4. Percent of the population not employed full time by deprivation quintile in Saskatchewan between 1976 and 2011 estimated using data from the Survey of Labour and Income Dynamics.

The evidence clearly shows large and increasing inequalities in income. It is striking that the lowest income quintile makes only \$1 for each \$7 made by the highest income quintile. Education has increased dramatically for all quintiles since 1976. Nonetheless, the highest deprivation quintiles still have lower rates of high school graduation than the those in lower deprivation, and between 2007 and 2010, the rates of educational attainment worsen in the highest deprivation quintile. The percent of the population not employed full time has decreased since 1976 as women have entered the labour force. However, just less than 60% of the lowest income quintile are not employed full time compared to just over 20% of the highest income quintile, and this gap has widened over time.





## Deprivation map

The deprivation map shows the distribution of deprivation in the Saskatchewan (Supplement 4 contains full resolution map (Click here to download)). Detailed maps for each Regional Health Authority (RHA) and Regional Intersectoral Committee (RIC) are provided on our website.

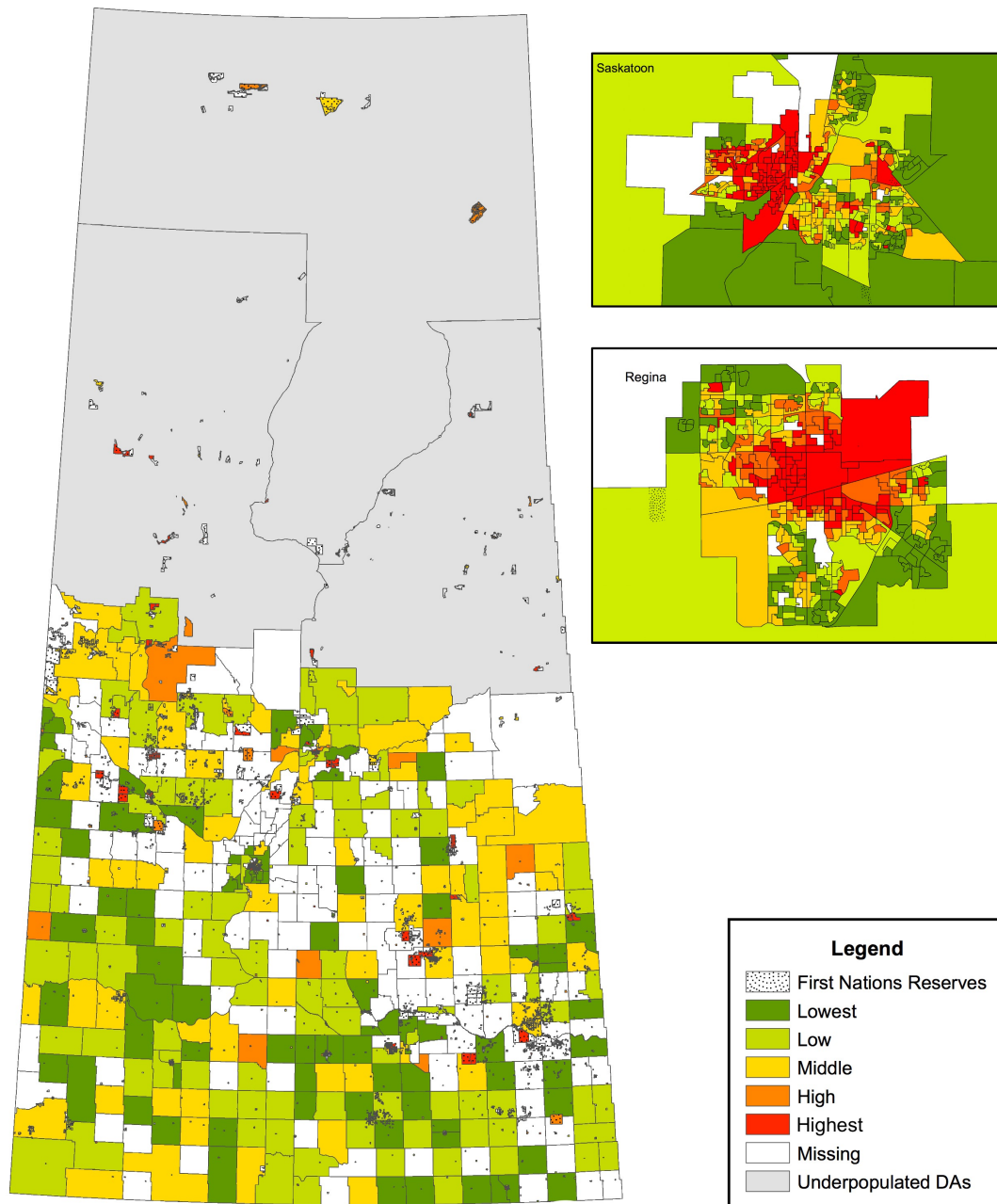


Figure 5. Map of deprivation by Census Dissemination Areas in Saskatchewan (2006 Census Data)

## Health inequalities in Saskatchewan

For this report we analyzed health inequalities using 15 health indicators. In this section, we discuss our results in detail for three of these indicators: all-cause mortality, Chronic Obstructive Pulmonary Disease (COPD), and mental disorders. These health indicators capture three different patterns of health inequalities which serve to indicate the breadth of changes possible. Complete results for the remaining health outcomes are presented in Supplement 5 on our website ([Click here to Download](#)), and summary results for all indicators are included at the end of this chapter in an attempt to present the trends overall and to assist in prioritizing efforts to improve health equity.



## All-cause Mortality

All-cause mortality is the number of deaths by all causes within the province of Saskatchewan, and is an important summary indicator for the health of a population.<sup>22</sup> In 2009 Saskatchewan had the 6<sup>th</sup> highest all-cause mortality period prevalence among Canadian provinces and territories.<sup>23</sup> Between 2000 and 2011 Saskatchewan's all-cause mortality declined less than in comparable provinces Alberta and Manitoba.<sup>23</sup>

Figure 5 shows the age and sex standardized all-cause mortality period prevalence per 100,000 population in Saskatchewan between 2001 and 2009 for each deprivation quintile and the province overall. Since 2001 all-cause mortality in Saskatchewan has been quite stable ranging from 589 to 615 deaths per 100,000 population per year. However, mortality in the highest deprivation quintile has been consistently higher than mortality in the other quintiles, and it has been increasing over time.

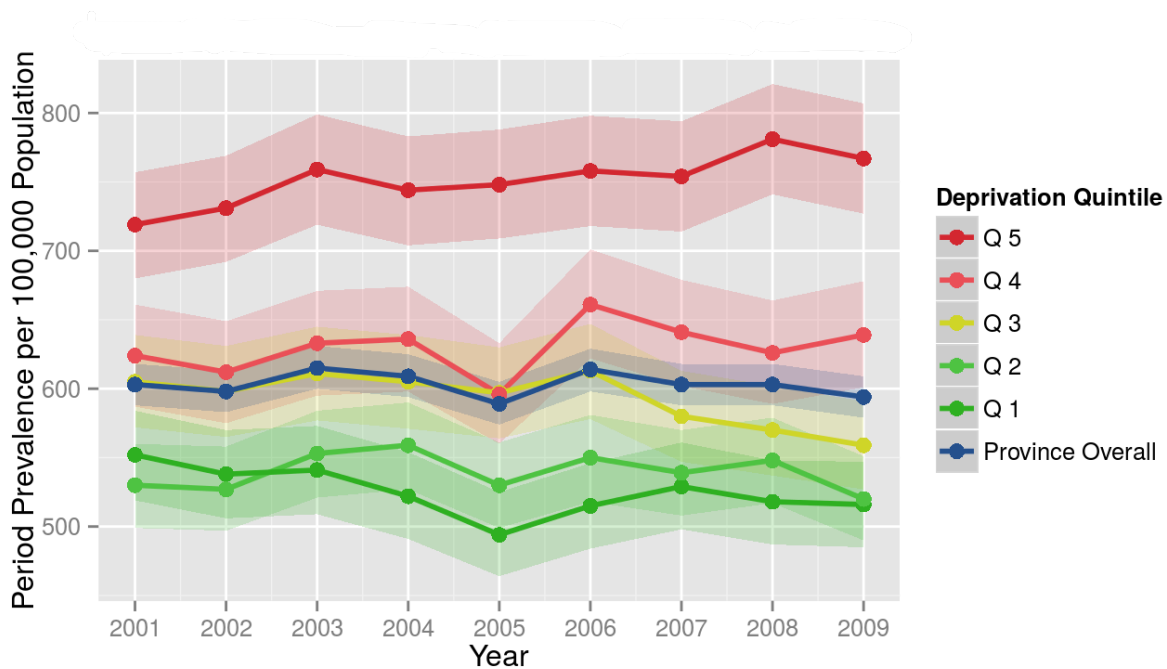


Figure 6. Age sex standardized period prevalence of all-cause mortality per 100,000 population by deprivation quintile in Saskatchewan from 2001 to 2009.

The ALC coefficient for all-cause mortality was 0.06 in 2001 and rose to 0.08 in 2009. This is a statistically significant increase in social inequalities in all-cause mortality in Saskatchewan. The rate ratio and rate difference measures are consistent with the ALC coefficient. Those residing in the most deprived areas had a 30% greater chance of experiencing death compared to those residing the highest income areas. Between 2001 and 2009 there was a 51% increase in deaths

in the most deprived quintile from 167 per 100,000 population in 2001 to 251 per 100,000 population in 2009.

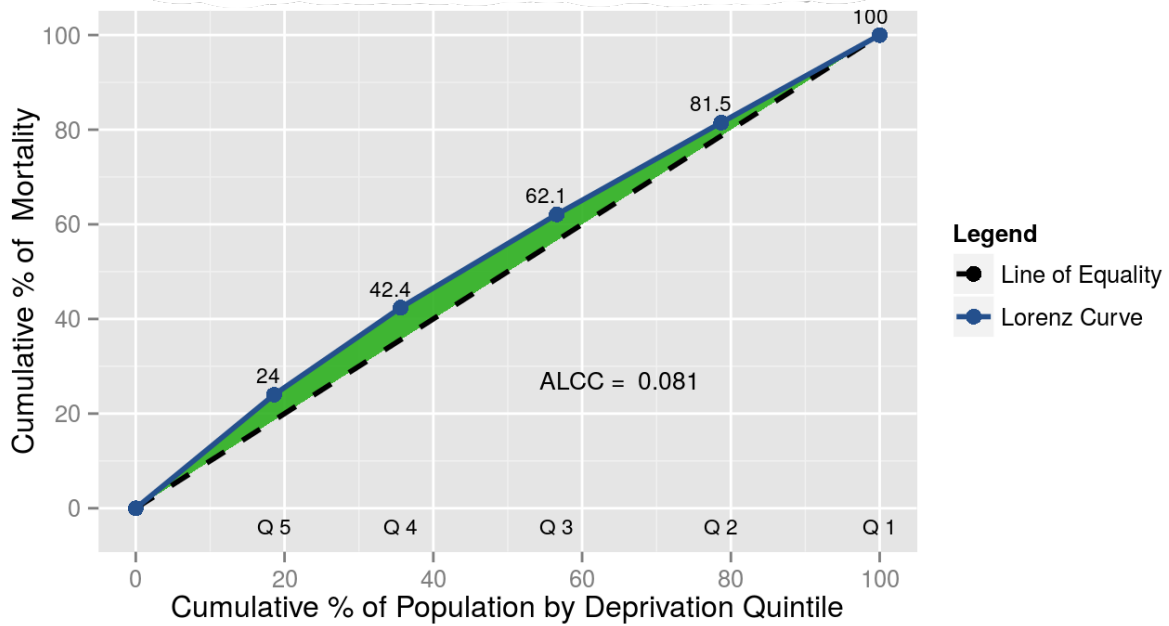


Figure 7. Area level concentration curve and coefficient for all-cause mortality in 2009 in Saskatchewan

Increasing inequality in all-cause mortality explains why Saskatchewan has not had improvements in all-cause mortality overall. The mortality in the most deprived group is well above the other deprivation categories in the province. Of note, there also appears to be an increase in all-cause mortality among Q4 after 2006 that shows increasing inequality not only among the most deprived but the second most deprived areas in the province as well.



## Chronic Obstructive Pulmonary Disease

Chronic obstructive pulmonary disease (COPD) is a progressive lung disease that makes breathing difficult. It is the fifth leading cause of death in high-income countries, accounting for 3.8% of all deaths.<sup>24</sup> The majority of COPD cases are associated with smoking, making COPD preventable. The Saskatchewan Ministry of Health has made a strong commitment to reducing the impact of COPD and five other major chronic conditions (diabetes, coronary artery disease, heart failure, depression, and asthma) through better disease management. It aims to ensure that 80 per cent of patients with these common chronic conditions are receiving care according to best practice by March 31, 2020.<sup>11</sup>

Since 2001 COPD has been on the rise in Saskatchewan. The age and sex standardized period prevalence for COPD increased from 1023 cases per 100,000 population in 2001 to 1203 cases per 100,000 population in 2013. Figure 7 shows that all socioeconomic groups have experienced this rise. However, the rise has been most concentrated among the least well off groups in the population leading to a widening gap in health.

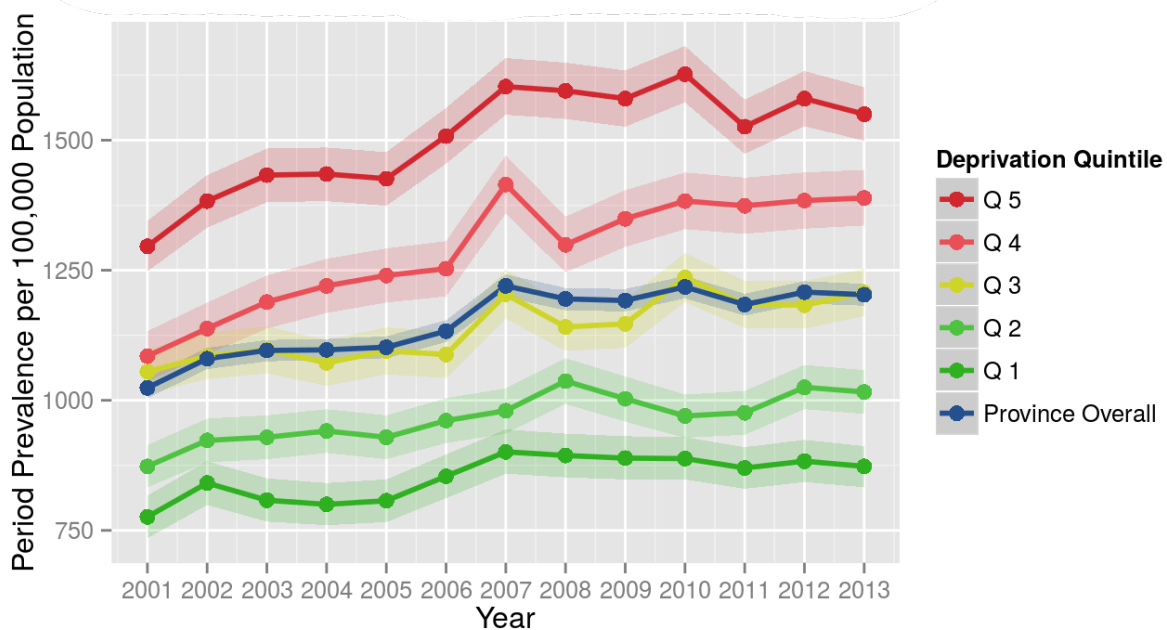


Figure 8. Age and sex standardized period prevalence of COPD per 100,000 population by deprivation quintile in Saskatchewan from 2001 to 2013.

The three measures of inequality confirm that health inequalities in COPD have been increasing over time in Saskatchewan. The ALC coefficient for COPD rose from 0.10 in 2001 to 0.12 in 2013. The rate ratio and rate difference measures are consistent with the ALC coefficient. Those

residing in the most deprived areas had nearly double (DRR = 1.78) the chance of experiencing COPD compared to those residing the least deprived areas in 2013. Between 2001 and 2009 there were 157 more COPD cases per 100,000 population in the most deprived group, a 30% increase. In 2001 there were 521 COPD cases per 100,000 population in the most deprived group, whereas, in 2013 there were 677 COPD cases per 100,000 population in the most deprived group.

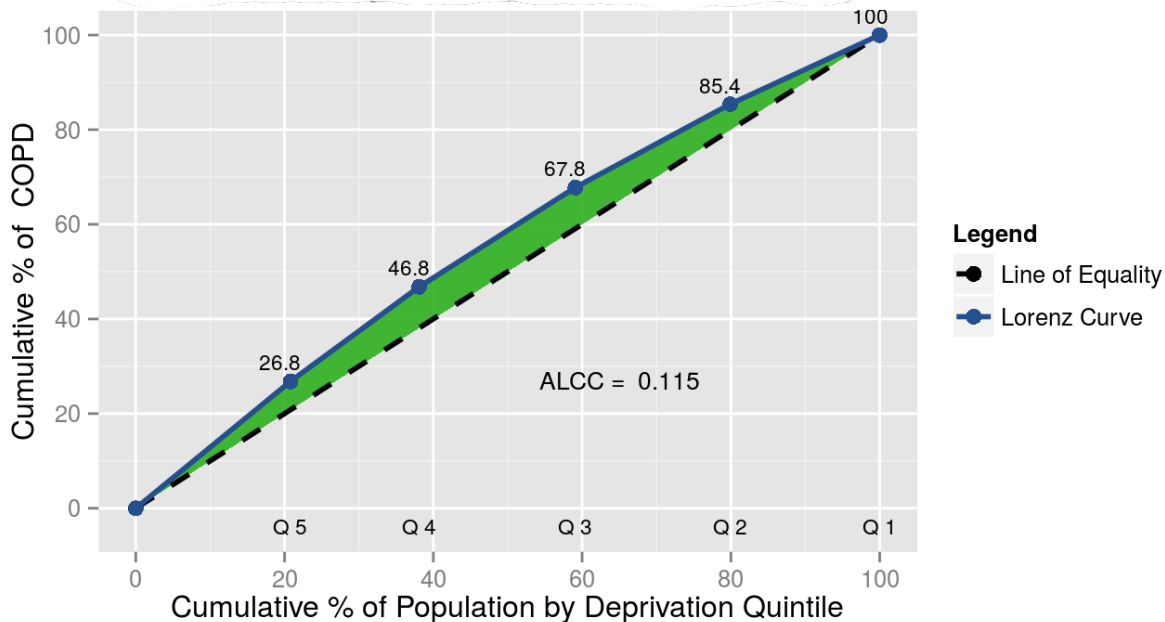


Figure 9. Area level concentration curve and coefficient for COPD in 2013 in Saskatchewan

The leading risk factors for COPD are associated with the social determinants of health. Smoking is the leading risk factor,<sup>24</sup> while other important risk factors are exposure to indoor and outdoor air pollution, occupational hazards, and bacterial or viral infections. Research has shown that less educated groups are more likely to smoke. The educational inequality in smoking has increased over time.<sup>25</sup> Social determinants of health like housing and employment are important determinants of exposure to other risk factors like air pollution and occupational hazards.<sup>26,27</sup>

While overall smoking rates have declined in Saskatchewan, these declines have been steeper for higher income groups than in lower income groups. A health equity approach to COPD will need to:

- Ensure that COPD management is effective in all subgroups of the population.
- Ensure that risk factor reduction such as smoking prevention and cessation is effective in all subgroups such that the gap in smoking rates, exposure to air pollution and occupational risks narrows over time.
- Ensure that the gap in the underlying social determinants of health narrows over time.



## Mental Disorders

For this study mental disorders included people classified as depressed, anxious, substance abusers, having personality disorders, or schizophrenia. Five-year period prevalence of cumulative mental illness refers to the proportion of the population aged 10 and older with a diagnosis of a mental disorder. Worldwide mental and substance use disorders increased by 38% between 1990 and 2010 and are the leading cause of years living with a disability worldwide.<sup>28</sup>

Mental disorders increased slightly in Saskatchewan between 2001 and 2013. The age and sex standardized period prevalence for mental disorders increased from 10331 cases per 100,000 population in 2001 to 10712 cases per 100,000 population in 2013. It is important to note the scale of the challenge of mental disorders. Nearly 10% of Saskatchewan residents have experienced some type mental of illness in the past 5 years. As shown in Figure 9 mental disorders are experienced by people in all socioeconomic groups. There is large inequality in the prevalence of mental disorders in the province, however, our data show that the inequality has reduced somewhat over time.

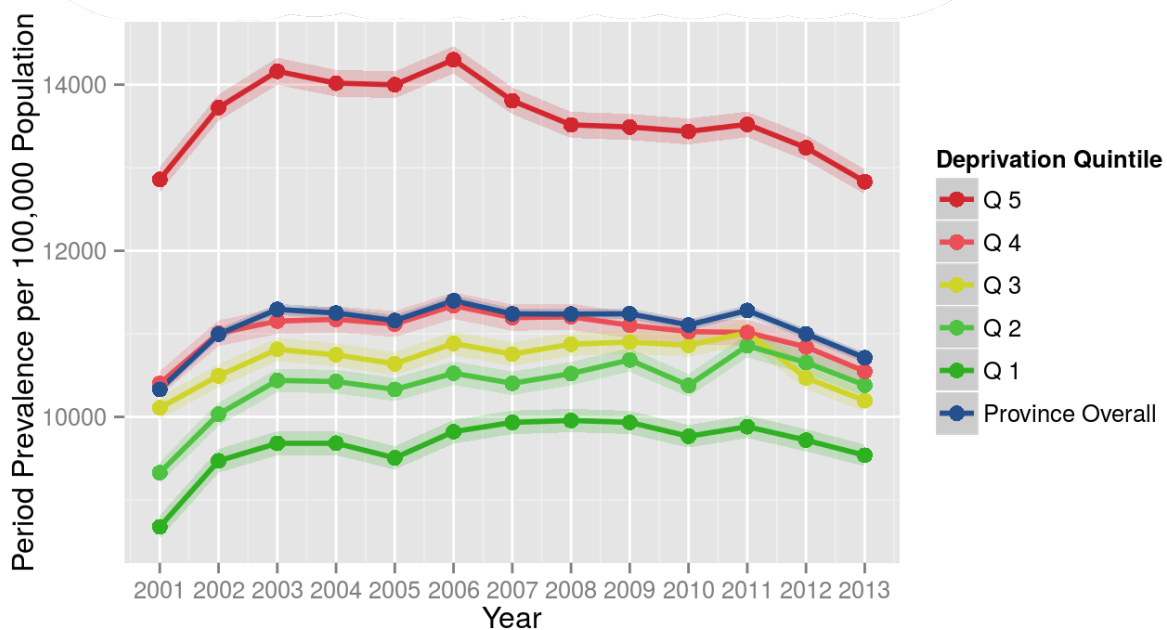


Figure 10. Age and sex standardized period prevalence of mental disorders per 100,000 population by deprivation quintile in Saskatchewan from 2001 to 2013.

The three measures of inequality confirm that health inequalities in mental disorders have been decreasing over time in Saskatchewan. The ALC coefficient for mental disorders was 0.07 in 2001 and 0.05 in 2013. The rate ratio and rate difference measures are consistent with the ALC



coefficient. Those residing in the most deprived areas had a 35% greater chance of experiencing at least one mental disorder compared to those residing the highest income areas in 2013. Between 2001 and 2013 there were 887 fewer mental disorder cases in the most deprived group compared to the least deprived group a 21% decrease in the rate difference.

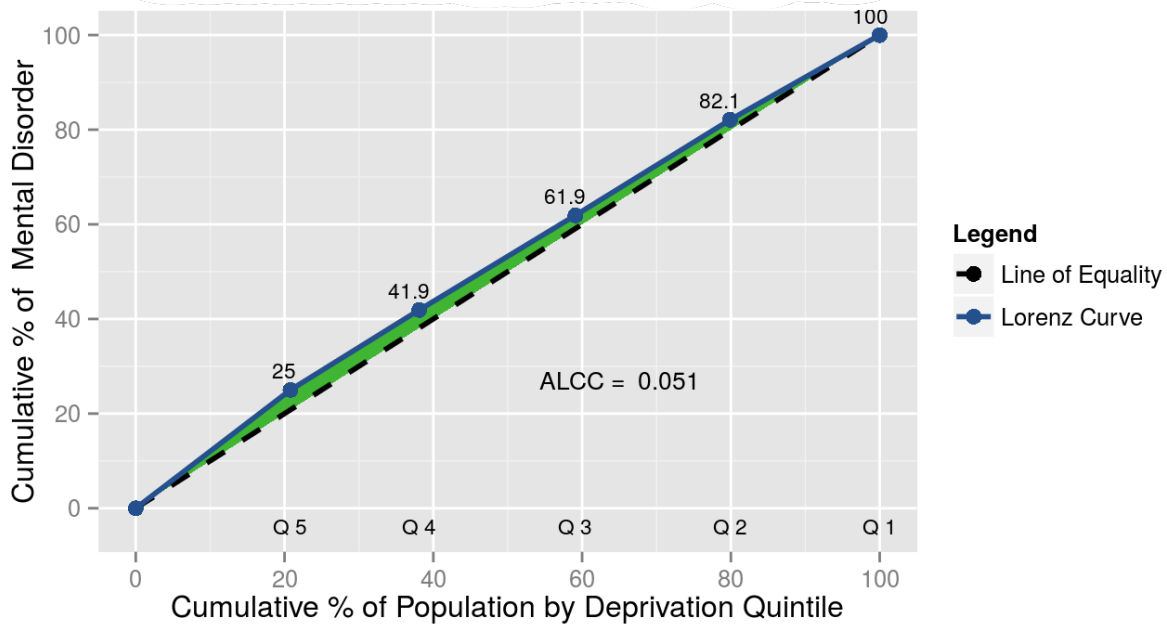


Figure 11. Area level concentration curve and coefficient for mental disorders in 2013 in Saskatchewan

The Public Health Agency of Canada shows that risk factors for mental illness include:<sup>30</sup>

1. Family history of mental illness
2. Age
3. Sex/Gender
4. Substance abuse
5. Chronic diseases (including COPD)
6. Family, workplace, life event stresses

While mental illness can lead to decreased socio-economic status, mental disorders can also be caused in part by the social determinants of health. Substance abuse, and stress are more common in higher deprivation groups and as we have already seen, many chronic diseases are more common in these groups as well. Improving mental health is listed as a key priority of the Saskatchewan government. Our data show that reducing inequalities in mental health should also be an important objective if the entire population of Saskatchewan is to experience “a state of well-being in which the individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community”.<sup>31</sup>





## Are health inequalities improving?

Data for all-cause mortality, COPD, and mental disorders provide examples that show that health inequalities in Saskatchewan are high for most health indicators and that some inequalities are getting worse, while others are stable or getting better over time. The figure and chart below shows the change in period prevalence, disparity rate ratio, disparity rate difference, and area level concentration coefficient in the 15 health outcomes analyzed. The indicators that are getting worse over time are in red, no change in yellow, and decreasing in green. Supplement 6 available on our website shows the complete results in table format ([Click here to download](#)).

### High Inequality (measured using ALCC)

		DRD & DRR Change		
		Decrease	No change	Increase
Prevalence	Increase		Diabetes Food Security	Self-rated Mental Health COPD
	Decrease		Injury	

### Moderate Inequality (measured using ALCC)

		DRD & DRR Change		
		Decrease	No change	Increase
Prevalence	Increase		Chronic Stress	Self-rated Health
	Decrease		CHF Fruit and Vegetable Consumption	

### Low Inequality (measured using ALCC)

		DRD & DRR Change		
		Decrease	No change	Increase
Prevalence	Increase	Mood Disorder Mental Disorder		Mortality
	Decrease	Asthma CAD		Smoking

Table 2. High, moderate, and low inequality measured using the area level concentration coefficient by prevalence, by change in disparity rate ratio and disparity rate difference.



These tables serve to assist health planners in prioritizing where to look first as they endeavor to improve health equity if they wish to target areas where the inequality is highest, and is getting worse over time.

## Discussion

The purpose of this report was to provide a baseline of trends in social determinants of health and health inequalities for the province of Saskatchewan that can be used to prioritize future initiatives and evaluate progress as we work to “close the gap”. Table 2 shows that all 15 health indicators had some degree of inequality in their distribution across levels of deprivation in the province of Saskatchewan during the study period. The indicators in red (mostly the broad measures of a population’s overall health (self-rated health, self-rated mental health, and all-cause mortality) can be used as sentinel indicators of the health of the population when analyzed over time, or between groups. The finding that these indicators are the ones showing the greatest inequity and are getting worse over time suggests that overall, the social determinants of health and health inequalities is a particularly important issue in our province at this time.

The other health indicators include a mix of specific illnesses, health behaviours, and outcomes. Among these COPD stands out as a condition that has high inequality and has worsened over time. Most other indicators (highlighted in yellow) have high to moderate inequality, but show a mixed picture over time, with rates either staying unchanged, or with either the relative or absolute difference increasing while the other decreased. Among this group of moderate inequality, we find factors such as higher levels of chronic stress and food insecurity and lower levels of fruit and vegetable consumption which can all lead to poorer health outcomes. We also find certain diseases such as type II diabetes and congestive heart failure may be the result of an inability to afford a healthy lifestyle. Injury is another outcome in this moderate inequality group. Studies have shown that injuries of most causes are higher in higher deprivation areas.

The only indicators that show decreasing inequality over the study period (those in green) are those that show a lower rate of inequality overall: asthma and Coronary Heart Disease. While substandard housing can lead to higher rates of certain respiratory diseases, including asthma, other causal factors with this disease can be more common in areas of low deprivation, blunting this effect. Similarly, there are different risk factors for CAD in lower vs higher deprivation groups that tend to lessen the inequality for these diseases, but nevertheless, some inequity remains.

The amount of time required for poor social determinants of health to result in impacts to health varies with both the specific determinant and the health condition under study. This time lag can also vary when the causal chain runs in the other direction, with poor health resulting in poorer social determinants of health.



This report is not about trying to quantify the amount of poverty that leads to poor health or the amount of poor health that leads to poverty. We know that the two issues are linked, and that causation can go in both directions. However, the literature supports that the balance tilts more in the direction of poverty leading to poor health. Since this report deals with data analyzed by summarizing groups of people living in environments that differ by their relative level of deprivation, not at the individual level, we are not trying to quantify the causal link. Rather, this report shows that inequalities in the distribution of both social determinants of health and a selection of health indicators both exist, and that many of them have been getting worse over time. Widening inequalities in the social determinants of health have been shown to be destructive for communities and for societies.<sup>32</sup> Similarly, rising health inequalities are not desirable for communities let alone the affected individuals.<sup>33</sup>

### Social determinants -> Smoking -> COPD

Living in a poorer neighbourhood is associated with more smoking. This can be due to various factors such as the use of smoking as a stress reducer for people living in poverty, more advertising and availability of cigarettes in the neighbourhood, and a lack of resources to support successful quitting attempts. This, combined with higher levels of harm caused by cigarette smoke for people living with the chronic stress experienced in these neighbourhoods can lead to more smoking related illnesses such as COPD and heart disease years to decades later. As COPD develops and gets worse, it becomes harder to work, maintain a home, or look after one's self, further reducing income and quality of life, leading into a downward spiral of social determinants and health. Smoking and COPD occur in all income quintiles, but at a higher rate in lower income groups and the consequences are worse in lower income groups if there are barriers to receiving preventive care.

Smoking is still an individual choice, but the circumstances that lead some people to smoke are more common in poor neighbourhoods than in wealthier ones, and the ability to successfully stop smoking is greater in wealthier neighbourhoods. An effective approach to reducing the inequalities in smoking related illnesses such as COPD needs to tailor prevention programming, cessation services, and treatment services to reach these populations. It also needs to recognize that to truly reduce these differences in smoking and COPD, the underlying differences in the social determinants of health should be reduced as well, in an effort to level the playing field in making the healthy choices the easy choices for more people.

If both inequalities in the social determinants and health inequalities are present in a society at the same time, they both require action from an ethical standpoint regardless of the direction of causation. The after effects of low income, education and employment in the population result in extra costs to government services at local, provincial and federal levels through an increased demand for the various sectors such as health, social services, justice, and education. We can choose to pay now, in the form of supportive and preventive services and policies or pay later with reactive approaches that deal with the after effects of poverty and illness. In reality, all societies need to invest in a combination of both preventive and reactive strategies, but it has been shown that shifting the balance toward more preventive approaches is more effective,



ethical and cost-effective. Evidence is also mounting that the timing for action should not be delayed, even in difficult economic times. In fact it appears that times of economic downturn may be the most important times to invest in both improving the social determinants and reducing health inequalities both to mitigate the effects of the downturn on health and well-being, but also as a way to speed the economic recovery.<sup>34</sup>

In the health sector, quality improvement initiatives can inadvertently increase inequality, due to a lack of understanding of how they will differentially impact population sub-groups, for example low income groups. Adjustments to the methods used to monitor and improve the quality of our healthcare system to ensure that sub-groups are negatively affected and quality improves overall are a desirable end. This is why we need to support actions to improve the social determinants of health and health equity in the health system. It has been shown that societies that have a more equitable distribution of the social determinants of health have fewer health and social problems, leading to both a healthier society, and an ability to concentrate more of our fixed tax dollars on prevention rather than responding to the after effects of higher rates of illness, and the other impacts of living with greater levels of deprivation. In effect, it is cheaper to decrease poverty than to respond to its after events.

## Recommendations

The results of our report show that inequalities in the social determinants of health and health inequalities are high and persistent across Saskatchewan. In most cases these inequalities are getting worse, or not improving despite recognition of their existence and an imperative to work on closing the gap by the health system and intersectoral planners over the past 7 years. While not all inequality is necessarily undesirable, the analysis in this report gives us some indication of where inequalities are highest and where they are growing. This information, combined with an understanding of which of these health conditions affect the largest group of people can be used to prioritize which conditions the health system could prioritize for action to reduce health inequalities.

### Health Sector Actions

Over the past 10 years, there has been a growing body of literature outlining the steps that can be taken by the health system to reduce health inequity and mitigate the effects of poverty on health.<sup>35-37</sup> For example, in Saskatchewan, the Saskatoon Health Region has been working to decrease health inequity using a variety of methods, including:

- A health equity audit tool used by all program areas to determine where health inequities exist in their department, target improvements, and monitor their success in closing the gap over time.



- Developing a health equity gauge to evaluate the extent to which departments are incorporating health equity into their planning and program delivery, and evaluate whether equity is being considered across the system.
- Incorporating health equity into their healthcare management system such that all quality improvement initiatives can provide an equity lens to the project to ensure effectiveness across various patient and client groups.
- Asking clients to provide information about their social determinants of health to help customize their care and connect them to other supports and services.
- Development of a draft health equity position statement to be adopted by the Board and Senior Leadership of the Saskatoon Health Region to embed the above actions in our standard work and guide future improvements and decisions at the most senior levels.
- Improving cultural safety and the cultural representativeness of the workplace in an effort to decrease the institutionalized racism prevalent in the health system.
- Working in partnership with other agencies and organizations across the health system and in other sectors to help our common clients get the best mix of services to meet their needs and improve their health and wellbeing rather than only treating the symptoms of poor living conditions.

## Responding to Challenge of Mental Health Treatment

In December 2014 the Government of Saskatchewan commissioned and endorsed a 10 year mental health and addictions action plan.<sup>29</sup> The plan called “Working Together for Change: A 10 year Mental Health and Addictions Action Plan for Saskatchewan” outlines 16 recommendations sorted into seven action categories:

1. Enhance access and capacity and support recovery in the community
2. Focus on prevention and early intervention
3. Create person and family-centered and coordinated services
4. Respond to diversities
5. Partner with First Nations and Métis Peoples
6. Reduce stigma and increase awareness
7. Transform the system and sustain the change

These efforts in the Saskatoon Health Region have started to show benefit through narrowing the gap in service access and outcomes where targeted program improvements have been made. Increased awareness of the causes of health inequalities by staff and managers in many parts of the system, combined with a desire to work on quality improvement in these areas leads to awareness that we can improve the health of the population faster by ensuring our programs and services are designed to meet the varied needs of different groups of patients and clients.

Approaches such as those mentioned above are gaining momentum across Canada and around the world as a result of increased monitoring and awareness, standardized data collection and the sharing of effective interventions. Adoption of these and similar approaches to improving



health equity within the health system can and should be done by all Regional Health Authorities in Saskatchewan with support and leadership at the provincial level. The tools now exist to make the vision statement of decreasing health disparities a reality in our province.

## Health in All Policies: An all-of-government approach

Similar to the analysis of health indicators, the analysis of trends in the social determinants of health show that income inequality is growing in this province, and this is mirrored in the persistent gaps in education and full time employment between various income groups. In 2014, a report entitled Poverty Costs was released showing that the direct and indirect financial impacts of poverty in our province surpassed \$3.8 Billion per year, and resulted in diverse interest groups and individuals asking for the creation of a provincial poverty reduction strategy.<sup>38</sup> An Advisory Group on Poverty Reduction was convened in late 2014 with representatives from 5 provincial Ministries and 6 community experts. In 2015 they released their report after looking at the evidence and listening to stakeholders. The recommendations form the basis for what a comprehensive poverty reduction strategy would look like in our province given the current set of programs and services and possible gaps. The Advisory Group on Poverty Reduction “envisions all of Saskatchewan committing to actions that will reduce, and ultimately eliminate, poverty in our communities (p. 3).”<sup>39</sup> The group has proposed 6 areas of initial focus for reducing poverty, which are the most important social determinants of health for our province at this time:

1. Income Security
2. Housing and Homelessness
3. Early Childhood Development
4. Education and Training
5. Employment
6. Health and Food Security

A number of promising interventions and evidence-based policies have been identified and proposed under each of these focus areas in the Advisory Group’s final report. A poverty reduction strategy is expected to be announced in 2016 and what combinations of these or other policy options it contains will be crucial in determining the speed and effectiveness of Saskatchewan’s efforts to reduce social inequalities in health in the coming years.

International experience suggests that reducing social inequalities in health is not easy.<sup>40,41</sup> England, the first European country to implement policies to reduce social inequalities in health did not meet it’s targets. After 13 years of effort, inequalities in life expectancy and infant mortality had not been narrowed to meet their target of 10%. Mackenbach identifies 3 reasons why policies to reduce social inequalities in health in England were not effective.<sup>41</sup>





First, there is no package of policies and interventions with strong scientific evidence for effectively reducing health inequalities.<sup>41</sup> Individual policies and programs are able to reduce poverty to some degree, but inequality is determined by the well-being of the least and the most well off. Even if the conditions of the least well off improve, inequality can still increase if the conditions of the most well-off also improve more quickly.<sup>42</sup> Second, the scale and intensity of policy change required to impact social inequalities are great, and thus limited by inconsistent levels of public support, and the capacity of government bureaucracies to implement large scale policy changes in the span of government mandates. Third, health inequalities do not occur overnight. They result from years of exposure to risks. In England, it was suggested that redirecting less than 1% of £1100 trillion in annual public expenditure to reducing health inequalities was simply a drop in the bucket and see an immediate effect was not realistic.

Saskatchewan can learn from the English experience and the World Health Organization Commission on the Social Determinants of Health. First, interventions to reduce social inequalities must be large in scale and bold in ambition. For example, the Advisory Group on Poverty Reduction has proposed a basic income program be piloted and implemented in Saskatchewan. Similar initiatives are being discussed in other provinces and at the federal level.



A provincial basic income program is promising in that it would be sufficient in scale to potentially reduce social and health inequalities. As discussed however, public support for this initiative will be a crucial challenge for large scale implementation.<sup>43</sup>

Second, evaluation of any policies and interventions aimed at improving the social determinants of health and reducing poverty is crucial.<sup>44</sup> This report is an early step toward monitoring changes in social determinants of health and health inequalities over time in Saskatchewan, but a small investment in the capacity for ongoing evaluation and monitoring of health inequalities and the determinants of health as well as the impacts of program and policy responses to these issues will be required. For example, provincial agreements facilitating data sharing between ministries, data linkage projects, and improved open and research data access would go a long way toward making monitoring easier.

It is recognized that investment in the determinants of health will be required to ensure a prosperous future for Saskatchewan. This will require an all-of-government response, where all sectors of government are aware of the combined impact of their various programs and policies and how they work together to affect the health and well-being of the population. Some governments have enshrined a “Health in All Policies” approach within legislation as one way to ensure that competing priorities do not inadvertently worsen health for all or part of the population. This approach is supported by research, and promoted by the World Health Organization.<sup>45</sup> Ensuring that any government interventions are rigorously monitored and evaluated in a transparent manner helps to ensure broad based non-partisan support for these essential programs should they prove to be effective. Bringing an explicit health equity lens to these efforts will ensure that actions on the social determinants of health are prioritized.

Despite economic setbacks and instability, the last few decades have seen a tremendous increase in global wealth, with more developing countries coming out of extreme poverty and investing in the conditions to promote health, such that some economists are saying that it is within our grasp to end extreme poverty globally.<sup>46</sup> Many people in Canada support helping the poorest of the poor in the developing world when they face natural disasters, war and famine, and see the wisdom in assisting these countries to become more self-sufficient. Similar arguments can be made for investing in the social determinants of health here at home. The recommendations contained in the Saskatchewan Advisory Committee on Poverty Reduction’s final report can be partially funded through a reallocation of existing funding, or for a modest increase in these levels of support, at least in the short term while they work to improve people’s health and well-being. Collective wealth in our province is at levels far above what our grandparents could have imagined. Through a combination of fair taxation, shared responsibility, and partnering with non-government agencies and industry, we have the means to make these investments in our collective future. Can we afford to reduce health inequity and improve the distribution of the social determinants of health? Perhaps we should be cautiously optimistic. One thing is certain. Given the trajectory of health costs and the costs of dealing with the effects of poverty, we probably can’t afford **not** to.





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