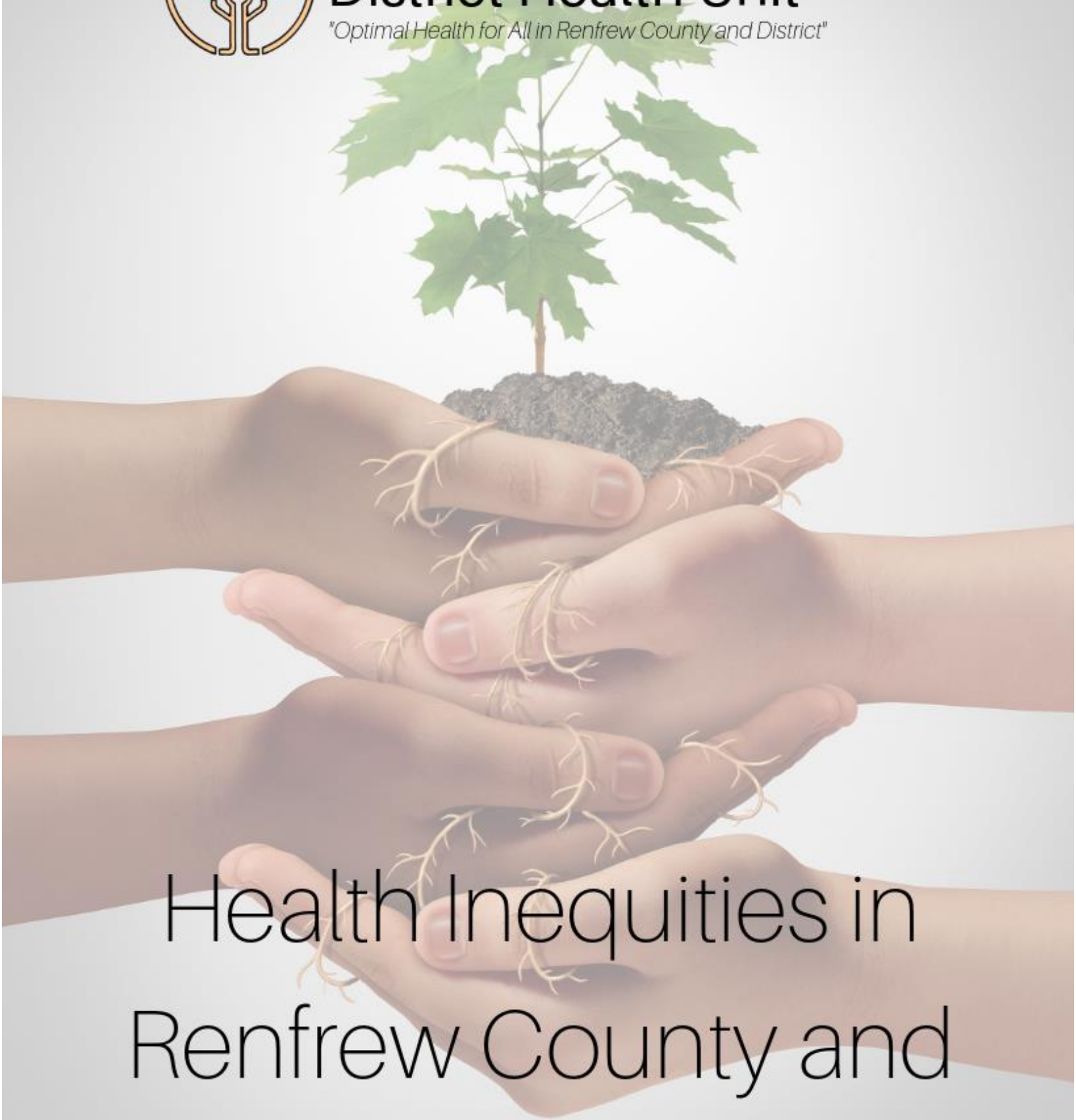
Renfrew County and District Health Unit

"Optimal Health for All in Renfrew County and District"



Health Inequities in Renfrew County and District

Authors

Data analysis, results and report prepared by the Knowledge Management Division, Kingston, Frontenac and Lennox & Addington Public Health: Evan Arsenault, Paul Belanger, Brooke Linden, Li Liu, Brian Mosley, Nancy VanStone.

Co-Authors

Planning, development and editing by Renfrew County and District Health Unit (RCDHU): Juliana Dow, Carolyn Froats-Emond, Colleen Musclow, Peggy Patterson, Courtney Trombley (knowledge translation), and Dr. Rim Zayed (epidemiology support and knowledge translation).

Acknowledgements

The authors are grateful for the guidance provided by other health units that have embarked on developing health equity reports. In particular, the methods presented in Public Health Sudbury & Districts' report, *Opportunity for All: The Path to Health Equity*, were used as a framework for our approach to assessing health equity. Thank you to all our colleagues at both Kingston, Frontenac and Lennox & Addington Public Health and Renfrew County and District Health Unit for their time and effort in preparing this report. In addition, thank you to the RCDHU staff who provided their professional expertise and editorial support in reviewing this report.

Citation

Renfrew County and District Health Unit. *Health Inequities in Renfrew County and District*. Pembroke, ON; 2018.

Audience

The data and discussion in this report will be of importance to public health staff, health care providers, social service providers, researchers, community organizations, and other stakeholders seeking to improve health equity in Renfrew County and District.

Survey

Please click here to complete a one minute online evaluation survey to provide feedback on this report.

Contact for More Information

Renfrew County and District Health Unit
7 International Drive
Pembroke, ON
K8A 6W5

Telephone: 613-735-8650 ext. 512
Fax: 613-735-3067
media@rcdhu.com
www.rcdhu.com

"*Optimal Health for All in Renfrew County and District*"

Table of Contents

List of Figures

List of Tables

Abbreviations

BORN	Better Outcomes Registry & Network
CCHS	Canadian Community Health Survey
DI	Deprivation Index
DICmb	Combined Deprivation
DIMat	Material Deprivation
DISoc	Social Deprivation
ED	Emergency Department
HBHC	Healthy Babies Healthy Children
IFS	Infant Feeding Surveillance
INSPQ	Institut national de santé publique du Québec
LRADG	Low-Risk Alcohol Drinking Guidelines
MVPA	Moderate-to-Vigorous Physical Activity
PAF	Population Attributable Fraction
PYLL	Potential Years of Life Lost
RCD	Renfrew County and District
RCDHU	Renfrew County and District Health Unit

Executive Summary

Why a report on health inequities?

All people in Renfrew County and District should have the opportunity to be as healthy as possible. But health is influenced by a variety of factors, ranging from genetics and behaviours to the physical, social, and economic environments in which we live.

The environments in which we live are often beyond our control as individuals. Some of us are fortunate enough to grow up in a family with a stable income, a house in a good neighbourhood, many opportunities such as post-secondary education, and easy access to services when we need them. These people are more likely to live a long, healthy life. Some of us live less healthy and shorter lives because we are affected by low income, less education, poor housing, less access to healthy food, and/or other disadvantages.

When differences in health are systematic, avoidable and unfair and have the potential to be changed or decreased by social action, they are called health inequities. There are many things that local, provincial and national organizations can do together to reduce health inequities, improving the chances that everyone can achieve lasting good health.

> *Health equity means that all people can reach their full health potential and are not disadvantaged from attaining it because of their race, ethnicity, religion, gender, age, social class, socioeconomic status or other socially determined circumstances.*

Public health units in Ontario are mandated to play a role in improving health equity. An important step in this process is to use local information about population health to describe the existence and impact of health inequities. The *Health Inequities in Renfrew County and District* report was developed to inform local discussion and action on addressing health inequities in Renfrew County and District.

What we did

This analysis divided Renfrew County and District into 164 small geographic areas. These are the smallest unit of geography for which Statistics Canada provides data from the Census, and each contains about 400 to 700 people. Each area was placed into one of three groups: least deprived, neutral, or most deprived. Areas were placed in one of these groups based on the following information from the Census about the people living there: education, employment, income, marital status, single parenthood, and the proportion of people living alone.

Next, information about health was examined in relation to where people lived. This included health risk factors, maternal health indicators, measures of health service utilization, and death rates.

The method used in this report to identify health differences between the least deprived and most deprived areas is called the Deprivation Index. The **material** Deprivation Index uses information about education, employment and income. The **social** Deprivation Index uses information about marital status, single parenthood, and the proportion of people living alone. The **combined** Deprivation Index uses all six pieces of information.

What we found

Of the 53 health indicators examined, 23 are shown in the report because of noteworthy differences in health between the least deprived and most deprived areas. The table below shows these differences based on the combined Deprivation Index. The column on the right shows the relative risk, or the magnitude of the difference between the most deprived and least deprived areas. Relative risk is only reported where the difference between most and least deprived areas is statistically significant.

Differences in Health between the Least Deprived and Most Deprived Areas by Combined Deprivation Index

HEALTH INDICATOR	Least Deprived	Most Deprived	Relative Risk
Health Risk Factors			
1. Proportion who are current cigarette smokers	23.7%	34.9%	--
2. Proportion exposed to second-hand smoke	11.6%	20.1%	--
3. Proportion who exceeded the Low Risk Alcohol Drinking Guidelines (LRADG)	56.4%	42.7%	--
4. Proportion physically inactive during leisure time	36.7%	57.9%	**1.5**
Maternal Health			
5. Proportion taking folic acid supplement prior to, and during pregnancy	36.3%	27.3%	**1.3***
6. Proportion who smoked cigarettes during pregnancy	14.8%	20.6%	**1.4**
7. Proportion who used alcohol during pregnancy	2.3%	3.6%	--
8. Proportion who used drugs during pregnancy	2.1%	6.2%	**2.9**
9. Proportion with a mental illness prior to pregnancy (mother or parenting partner)	17.7%	26.5%	**1.5**
10. Proportion with a mental health concern during pregnancy	22.2%	31.5%	**1.4**
11. Proportion of new mothers intending to exclusively breastfeed	84.2%	75.8%	--

HEALTH INDICATOR	Least Deprived	Most Deprived	Relative Risk
12. Proportion exclusively breastfeeding at 2 months postpartum	44.4%	32.7%	--
Health Service Utilization			
13. Proportion who visited a dentist in the past 2 years	76.7%	58.9%	--
14. Rate of all-cause hospitalizations per 1,000 population	44.4	134.9	**3.0**
15. Rate of emergency department (ED) visits for injuries per 1,000 population	98.2	249.0	**2.5**
16. Rate of ED visits for injuries caused by falls (65 years and older) per 1,000 population	40.1	129.6	**3.2**
17. Rate of all-cause ED visits per 1,000 population	556.2	1479.7	**2.6**
Mortality			
18. Rate of all-cause Potential Years of Life Lost (PYLL) per 1,000 population	25.0	82.4	**3.2**
19. Rate of cancer PYLL per 1,000 population	9.3	19.9	**2.1**
20. Rate of cardiovascular disease PYLL per 1,000 population	2.5	16.1	**6.4**
21. Rate of all-cause mortality per 1,000 population	2.9	13.2	**4.5**
22. Rate of cancer mortality per 1,000 population	0.9	3.2	**3.5**
23. Rate of cardiovascular disease mortality per 1,000 population	0.7	4.2	**6.0**

***Note:** For indicator 5 only, the relative risk is reported as the number of times higher the risk for the health indicator is within the **least** deprived areas compared to the risk within the **most** deprived areas (i.e. the reverse interpretation is used for all other indicators).

What it means

Health Risk Factors

Factors such as smoking, exposure to second-hand smoke, and physical inactivity during leisure time, are more prevalent in the most deprived areas. The difference between the least and most deprived areas was statistically significant for physical inactivity only. In contrast, drinking in excess of the Low Risk Alcohol Drinking Guidelines appears to be higher in the least deprived areas.

Maternal Health
The analysis in this report provides strong evidence that pregnant women living in most deprived areas are at a disadvantage. They are more likely to smoke cigarettes, use drugs, experience a mental health concern, and less likely to take folic acid supplements than pregnant women in the least deprived areas.

Health Service Utilization
Health service utilization was also higher for people living in the most deprived areas. Hospitalization rates and emergency department (ED) visit rates were 2.5 to 3.2 times higher in the most deprived areas compared to the least deprived areas. The report examined hospitalizations and ED visits due to all causes, as well as ED visits for injuries, and ED visits for injuries caused by falls among people age 65 and older.

Mortality
Premature death (potential years of life lost) was 2.1 times higher for cancer and 6.4 times higher for cardiovascular disease in the most deprived areas compared to the least deprived areas. The death rate for cancer was 3.5 times higher, and the death rate for cardiovascular disease was 6 times higher in the most deprived areas compared to the least deprived areas.

For most of the health service utilization and mortality indicators, there was a step-wise difference between the least deprived, neutral and most deprived areas. People in the least deprived areas were healthier than those in the neutral areas, who were healthier than those in the most deprived areas.

It is clear that differences in health in Renfrew County and District are related to social and material circumstances. Health inequities exist in Renfrew County and District. This knowledge provides a compelling case for action to reduce health inequities.

What next?

The next step is to develop strategies to reduce health inequities. The health unit and community partners can work in collaboration with people experiencing health inequities to:

- Have discussions about the local impact of health inequities and establish effective strategies for reducing health inequities
- Modify and orient programs and services to meet the unique needs of disadvantaged groups
- Analyse, develop and advance policies that improve social and economic conditions and support health.

Introduction

Health is influenced by a variety of factors ranging from individual genetics and behaviours to the physical, social, and economic environments in which we live. [1] These factors impact not only individual health, but also the overall health of communities or population groups. Identifying health inequalities, or differences in health status between groups, is important to inform the development of interventions to improve health.

Certain factors beyond an individual's genetics and behaviours have an impact on health. These interrelated social, political and economic factors are called the social determinants of health (SDOH), and create the conditions in which people live, learn, work and play. [2] These conditions significantly influence opportunities for health. It is estimated that 50% of health outcomes can be attributed to the social determinants of health. [3]

Social Determinants of Health [2] **Factors that have a significant impact on health**	
• *Access to health services* • *Culture, race and ethnicity* • *Disability* • *Early childhood development* • *Education, literacy and skills* • *Employment, job security, and working conditions* • *Food insecurity* • *Gender identity and expression*	• *Housing* • *Income and income distribution* • *Indigenous status* • *Personal health practices and resiliency* • *Physical environments* • *Sexual orientation and attraction* • *Social inclusion/exclusion* • *Social support networks*

Some individuals, communities and population groups are healthier than others, not because of personal choice, but because of social, economic and environmental circumstances. [4] This creates a gradient in health such that people affected by factors like lower income, less education, inadequate housing, less access to affordable and nutritious food, and/or other disadvantages live less healthy and shorter lives. [5] When these conditions lead to differences in health that are systematic, avoidable and unjust, they are termed health inequities. [5]

Health equity *means that all people can reach their full health potential and are not disadvantaged from attaining it because of their race, ethnicity, religion, gender, age, social class, socioeconomic status or other socially determined circumstance.* [5]

Health inequities *are health differences that are:*

- *Systematic, meaning that health differences are patterned, where health generally improves as socioeconomic status improves;*
- *Socially produced, and therefore could be avoided by ensuring that all people have the social and economic conditions that are needed for good health and well-being; and*
- *Unfair and/or unjust because opportunities for health and well-being are limited.* [2]

The importance of addressing the social determinants of health and reducing health inequities is emphasized in research and population health assessments at the global, national, provincial and local levels. In 2011, the World Health Organization released a discussion paper, *Closing the Gap: Policy into Practice on Social Determinants of Health*, that outlines the importance of addressing health inequities resulting from disparities in social conditions throughout the world. [6] *The Rio Political Declaration on Social Determinants of Health: A Snapshot of Canadian Actions 2015*, from the Public Health Agency of Canada, outlines Canada's commitment to address health inequities and provides examples of government and multi-sector action to advance health equity and address the social determinants of health in Canada. [7]

In Ontario, the 2015 report of Ontario's Chief Medical Officer of Health, *Mapping Wellness: Ontario's Route to Healthier Communities*, reiterates the importance of local-level population health data in making evidence-informed decisions to improve the health of communities. [8] Within Ontario, local public health agencies have prioritized assessing and reporting on health inequities in their areas. For example, Public Health Sudbury & Districts produced the 2013 report, *Opportunity for All: The Path to Health Equity* that describes linkages between health and social and economic environments in the City of Greater Sudbury. [9]

In January 2018, the Ontario Ministry of Health and Long-Term Care released an updated public health mandate through the Ontario Public Health Standards (OPHS). This document includes direction for focused work on the social determinants of health and health equity. The OPHS aligns with the public health roles for improving health equity, from the National Collaborating Centre for Determinants of Health. They include:

1. Assess and report on the existence and impact of health inequities, and effective strategies to reduce these inequities.
2. Modify and orient interventions and services to reduce inequities, with an understanding of the unique needs of populations that experience marginalization.

3. Partner with other government and community organizations to identify ways to improve health outcomes for populations that experience marginalization.
4. Lead, support and participate with other organizations in policy analysis and development, and in advocacy for improvement in health determinants and inequities. [10]

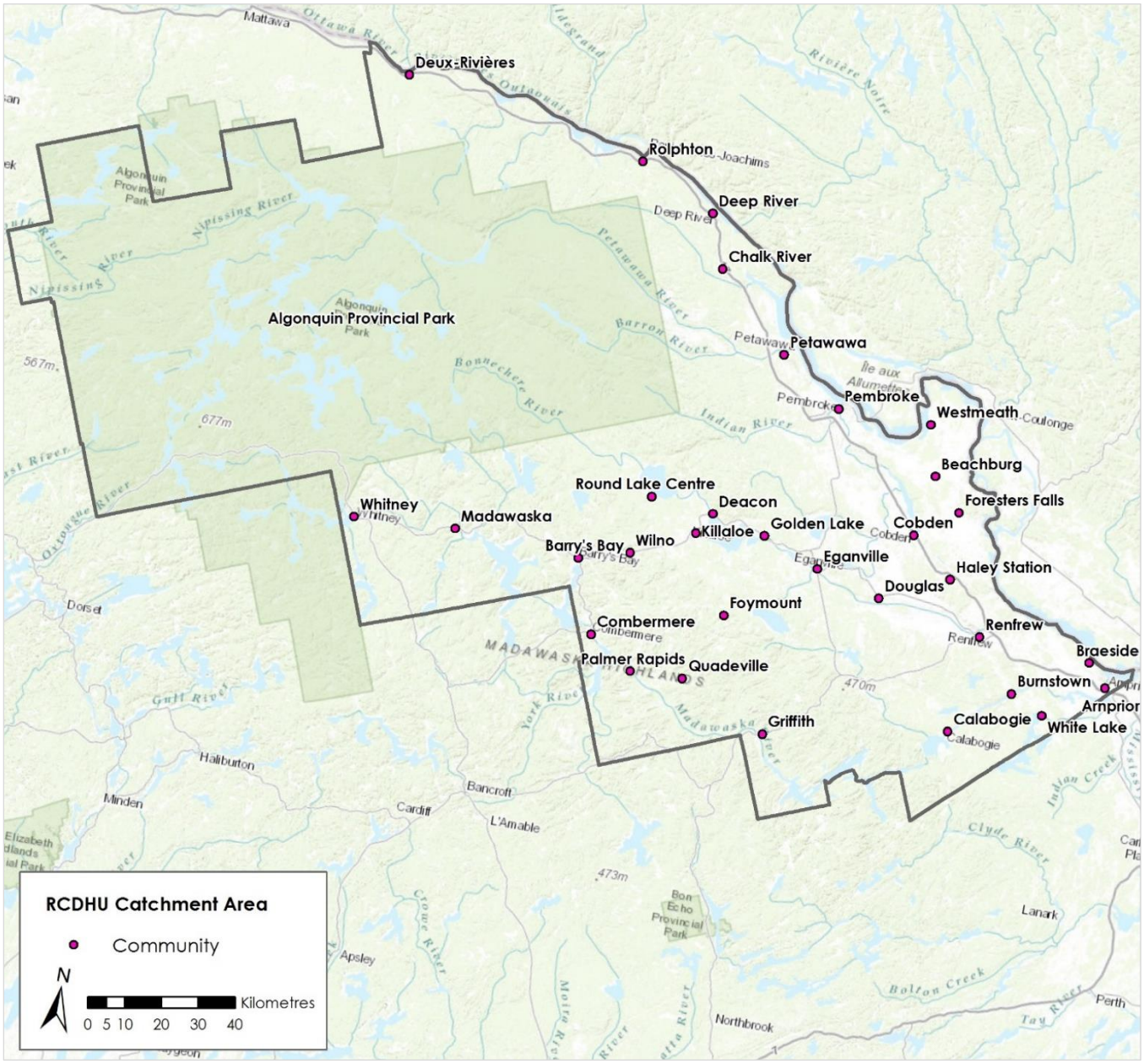
Given the importance of the social determinants of health and health equity to the well-being of all people living in its service area, Renfrew County and District Health Unit (RCDHU) is committed to promoting more equitable opportunities for health. This report seeks to describe the existence and impact of health inequities—in other words, to measure differences in health between people living in the most and least socioeconomically deprived areas in Renfrew County and District (RCD). The findings from this report will aid in developing local strategies for reducing health inequities in RCD, moving toward the health unit's vision of "optimal health for all".

*The **purpose** of this report is to assess and report on health inequities in Renfrew County and District in order to:*

- *Demonstrate the connections between the social determinants of health and health outcomes*
- *Assist in the identification of local populations that are experiencing health inequities*
- *Support the identification of opportunities for public health, community partners and stakeholders to work collaboratively to reduce health inequities*
- *Support the integration of a health equity approach to program planning and service delivery*

Renfrew County and District Health Unit is one of 35 Public Health Units in Ontario and serves 19 municipalities over a 14,980 square kilometre area. The RCDHU catchment area is shown in Figure 1.

Figure 1: Map of RCDHU Catchment Area



Methodological Overview

Data Sources

The data sources that were accessed for this analysis are: the Canadian Community Health Survey (CCHS), IntelliHealth Ontario, the Better Outcomes Registry and Network (BORN), the Healthy Babies Healthy Children (HBHC) screen, and RCDHU's Infant Feeding Surveillance (IFS) system. These data sources are described in Appendix 1.

Health Indicators

Fifty–three health indicators were analyzed to assess health inequities. Health indicators included health risk factors (e.g. smoking), maternal health (e.g. mental health during pregnancy), health care utilization (e.g. emergency department visits for injuries), and causes of death (e.g. cancer related deaths). Health indicators were chosen because of their relevance to the health of our community and the availability of data for small geographic areas. For a complete list of the health indicators that were analyzed, see Appendix 2.

Measuring Deprivation

To analyze the health indicators, a tool based on data from Statistics Canada's Census was used – the Deprivation Index (DI).[11] The DI was developed by the Institut national de santé publique du Québec (INSPQ) to spatially measure and compare socioeconomic conditions.[11] The DI considers two components of deprivation: material and social. [11] Each component is derived from three socio-economic indicators collected by the Census (Table 1 and Table 2). Combined deprivation (DICmb) is calculated by combining the two indices. These DI indicators integrate key social determinants of health such as income, education, employment and social support into this health equity assessment.

Table 1: Material Deprivation Index (DIMat)

Indicators
Proportion of people 15 years and older without a high school diploma
Employment/population ratio of people aged 15 years and older
Average income of people aged 15 years and older

Table 2: Social Deprivation Index (DISoc)

Indicators
Proportion of people 15 years and older living alone
Proportion of people aged 15 years and older who are separated, divorced, or widowed
Proportion of single-parent families

Deprivation is defined as "a state of observable and demonstrable disadvantage relative to the local community or the wider society or nation to which an individual, family or group

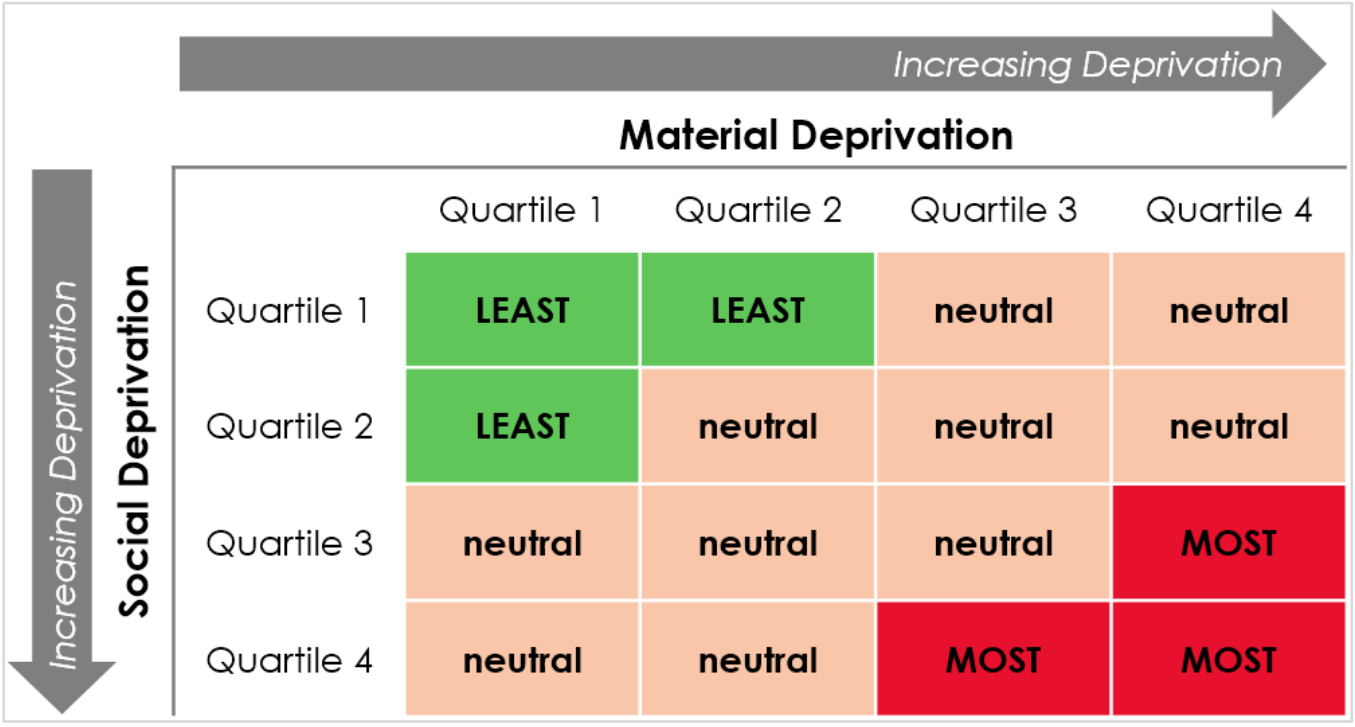
belongs."[12] Material deprivation refers to the ability to access goods and conveniences that are part of modern life. The DI uses information about education level, employment and income to assess material deprivation. Social deprivation is about the frequency and quality of social interactions – having social support networks and feeling included. The DI uses information about marital status, single parenting and living alone to assess social deprivation.

The geographic areas for this analysis are called dissemination areas. Dissemination areas are the smallest unit of geography for which Statistics Canada provides data from the Census. Dissemination areas generally have between 400 and 700 people.[13] Renfrew County and District contains 164 dissemination areas.

Material deprivation, social deprivation, and combined deprivation were calculated for each dissemination area based on responses provided by residents on the Census questionnaire. The dissemination areas were then ranked and put into four groups, or quartiles. Quartile 1 represents the least deprived group, while quartile 4 represents the most deprived group.

Because of the small population size in RCD, these four groups were re-organized into three groups as shown in Figure 2: least deprived, neutral, and most deprived. Each health indicator was studied to see if there were differences in health between people living in the most deprived dissemination areas compared to people living in the least deprived dissemination areas.

Figure 2: Least Deprived, Most Deprived and Neutral Groups for Renfrew County and District



Limitations

An alternative to the Deprivation Index (DI) is the Ontario Marginalization Index (OMI). It uses four groups of socio-economic indicators from the Census to measure material deprivation, residential instability, dependency and ethnic concentration. For this report, the health indicators were also analyzed using the OMI. Different indices may result in different categorization of dissemination areas by level of deprivation. However, we did not observe important differences in the results from analyses using the DI vs. the OMI. It was decided to show results based on the DI for the purpose of this report.

The DI and the OMI use predefined geographic areas to group people together. However, the socioeconomic characteristics of the people living in a dissemination area will vary. For example, residents with socioeconomic characteristics of people living in the most deprived dissemination areas may live in a dissemination area classified as least deprived. This has the effect of masking differences in health related to socioeconomic status. It is possible that if the boundaries of the dissemination areas had been drawn differently, the findings of this analysis may have been different. Further methodological limitations are described in Appendix 3.

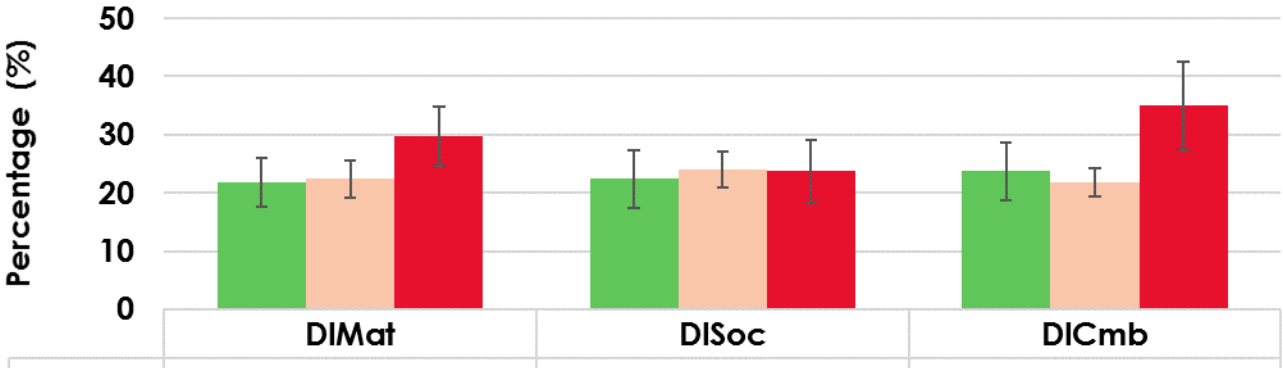
How to Read This Report

The health indicators analyzed in this report are presented in a standard format. Each indicator is introduced with a brief description of its importance to health and if available, support from the academic literature linking the indicator to socioeconomic deprivation. The analysis of each indicator includes three components: 1) a graphical display of inequality, 2) measurement of relative inequality, and 3) measurement of the population impact of inequality.

1) Graphical Display of Inequality

Results for a sample health indicator are shown in Figure 3. The proportion or rate for people who live in the least, neutral, and most deprived areas are represented by green, pink, and red bars, respectively across material (**DIMat**), social (**DISoc**), and combined (**DICmb**) deprivation.

Figure 3: Sample Indicator



	DIMat	DISoc	DICmb
Least	21.7% (17.5 – 25.9)	22.4% (17.3 – 27.4)	23.7% (18.7 – 28.8)
Neutral	22.3% (19.2 – 25.6)	24.0% (21.0 – 26.9)	21.8% (19.3 – 24.3)
Most	29.7% (24.6 – 34.8)	23.7% (18.3 – 29.2)	35.0% (27.4 – 42.5)

The table displayed at the bottom of Figure 3 includes the value reflected by the bars in the graph, as well as the confidence intervals for each value in brackets. Confidence intervals are also graphically displayed as black error bars at the top of each coloured bar. In this report, we have used 95% confidence intervals to determine whether differences between least deprived and most deprived groups are statistically significant. For more information on how to interpret confidence intervals, refer to Appendix 4.

2) Measurement of Relative Inequality

These measurements are used to show the magnitude of inequality between two population groups. Indicators are reported as either **proportions** or incidence **rates**. Throughout this report, observations are made about potential trends and relative differences between the "most" and "least" deprived areas.

A **proportion** (also referred to as a prevalence estimate) indicates the part of the total population affected by a health indicator of interest for a defined period in time (e.g. the proportion of people who reported exposure to second-hand smoke during the years 2000 to 2008).

A **rate** indicates the frequency with which an event occurs in a defined population in a specified period of time (e.g. number of hospitalizations per 1,000 population). Rates in this report are calculated per 1,000 population. The use of rates facilitates comparison between groups and over time.

A **relative risk** shows how many times higher or lower the rate of an outcome is, in a population group of interest compared to the reference group. In this report, relative risk indicates the number of times higher or lower the risk for a health indicator is for people living in the most deprived areas compared to the risk for people living in the least deprived areas (i.e. the magnitude of inequality between two population groups). This statistic is only reported where the difference between most and least deprived areas is statistically significant (i.e. where confidence intervals do not overlap).

To simplify analyses throughout this report, **relative risks are reported for combined deprivation only**. In cases where the difference between the least and most deprived groups is not statistically significant, values for the least and most groups are compared, but no statistical test is reported.

3) Measurement of the Population Impact of Inequality

Population Attributable Fraction (PAF) quantifies the potential rate reduction (expressed as a percentage) that could be achieved in the total population in the hypothetical situation in which a population group of interest experienced the same rate as the reference group. This measure of **health opportunity** is included for most indicators throughout this report**. PAF provides an estimate of the potential for increased health if all RCD residents experienced the same conditions as those outside of the most deprived areas in the region, that is, in the least deprived and neutral areas.**

Where the relative risks provided for each indicator in this report compare the values within the most and least deprived areas (i.e. ignoring the neutral category), the PAF takes the neutral category into consideration. For the PAF calculation, a new relative risk is calculated by comparing the proportion or rate of each indicator in the neutral and least deprived areas (combined) to the rate in the most deprived areas. Again, only the data from combined deprivation is used in the calculation of PAFs throughout this report.

Further explanation of each of these calculations can be found in Appendix 4.

Identification of Health Indicators

Twenty-three health indicators were selected for inclusion in this report based on regional importance and meaningful differences observed across levels of deprivation (see Table 3). Four thematic areas emerged, addressing the following indicators:

Table 3: List of Health Indicators Included in this Report

Health Risk Factors
1. Proportion who are current cigarette smokers
2. Proportion exposed to second-hand smoke
3. Proportion who exceeded the Low Risk Alcohol Drinking Guidelines (LRADG)
4. Proportion physically inactive during leisure time
Maternal Health
5. Proportion taking folic acid supplement prior to, and during pregnancy
6. Proportion who smoked cigarettes during pregnancy
7. Proportion who used alcohol during pregnancy
8. Proportion who used drugs during pregnancy
9. Proportion with a mental illness prior to pregnancy (mother or parenting partner)
10. Proportion with a mental health concern during pregnancy
11. Proportion of new mothers intending to exclusively breastfeed
12. Proportion exclusively breastfeeding at 2 months postpartum
Health Service Utilization
13. Proportion who visited a dentist in the past 2 years
14. Rate of all-cause hospitalizations per 1,000 population
15. Rate of emergency department (ED) visits for injuries per 1,000 population
16. Rate of ED visits for injuries caused by falls (65 years and older) per 1,000 population
17. Rate of all-cause ED visits per 1,000 population
Mortality
18. Rate of all-cause Potential Years of Life Lost (PYLL) per 1,000 population
19. Rate of cancer PYLL per 1,000 population
20. Rate of cardiovascular disease PYLL per 1,000 population
21. Rate of all-cause mortality per 1,000 population
22. Rate of cancer mortality per 1,000 population
23. Rate of cardiovascular disease mortality per 1,000 population

Results

Community Profile

Renfrew County and District Health Unit (RCDHU) serves approximately 103,000 people living in 19 municipalities. The area covers 14,980 square kilometers, including most of Algonquin Provincial Park. To provide some perspective, we are two times the size of the Greater Toronto Area and about 1% of the population.

Renfrew County and District (RCD) is rich in natural spaces and farm land. Beautiful lakes and rivers, trails, parks, and forested areas provide both economic and population health benefits. Forty-eight percent of the population lives in designated rural areas. Residents in RCD are dependent on private transportation, as there is no public transportation. This is often an issue with accessing services and recreational activities, particularly for people living in lower income households.

Demographic Characteristics

The RCD area has experienced a 1% population increase since 2011. In 2016, 21% of the population was age 65 and over, and this is expected to increase to 30% by 2041. Fifty percent of the population is under age 45, and this is projected to decrease to 45% by 2041. The average age in RCD is 43.3 years, and the average household size is 2.3 people. Sixty-one percent of people age 15 and over are married or living common law, 22% are "never married" and 16% are separated, divorced or widowed.

The residents of RCD are predominantly English speaking and 12% are bilingual. Renfrew County and District is on traditional (unceded) Algonquin territory. The Algonquins of Pikwàkanagàn First Nation is situated on the shores of the Bonnechere River and Golden Lake. Based on the 2016 census, 2.7% of all RCD residents (2,730 people) are Registered or Treaty Indians and almost 9% (8,705 people) report Aboriginal identity (First Nations, Métis, Inuit). Across RCD, just over 5% of residents are immigrants (born outside Canada). Approximately 3% belong to a visible minority. Life expectancy at birth is 79 years for males, and almost 84 years for females. Corresponding numbers for Ontario are provided in Table 4.

Table 4: Demographic Characteristics of Renfrew County and District

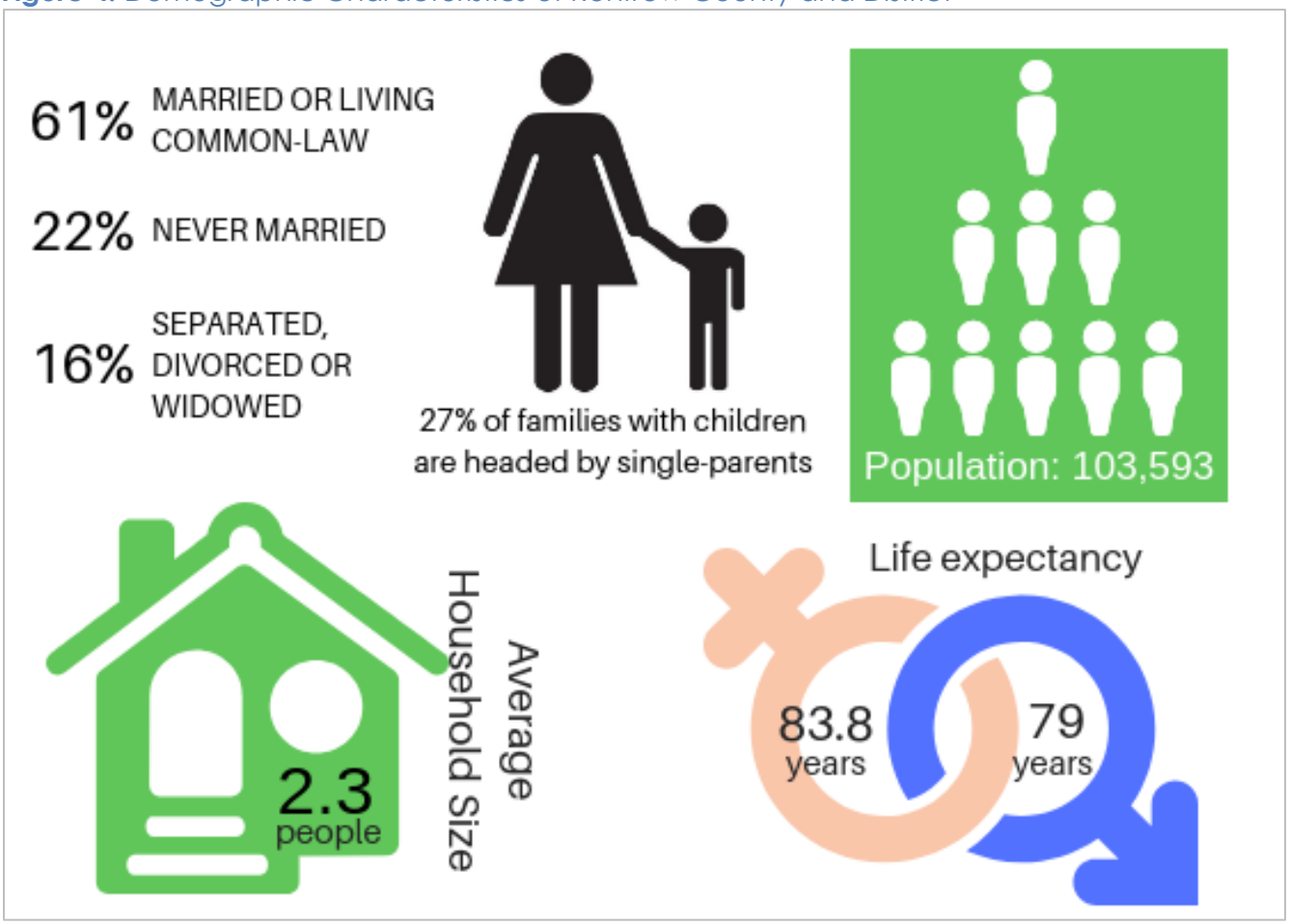
Characteristic	RCD	Ontario
Population size	103,593	13,448,494
Population change since 2011	1% increase	4.6% increase
Average age	43.3 years	41 years
Average household size	2.3 people	2.6 people
Immigrants (born outside Canada)	5.5%	29%
Visible minority	2.6%	29%
Age structure of the population		
Proportion of the population age 65+, 2016	21%	17%
Proportion of the population age 65+, 2041[a]	30%	25%
Proportion of the population age 0 - 44, 2016	50%	55%
Proportion of the population age 0 - 44, 2041[a]	45%	51%
Marital status, age 15 and over		
Married or living common-law	61%	57%
Never married	22%	28%
Separated, divorced or widowed	16%	14%
Families with children headed by a single parent	27%	27%
Knowledge of official languages		
English only	87%	86%
French only	0.3%	0.3%
English and French	12%	11%
Neither English nor French	0.2%	2.5%
Aboriginal peoples		
Registered or Treaty Indian	2.7%	1.3%
Aboriginal identity	8.7%	2.8%
Life expectancy at birth		
Life expectancy at birth, 2012 – 2015, males [b]	79 years	80.2 years
Life expectancy at birth, 2012 – 2015, females [b]	83.8 years	84.3 years

Source: Statistics Canada, Census Profile, 2016 Census [14]

[a] Ministry of Finance, "Ontario Population Projections Update Based on the 2011 Census: 2017 – 2041Ontario and its 49 Census Subdivisions," (Spring 2018). Available from: https://www.fin.gov.on.ca/en/economy/demographics/projections/#c1.

[b] Statistics Canada. Table 13-10-0063-01. Life expectancy, at birth and at age 65, by sex, three-year average, Canada, provinces, territories, health regions and peer groups.

Figure 4: Demographic Characteristics of Renfrew County and District



Socioeconomic Characteristics

Fifty-seven percent of the population age 25 to 64 have completed post-secondary education, while 32% have a high school diploma and 11% did not complete high school. Of those employed, 53% worked full-year, full-time during the previous year. Eleven percent were self-employed. For 92% of workers, a car, truck or van was the main way to get to work while 6% used a bicycle or walked. The average total income of individuals age 15 and over was $42,424 and the median household income was $67,421 (2015). Thirteen percent of the population lived in a household with a low income. Corresponding numbers for Ontario are provided in Table 5.

Table 5: Socioeconomic Characteristics of Renfrew County and District

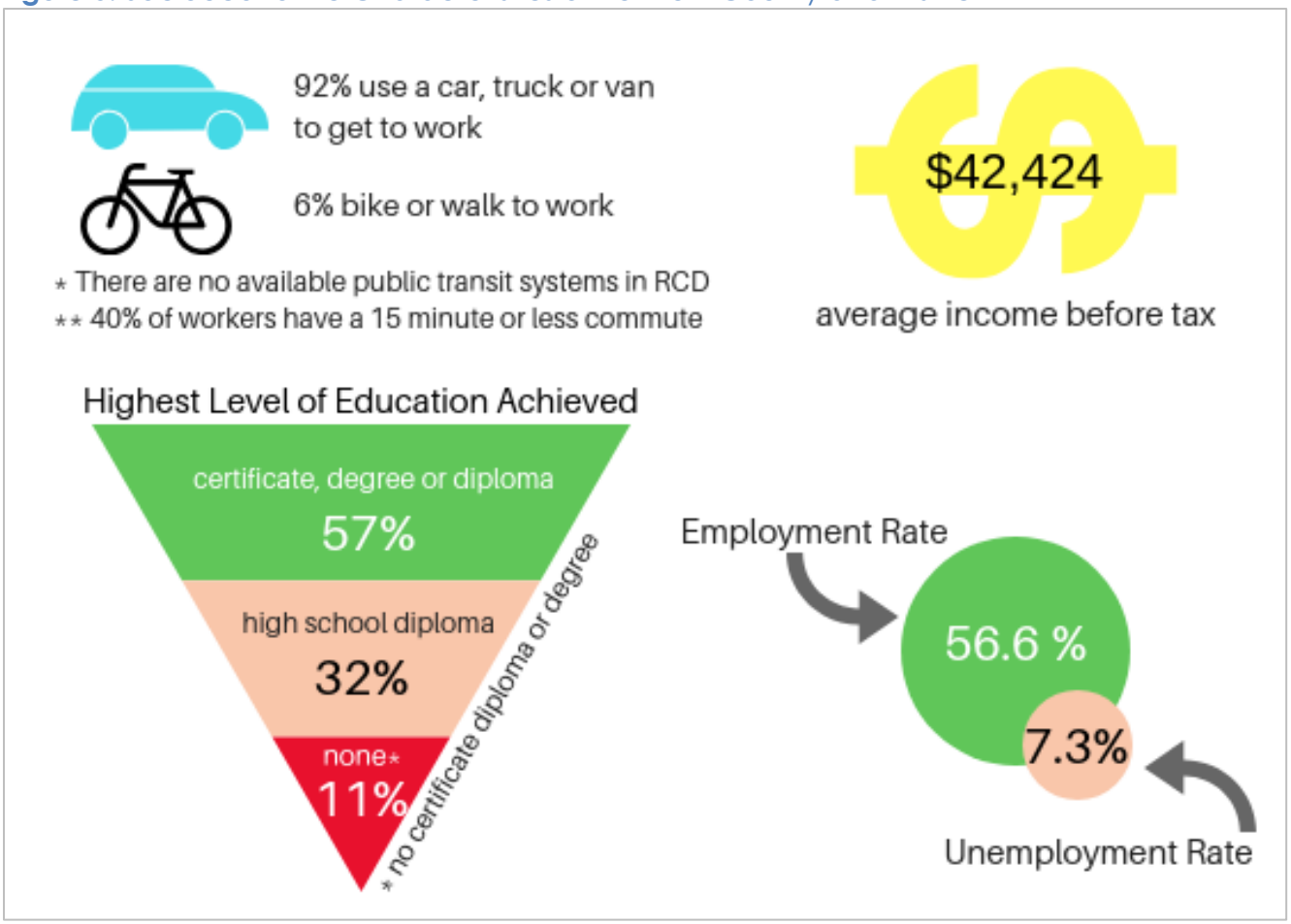
Characteristic	RCD	Ontario
Highest level of education completed by residents age 25 to 64		
Post-secondary certificate, diploma or degree	57.0%	65.1%
High school diploma or equivalency certificate	31.7%	24.5%
No certificate, diploma or degree	11.3%	10.4%
Employment		
Employment rate *	56.6%	59.9%
Unemployment rate †	7.3%	7.4%
Worked full-year, full-time	53%	52.3%
Worked part year and/or part-time	47%	47.7%
Self-employed	10.6%	11.8%
Main mode of commuting to work		
Car, truck or van (driver or passenger)	92.3%	77.9%
Walk or bicycle	6.3%	6.5%
Public transit	0.5%	14.4%
Income		
Average total income of individuals age 15+, 2015	$42,424	$47,915
Median total income of households, 2015	$67,421	$74,287
Prevalence of low income based on the Low Income Measure (after tax), 2015	13.1%	14.4%

Source: Statistics Canada, Census Profile, 2016 Census [14]

* The employment rate refers to the number of persons employed in the week of Sunday May 1st to Saturday May 2nd, 2016, expressed as a percentage of the total population 15 years and over.

† The unemployment rate refers to the number of persons unemployed during the week of Sunday May 1st to Saturday May 2nd, 2016, expressed as a percentage of the labour force.

Figure 5: Socioeconomic Characteristics of Renfrew County and District



Geographic Distribution of Deprivation

The maps below show the dissemination areas of Renfrew County and District (RCD) by least, neutral, and most deprived areas. Figure 6 shows dissemination areas by material deprivation (**DIMat**), Figure 7 shows dissemination areas by social deprivation (**DISoc**), and Figure 8 shows dissemination areas by combined deprivation (**DICmb**). See also maps for Arnprior, Deep River, Pembroke, Petawawa and Renfrew in Appendix 5.

Figure 6: RCD Dissemination Areas by Material Deprivation (DIMat)

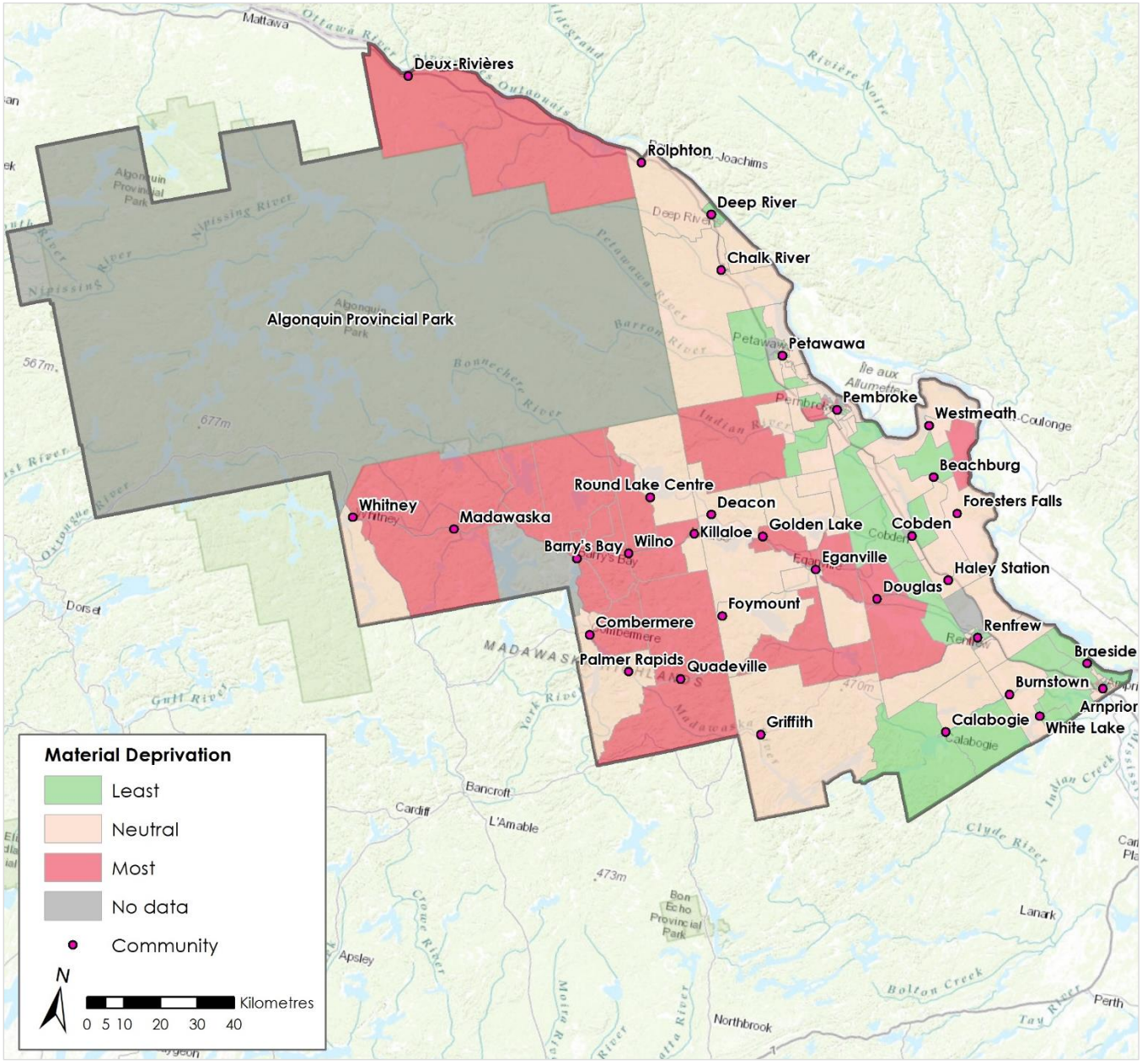


Figure 7: RCD Dissemination Areas by Social Deprivation (DISoc)

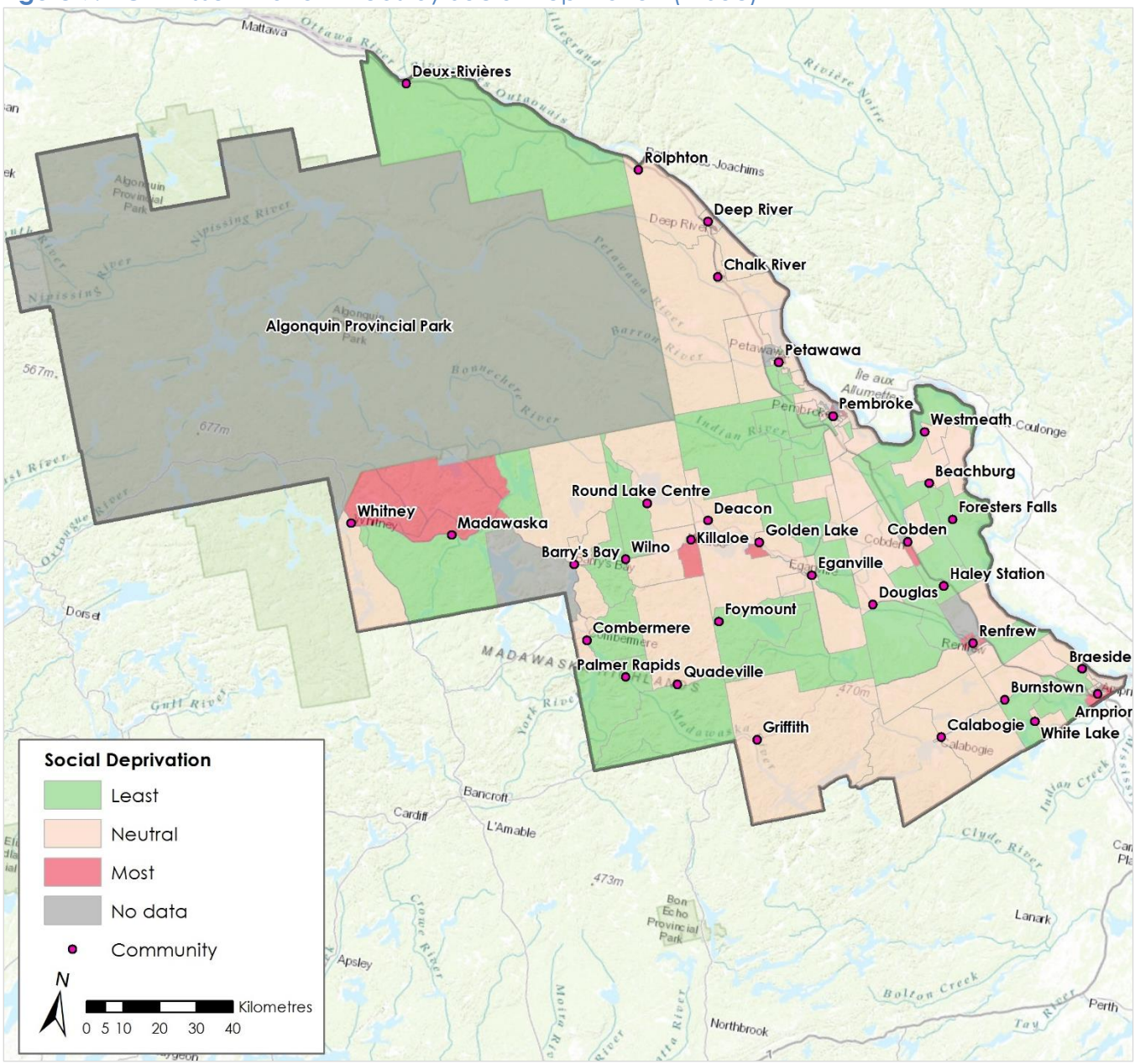
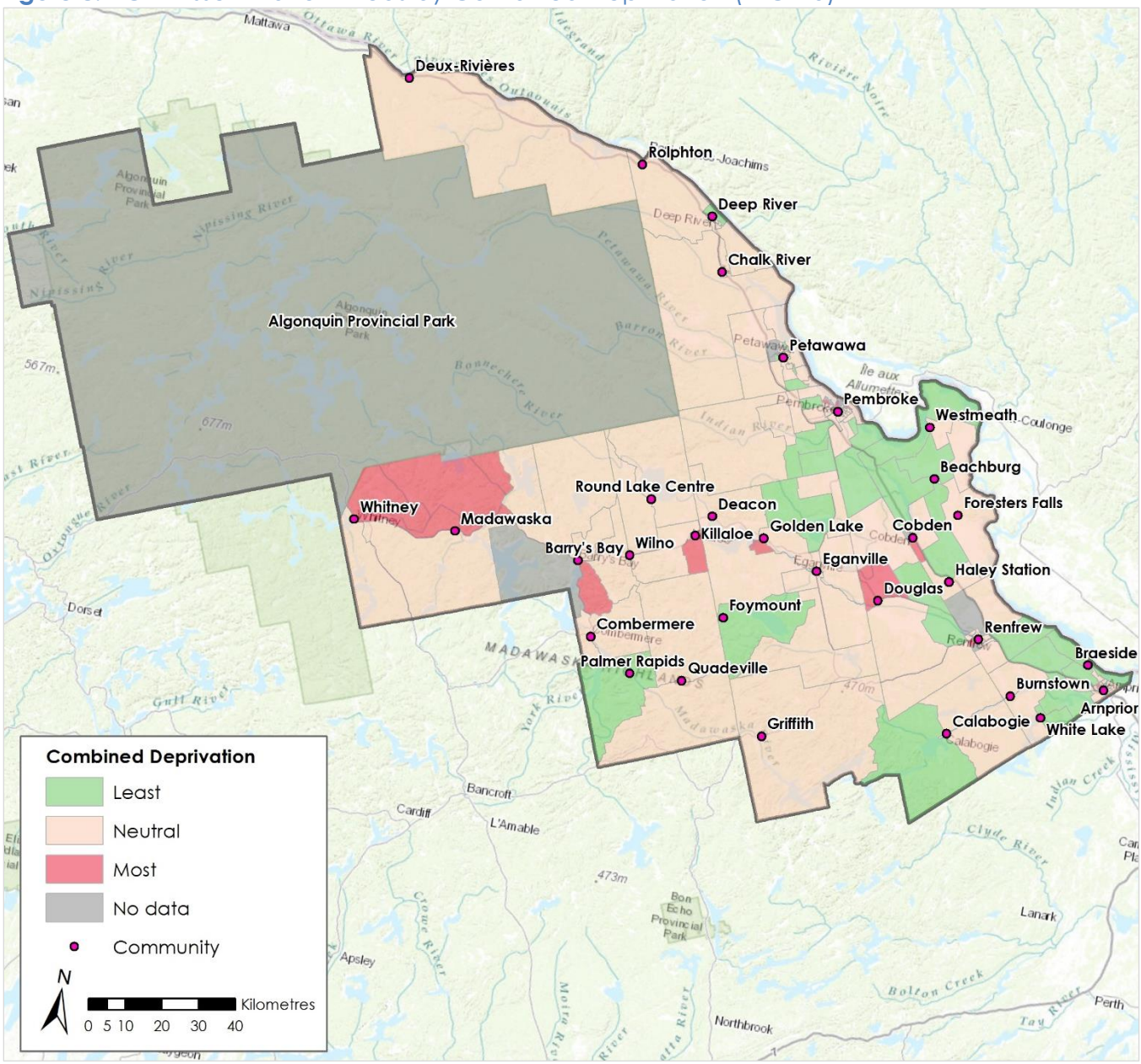


Figure 8: RCD Dissemination Areas by Combined Deprivation (DICmb)



Proportions and Rates for 23 Health Indicators in Renfrew County and District, Peer Group Health Units and Ontario

Peer Groups, are defined by Statistics Canada to enable comparison of health regions across Canada. Health regions are assigned to a Peer Group based on socioeconomic characteristics. In the following tables, RCD is compared to Ontario and to Ontario health units that are in Peer Groups D and E* (when comparable data for Peer Groups are available). Statistically significant differences between RCD and Ontario, and between RCD and Peer Groups D and E are highlighted in the tables below.

Table 6: Health Risk Factors Indicators

Health Indicator	RCD	Peer Group	Ontario
1. Proportion who are current cigarette smokers	24.0% ■ (21.6 – 26.3)	23.1% (23.0 – 23.4)	18.9% (18.5 –19.1)
2. Proportion exposed to second-hand smoke	12.3% ■ (10.2 – 14.3)	12.6% (12.0 – 13.5)	8.5% (8.3 – 8.7)
3. Proportion who exceeded the Low Risk Alcohol Drinking Guidelines (LRADG)	47.9% ■ (44.3 – 51.5)	44.4% (44.0 – 45.1)	38.0% (37.4 – 38.5)
4. Proportion physically inactive during leisure time	45.8% (43.0 – 48.6)	45.9% (45.0 – 46.1)	47.9% (47.4 – 48.3)

Source: CCHS, 2007-2014

■ Statistically significant difference between RCD and Ontario

The prevalence of current smokers and exposure to second-hand smoke was significantly higher in RCD than in Ontario (Table 6). Similarly, the prevalence of drinking in excess of the LRADG was significantly higher in RCD. The prevalence of physical inactivity was lower, but not significantly different.

* The Ontario health units that are in Peer Groups D and E are: Grey Bruce Health Unit, Haldimand-Norfolk Health Unit, Haliburton, Kawartha, Pine Ridge District Health Unit, Huron County Health Unit, Leeds, Grenville and Lanark District Health Unit, Oxford County Health Unit, Perth District Health Unit, Renfrew County and District Health Unit, Eastern Ontario Health Unit, District of Algoma Health Unit, and Chatham-Kent Health Unit. For more information, see http://www.statcan.gc.ca/pub/82-402-x/2015002/wp-dt/wp-dt-eng.htm.

Table 7: Maternal Health Indicators

Health Indicator	RCD	Ontario
5. Proportion taking folic acid supplement prior to, and during pregnancy	33.8% (30.4 – 37.3)	31.1% (30.8 – 31.4)
6. Proportion who smoked cigarettes during pregnancy	16.8% ■ (14.4 – 19.2)	10.0% (9.9 – 10.2)
7. Proportion who used alcohol during pregnancy	4.2% ■ (3.0 – 5.4)	2.5% (2.5 – 2.6)
8. Proportion who used drugs during pregnancy	2.3% (1.4 – 3.2)	2.1% (2.1 – 2.2)
9. Proportion with a mental illness prior to pregnancy (mother or parenting partner)	20.8% ■ (17.9 – 23.8)	16.1% (15.8 – 16.3)
10. Proportion with a mental health concern during pregnancy	17.7% (15.2 – 20.1)	15.8% (15.6 – 16.1)
11. Proportion of new mothers intending to exclusively breastfeed	89.1% (83.5 – 94.6)	93.6% (93.0 – 94.1)
12. Proportion exclusively breastfeeding at 2 months postpartum	40.2%	No Ontario data available

Source: BORN and HBHC Screen, 2015; RCDHU Infant Feeding Surveillance

■ Statistically significant difference between RCD and Ontario

The prevalence of taking a folic acid supplement prior to, and during, pregnancy was higher in RCD than Ontario, but not significantly higher (Table 7). The prevalence of smoking during pregnancy and the prevalence of drinking alcohol during pregnancy, were, however, significantly higher in RCD than Ontario. The prevalence of drug use during pregnancy was comparable in RCD and Ontario. The prevalence of a mental illness prior to pregnancy is significantly higher in RCD than Ontario and the prevalence of a mental health concern during pregnancy is higher in RCD than Ontario (but not significantly higher). Infant Feeding Surveillance data indicates that 40.2% of mothers surveyed in RCD reported exclusively breastfeeding at two months. As Infant Feeding Surveillance was conducted locally, there is no comparable data for Ontario.

Table 8: Health Service Utilization Indicators

Health Indicator	RCD	Peer Group	Ontario
13. Proportion who visited a dentist in the past 2 years	67.9% (64.5 – 71.2)	67.9% (67.0 – 68.3)	71.3% (70.6 – 71.8)
14. Rate of all-cause hospitalizations per 1,000 population	83.4 § (82.4 – 84.6)	65.4 (65.2 – 65.6)	47.6 (47.5 – 47.6)
15. Rate of ED visits for injuries per 1,000 population	157.0 § (155.9 – 158.9)	139.8 (139.6 – 140.1)	91.5 (91.4 – 91.6)
16. Rate of ED visits for injuries caused by falls (65 years and older) per 1,000 population	85.2 § (83.4 – 86.4)	70.7 (70.3 – 71.2)	58.7 (58.6 – 58.9)
17. Rate of all-cause ED visits per 1,000 population	909.1 § (906.4 – 911.4)	729.1 (728.5 – 729.7)	435.5 (435.3 – 435.6)

Source: CCHS, 2007-14; IntelliHealth Ontario, 2012-2016

§ Statistically significant difference between RCD and Ontario, and RCD and Peer Group

Comparing health services utilization indicators in RCD to the Peer Group and to Ontario shows important discrepancies. For example, although rates of visits to the dentist are comparable (Table 8), the rates of all-cause hospitalizations, ED visits for injuries, ED visits for falls (age 65 and older), and all-cause ED visits are all significantly higher in RCD than in both the Peer Group and Ontario.

Table 9: Mortality Indicators

Health Indicator	RCD	Peer Group	Ontario
18. Rate of all-cause Potential Years of Life Lost (PYLL) per 1,000 population	47.5 **§** (46.9 – 48.9)	52.4 (52.2 – 52.6)	41.2 (41.1 – 41.2)
19. Rate of cancer PYLL per 1,000 population	13.2 **§** (12.9 – 13.5)	15.1 (15.0 – 15.2)	11.6 (11.5 – 11.6)
20. Rate of cardiovascular disease PYLL per 1,000 population	7.7 **§** (7.4 – 7.9)	8.4 (8.3 – 8.5)	5.9 (5.90 – 5.93)
21. Rate of all-cause mortality per 1,000 population	8.2 **§** (7.9 – 8.4)	9.3 (9.2 – 9.4)	6.7 (6.66 – 6.70)
22. Rate of cancer mortality per 1,000 population	2.1 **§** (1.9 – 2.2)	2.4 (2.36 – 2.43)	1.7 (1.72 – 1.74)
23. Rate of cardiovascular disease mortality per 1,000 population	2.2 **§** (2.1 – 2.4)	2.6 (2.55 – 2.63)	1.7 (1.69 – 1.71)

Source: IntelliHealth Ontario, 2012-2016

§ Statistically significant difference between RCD and Ontario, and RCD and Peer Group

All mortality indicators were significantly higher for RCD than for Ontario. All mortality indicators were significantly lower than the Peer Group. In other words, although these rates are higher for RCD than are observed in Ontario, rates are lower than are observed for populations in other Ontario health regions considered comparable to RCD (Table 9).

Summary of Health Inequities in Renfrew County and District across Combined Deprivation Index

Twenty-three health indicators were selected for inclusion in this report. Table 10 lists proportions and rates for the least deprived and most deprived areas using the combined deprivation index. The relative risk indicates the magnitude of the difference between the most deprived and least deprived areas. Relative risk is only reported where the difference between most and least deprived areas is statistically significant.

Table 10: Differences in Health between the Least Deprived and Most Deprived Areas by Combined Deprivation Index (DICmb)

HEALTH INDICATOR	Least Deprived	Most Deprived	Relative Risk
Health Risk Factors			
1. Proportion who are current cigarette smokers	23.7% (18.7 – 28.8)	34.9% (27.4 – 42.5)	--
2. Proportion exposed to second-hand smoke	11.6% (7.7 – 15.5)	20.1% (13.1 – 27.2)	--
3. Proportion who exceeded the Low Risk Alcohol Drinking Guidelines (LRADG)	56.4% (46.6 – 66.2)	42.7% (32.4 – 53.0)	--
4. Proportion physically inactive during leisure time	36.7 (28.7 – 44.6)	57.9% (49.7 – 66.1)	**1.5**
Maternal Health			
5. Proportion taking folic acid supplement prior to, and during pregnancy	36.3% (32.8 – 39.7)	27.3% (23.6 – 31.0)	**1.3***
6. Proportion who smoked cigarettes during pregnancy	14.8% (11.9 – 17.7)	20.6% (17.7 – 23.6)	**1.4**
7. Proportion who used alcohol during pregnancy	2.3% (1.1 – 3.5)	3.6% (2.3 – 4.9)	--
8. Proportion who used drugs during pregnancy	2.1% (1.0 – 3.3)	6.2% (4.5 – 7.9)	**2.9**
9. Proportion with a mental illness prior to pregnancy (mother or parenting partner)	17.7% (14.3 – 21.1)	26.5% (22.9 – 30.1)	**1.5**
10. Proportion with a mental health concern during pregnancy	22.2% (19.7 – 24.8)	31.5% (27.7 – 35.2)	**1.4**
11. Proportion of new mothers intending to exclusively breastfeed	84.2% (76.0 – 92.5)	75.8% (66.3 – 85.3)	--
12. Proportion exclusively breastfeeding at 2 months postpartum	44.4% (29.9 – 59.0)	32.7% (21.9 – 43.5)	--

HEALTH INDICATOR	Least Deprived	Most Deprived	Relative Risk
Health Service Utilization			
13. Proportion who visited a dentist in the past 2 years	76.7% (68.1 – 85.2)	58.9% (48.8 – 69.1)	--
14. Rate of all-cause hospitalizations per 1,000 population	44.4 (43.1 – 54.7)	134.9 (132.2 – 131.6)	**3.0**
15. Rate of ED visits for injuries per 1,000 population	98.2 (96.2 – 100.1)	249.0 (245.5 – 252.4)	**2.5**
16. Rate of ED visits for injuries caused by falls (65 years and older) per 1,000 population	40.1 (37.2 – 42.9)	129.6 (123.8 – 135.3)	**3.2**
17. Rate of all-cause ED visits per 1,000 population	556.2 (551.6 – 560.8)	1479.7 (1471.2 – 1488.2)	**2.6**
Mortality			
18. Rate of all-cause Potential Years of Life Lost (PYLL) per 1,000 population	25.0 (24.1 – 26.0)	82.4 (80.4 – 84.4)	**3.2**
19. Rate of cancer PYLL per 1,000 population	9.3 (8.7 – 9.8)	19.9 (18.9 – 20.9)	**2.1**
20. Rate of cardiovascular disease PYLL per 1,000 population	2.5 (2.2 – 2.8)	16.1 (15.3 – 17.0)	**6.4**
21. Rate of all-cause mortality per 1,000 population	2.9 (2.5 – 3.2)	13.2 (12.4 – 14.0)	**4.5**
22. Rate of cancer mortality per 1,000 population	0.9 (0.8 – 1.1)	3.2 (2.8 – 3.6)	**3.5**
23. Rate of cardiovascular disease mortality per 1,000 population	0.7 (0.6 – 0.9)	4.2 (3.7 – 4.6)	**6.0**

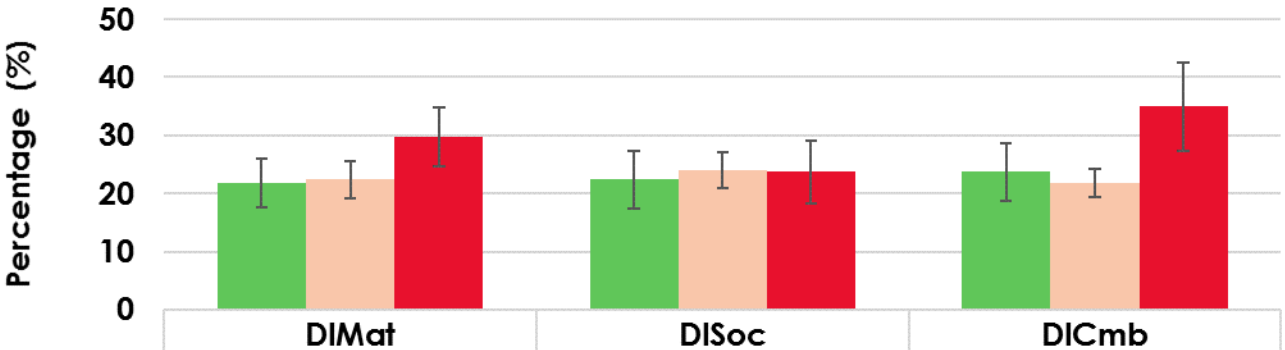
***Note:** For this indicator only, the relative risk is reported as the number of times higher the risk for the health indicator is within the **least** deprived areas compared to the risk within the **most** deprived areas (i.e. the reverse interpretation is used for all other indicators).

Health Risk Factors

1. Current Smokers

Cigarette smoking is the leading cause of preventable, premature death worldwide.[15] Chronic diseases, such as cancer, heart disease, stroke, lung and respiratory disease are associated with both smoking and exposure to second-hand smoke.[16] On average, smokers die ten years earlier than non-smokers.[16] Cigarette smoking has been linked to socioeconomic status, with rates of smoking higher among more deprived populations.[17]

Figure 9: Proportion RCD Residents Age 12+ who are Current Smokers



	DIMat	DISoc	DICmb
Least	21.7% (17.5 – 25.9)	22.4% (17.3 – 27.4)	23.7% (18.7 – 28.8)
Neutral	22.3% (19.2 – 25.6)	24.0% (21.0 – 26.9)	21.8% (19.3 – 24.3)
Most	29.7% (24.6 – 34.8)	23.7% (18.3 – 29.2)	35.0% (27.4 – 42.5)

Source: CCHS, 2007-2014

The indicator used in this analysis was the proportion of current smokers (i.e. those who self-reported smoking either daily or occasionally). A potential trend was observed across level of material deprivation, where the proportion of smokers increased as material deprivation increased (Figure 9). No clear trend was observed across levels of social deprivation. For combined deprivation, the proportion of current smokers was highest in the most deprived areas (35%) compared to the least deprived areas (23.7%).

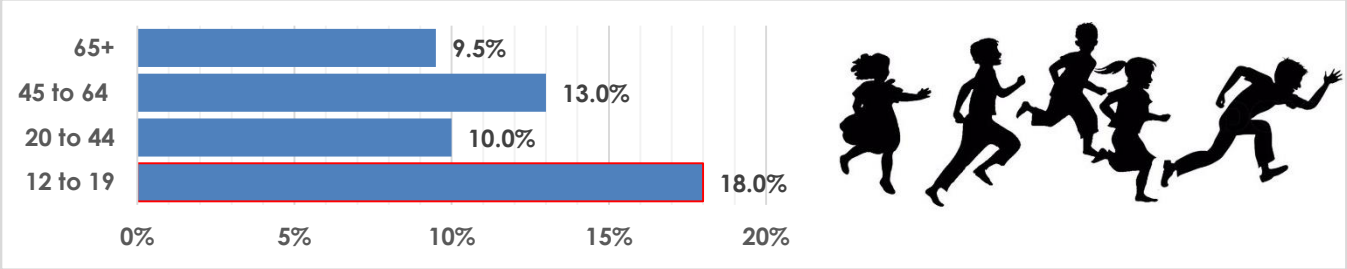
Although the differences between least and most deprived areas in RCD were not statistically significant, the trend observed by level of material deprivation was also observed at the provincial level[18] and is consistent with the academic literature.

Health Opportunity: If everyone in RCD experienced the same opportunities for health and well-being as those within the least deprived areas, there would be **428** fewer people who smoked each year. This represents a Population Attributable Fraction of **8.4%.**

2. Exposure to Second-Hand Smoke

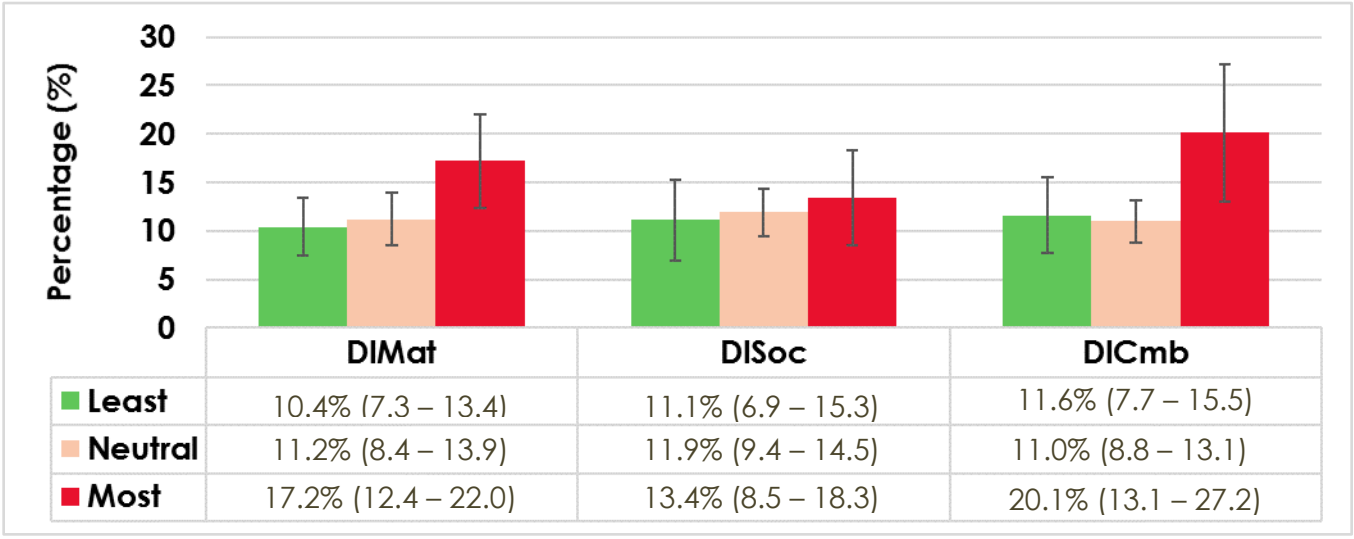
The indicator used to assess exposure to second-hand smoke was the proportion of the population who reported at least one person smoked inside their home either every day, or almost every day. The highest prevalence of exposure to second-hand smoke in RCD was observed among youth aged 12-19 years (18%). The Canadian Community Health Survey respondents are age 12 and over, but available data for age 12-19 years would suggest significant exposure to second-hand-smoke for children under age 12 (see Figure 10).

Figure 10: Proportion of RCD Residents Age 12+ Exposed to Second-Hand Smoke by Age Group



Source: CCHS, Statistics Canada, 2007-2014

Figure 11: Proportion of RCD Residents Age 12+ Exposed to Second-Hand Smoke



	DIMat	DISoc	DICmb
Least	10.4% (7.3 – 13.4)	11.1% (6.9 – 15.3)	11.6% (7.7 – 15.5)
Neutral	11.2% (8.4 – 13.9)	11.9% (9.4 – 14.5)	11.0% (8.8 – 13.1)
Most	17.2% (12.4 – 22.0)	13.4% (8.5 – 18.3)	20.1% (13.1 – 27.2)

Source: CCHS, Statistics Canada, 2007-2014

The proportion of individuals exposed to second-hand smoke generally increased with material, social and combined deprivation (Figure 11). Although these differences are not statistically significant, these trends are also observed by socioeconomic deprivation at the provincial level[18] and are consistent with the academic literature.

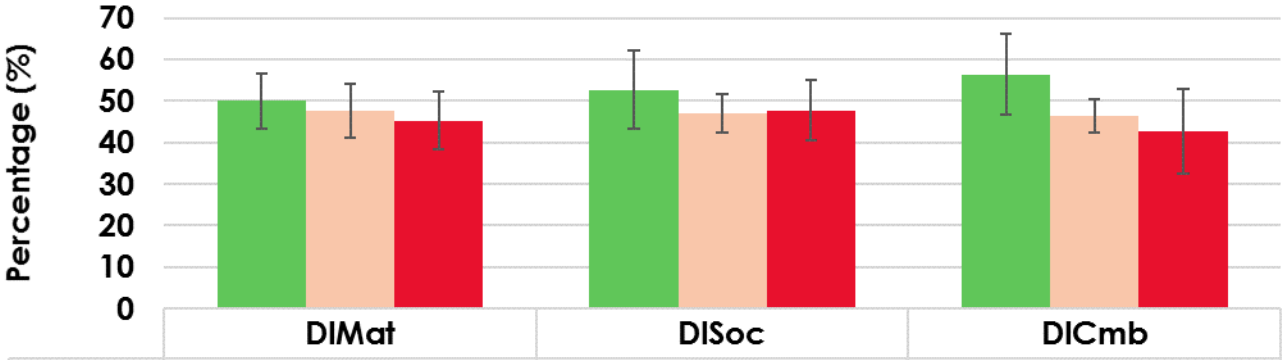
Health Opportunity: If everyone in RCD experienced the same opportunities for health and well-being as those within the least deprived areas, **359** fewer residents would be exposed to second-hand smoke each year. This represents a Population Attributable Fraction of **11.4%.**

3. Excessive Drinking

The Canadian Centre on Substance Use and Addiction recommends Low-Risk Alcohol Drinking Guidelines (LRADG) to reduce the risk of short- and long-term alcohol-related harms.[19] Excessive alcohol consumption increases the risk of injury, disease and death. [20, 21] In 2011, among psychoactive drugs, alcohol-related disorders were the top cause of hospitalizations in Canada. [19] In 2002, alcohol abuse was responsible for 1.9% of all deaths in Canada. [19]

Excess consumption of alcohol has been linked to socioeconomic status, with evidence supporting a positive relationship between high socioeconomic status and the prevalence of excess alcohol consumption. [22, 23]

Figure 12: Proportion of RCD Residents Age 19+ who Exceeded at Least One Low Risk Alcohol Drinking Guideline



	DIMat	DISoc	DICmb
Least	50.0% (43.5 – 56.6)	52.7% (43.4 – 61.9)	56.4% (46.6 – 66.2)
Neutral	47.6% (41.3 – 54.0)	47.0% (42.3 – 51.7)	46.5% (42.5 – 50.5)
Most	45.3% (38.4 – 52.2)	47.7% (40.4 – 54.9)	42.7% (32.4 – 53.0)

Source: CCHS, Statistics Canada, 2007-2014

The indicator used for this analysis was the proportion of residents who exceeded at least one LRADG. A potential trend was observed across levels of material and social deprivation, where the proportion of individuals consuming alcohol in excess of the LRADG decreased as material and social deprivation increased (Figure 12). For combined deprivation, the proportion of residents exceeding at least one alcohol consumption guideline was highest in the least deprived areas (**56.4%**) compared to the most deprived areas (**42.7%**).

Although the differences between least and most deprived areas in the RCD region were not statistically significant, the trends observed by levels of deprivation were also observed at the provincial level and are consistent with the academic literature.*

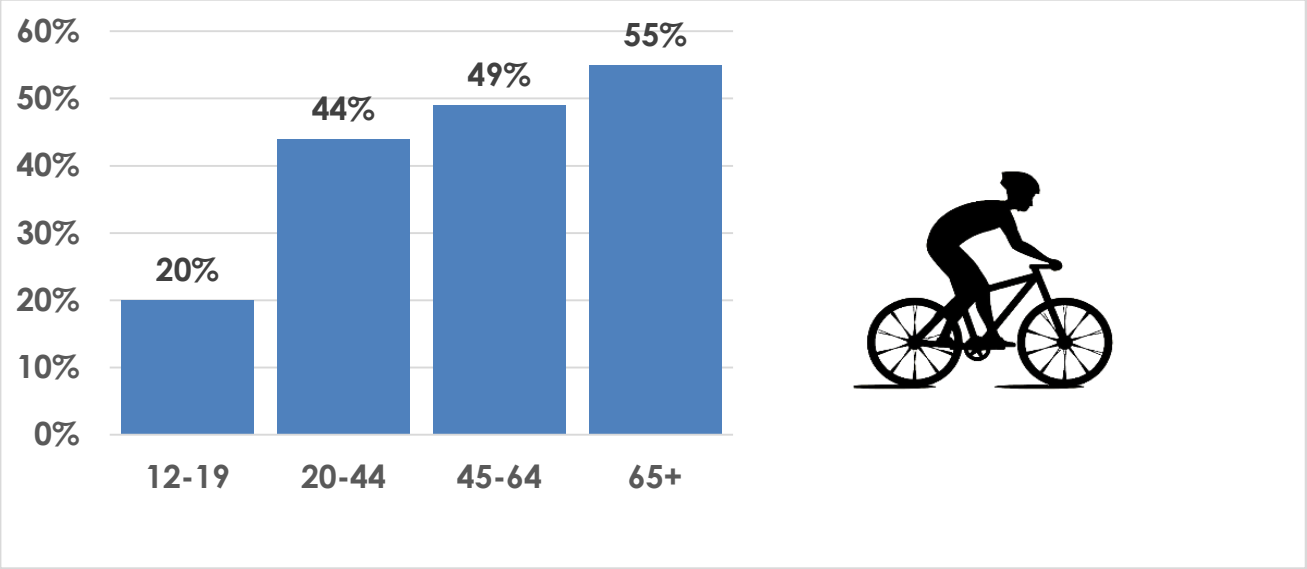
* As individuals in the least deprived areas are more likely to exceed the LRADG than those in the most deprived areas, a Population Attributable Fraction (PAF) is not appropriate here. Research indicates a link between higher socio-economic status and excessive alcohol use.

4. Physical Inactivity

The Canadian Society for Exercise Physiology recommends that adults aged 18 and older accumulate at least 150 minutes of moderate to vigorous physical activity (MVPA) per week.[24] For youth, the recommended amount is higher, with at least 60 minutes of MVPA per day.[25] In RCD, the lowest level of physical inactivity was found among youth aged 12-19 years (20%), more than doubling for those aged 20-44 years (44%) and continuing to increase with age (Figure 13).

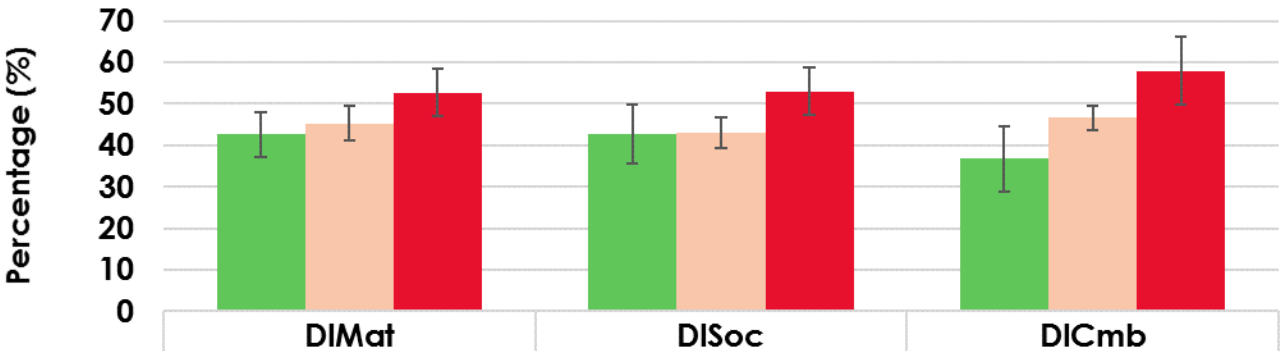
Physical inactivity has been linked to socioeconomic deprivation, with individuals in more deprived areas more likely to be physically inactive, [26] and more likely to report barriers to accessing facilities promoting physical activity.[27]

Figure 13: Proportion of RCD Residents Age 12+ Physically Inactive During Leisure Time by Age Group



Source: CCHS, Statistics Canada, 2007-2014

Figure 14: Proportion of RCD Residents Age 12+ Physically Inactive During Leisure Time



	DIMat	DISoc	DICmb
Least	42.6% (37.1 – 48.1)	42.7% (35.7 – 49.6)	36.7% (28.7 – 44.6)
Neutral	45.3% (41.1 – 49.6)	43.0% (39.2 – 46.8)	46.6% (43.6 – 49.7)
Most	52.6% (46.9 – 58.3)	53.0% (47.4 – 58.6)	57.9% (49.7 – 66.1)

Source: CCHS, Statistics Canada, 2007-2014

The indicator used for this analysis was physical inactivity during leisure time based on an assessment of activity levels over the previous three months. A trend was observed across levels of material and social deprivation, where the proportion of physically inactive residents increased as material and social deprivation increased (Figure 14).

The difference between the most and least deprived areas was statistically significant for combined deprivation. The prevalence of physical inactivity was **1.5 times higher** in the region's most deprived areas (**57.9%**) than that in the region's least deprived areas (**36.7%**).

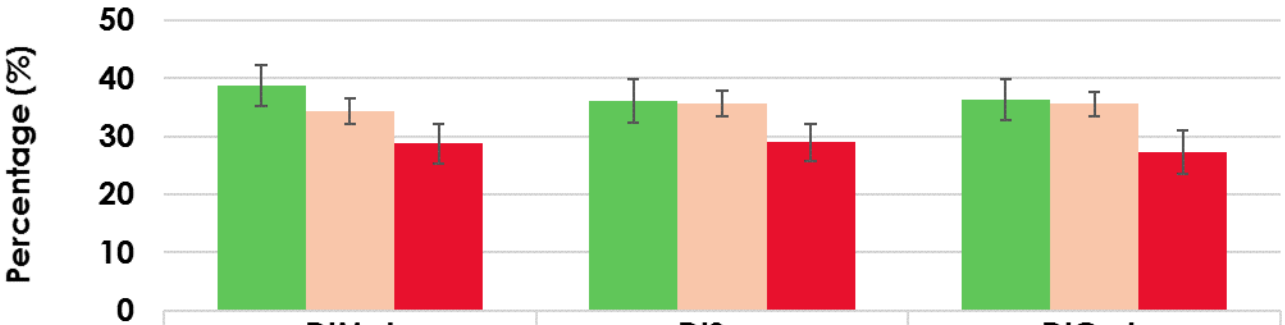
Health Opportunity: If everyone in RCD experienced the same opportunities for health and well-being as those within the least deprived areas, **413** fewer residents would be physically inactive. This represents a Population Attributable Fraction of **4.6%**.

Maternal Health

5. Folic Acid Use

Health Canada recommends that women of childbearing age eat a healthy diet based on Canada's Food Guide and take a daily multivitamin that has 400 mcg (0.4 mg) of folic acid, to prepare for a healthy pregnancy. [28] Consuming the recommended amount of folic acid is linked to the prevention of birth defects of the brain and spine, including neural tube defects such as anencephaly and spina bifida, [29-31] as well as to decreased risk for preterm delivery and low birth weight.[32] Research suggests that socioeconomically disadvantaged women are less likely to take folic acid supplements. [33, 34] Women at higher risk of not getting enough folate include those who have lower socio-economic status and those who are experiencing food insecurity [28] (inadequate or insecure access to food due to financial constraints [35]).

Figure 15: Proportion of New Mothers in RCD Who Took Folic Acid Supplement Prior to, and During Pregnancy



	DIMat	DISoc	DICmb
Least	38.7% (35.1 – 42.2)	36.1% (32.4 – 39.7)	36.3% (32.8 – 39.7)
Neutral	34.3% (32.1 – 36.5)	35.7% (33.5 – 38.0)	35.6% (33.4 – 37.7)
Most	28.7% (25.2 – 32.1)	28.9% (25.6 – 32.2)	27.3% (23.6 – 31.0)

Source: BORN, 2012-2016

A trend was observed across levels of material and social deprivation, where the proportion of women who used folic acid decreased as material and social deprivation increased (Figure 15).

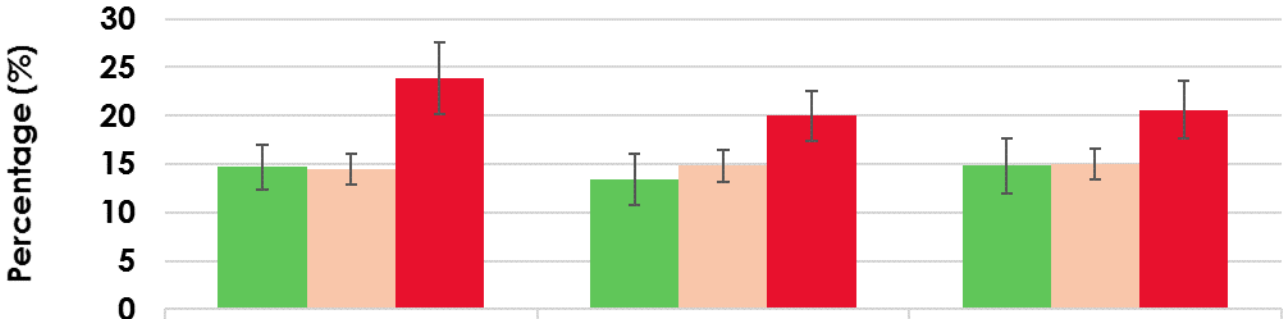
The difference between the most and least deprived areas was statistically significant for material, social, and combined deprivation. For combined deprivation, the proportion of new mothers who took folic acid supplements was **1.3 times higher** in the least deprived areas **(36.3%)** than in the most deprived areas **(27.3%)**.

Health Opportunity: If everyone in RCD experienced the same opportunities for health and well-being as those within the least deprived areas, **8** more women would take folic acid supplements prior to, and during pregnancy each year. This represents a Population Attributable Fraction of **3.9%**.

6. Smoking During Pregnancy

Pregnant women are advised to not smoke and to avoid second-hand smoke exposure during pregnancy.[36] Maternal smoking has negative effects on conception, the survival and health of the fetus, as well as the health of both mother and child post-delivery.[37-39] Smoking cigarettes during pregnancy has been linked to deprivation, with women living in more deprived areas more likely to smoke during their pregnancies.[40-42]

Figure 16: Proportion of New Mothers in RCD Who Smoked Cigarettes During Pregnancy



	DIMat	DISoc	DICmb
Least	14.7% (12.4 – 17.0)	13.4% (10.8 – 16.0)	14.8% (11.9 – 17.7)
Neutral	14.4% (12.8 – 16.0)	14.8% (13.1 – 16.4)	15.0% (13.4 – 16.5)
Most	23.8% (20.1 – 27.5)	20.0% (17.5 – 22.6)	20.6% (17.7 – 23.6)

Source: HBHC Screen, 2013-2016

A trend was observed across levels of material and social deprivation, where the proportion of women who smoked cigarettes during their pregnancy increased as material and social deprivation increased (Figure 16).

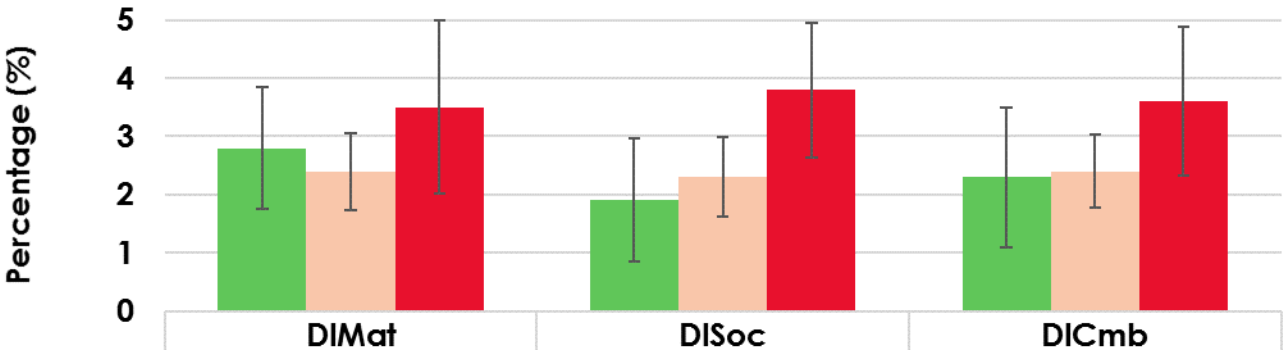
The difference between the most and least deprived areas was statistically significant for material, social, and combined deprivation. For combined deprivation, the proportion of women who smoked during their pregnancy was **1.4 times higher** in the most deprived areas (**20.6%**) than in the least deprived areas (**14.8%**).

Health Opportunity: If all pregnant women in RCD experienced the same opportunities for health and well-being as those within the least deprived areas, **11** fewer pregnant women would smoke during their pregnancy each year. This represents a Population Attributable Fraction of **5.7%**.

7. Alcohol During Pregnancy

The Low Risk Alcohol Drinking Guidelines state that if you are pregnant or planning to become pregnant, the safest choice is to drink no alcohol at all.[43] The consumption of alcohol during pregnancy can have negative impacts on the health of both mother and baby, including miscarriage, fetal alcohol spectrum disorder (FASD), low birth weight, and preterm birth.[44,45]

Figure 17: Proportion of New Mothers in RCD Who Used Alcohol During Pregnancy



	DIMat	DISoc	DICmb
Least	2.8% (1.7 – 3.8)	1.9% (0.9 – 3.0)	2.3% (1.1 – 3.5)
Neutral	2.4% (1.7 – 3.1)	2.3% (1.6 – 3.0)	2.4% (1.8 – 3.0)
Most	3.5% (2.0 – 5.0)	3.8% (2.6 – 5.0)	3.6% (2.3 – 4.9)

Source: HBHC Screen, 2013-2016

A potential trend was observed across levels of material and social deprivation, with the highest proportion of women who consumed alcohol during pregnancy found within the most deprived areas (Figure 17). For combined deprivation, **3.6%** of women in the most deprived areas reported using alcohol during their pregnancy, compared to **2.3%** of women in the least deprived areas.

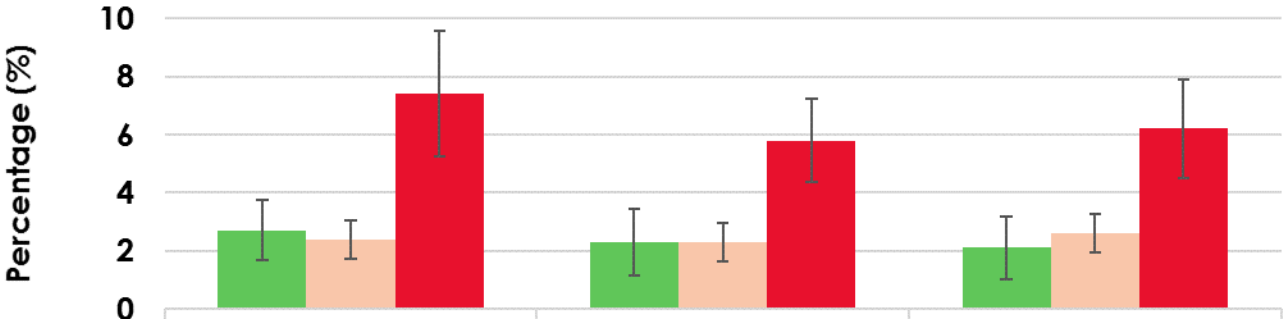
Although the differences between least and most deprived areas in RCD were not statistically significant, the trends observed are important to note as there is no threshold of alcohol use in pregnancy that has been proven to be safe.[43-45] The use of alcohol during pregnancy is associated with socioeconomic factors used to determine deprivation (e.g. marital status).[45]

Health Opportunity: If all pregnant women in RCD experienced the same opportunities for health and well-being as those within the least deprived areas, there would be **2** fewer pregnant women who used alcohol during their pregnancy each year. This represents a Population Attributable Fraction of **7.5%**.

8. Drug Use During Pregnancy

The use of licit and illicit substances during pregnancy can have negative impacts on the health of both mother and baby. These impacts include low birthweight, preterm birth, miscarriage, placental insufficiency, and pre-eclampsia.[46-49] National data shows that about 5% of Canadian women report using illicit drugs during their pregnancy, with cannabis being the most commonly used substance.[46]

Figure 18: Proportion of New Mothers in RCD Who Used Drugs During Pregnancy



	DIMat	DISoc	DICmb
Least	2.7% (1.7 – 3.8)	2.3% (1.1 – 3.4)	2.1% (1.0 – 3.3)
Neutral	2.4% (1.7 – 3.0)	2.3% (1.6 – 2.9)	2.6% (1.9 – 3.2)
Most	7.4% (5.3 – 9.6)	5.8% (4.4 – 7.3)	6.2% (4.5 – 7.9)

Source: HBHC Screen, 2013-2016

Substance use, including the use of both licit and illicit drugs during pregnancy has been linked to deprivation, with women in more deprived areas more likely to engage in substance use during pregnancy. A trend was observed where the highest proportion of new mothers who reported using drugs during their pregnancy was found within the most deprived areas (Figure 18).

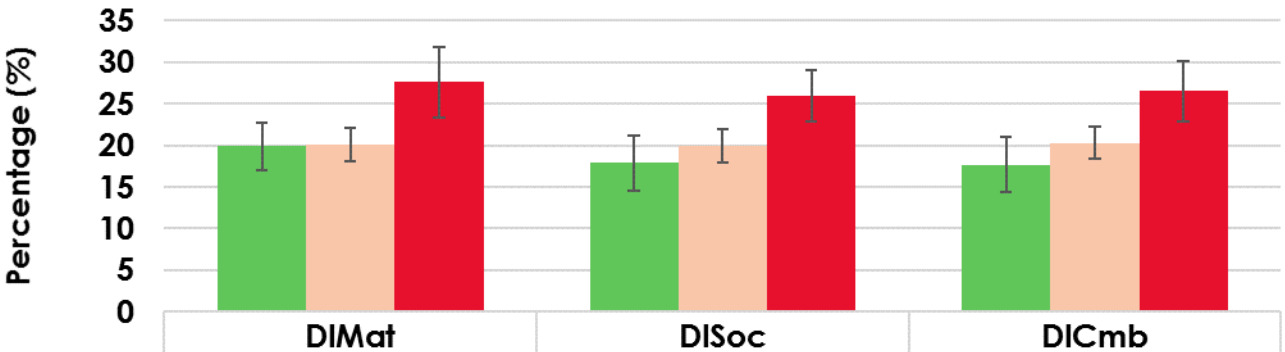
The difference in proportions between the most and least deprived areas was statistically significant for material, social, and combined deprivation. For combined deprivation, the proportion of women who reported using drugs during their pregnancy was **2.9 times higher** in the most deprived areas (**6.2%**) than in the least deprived areas (**2.1%**).

Health Opportunity: If all pregnant women in RCD experienced the same opportunities for health and well-being as those within the least deprived areas, there would be **10** fewer pregnant women who used drugs during their pregnancy each year. This represents a Population Attributable Fraction of **19.6%**.

9. History of Mental Illness Prior to Pregnancy, New Mother or Parenting Partner

Mental health challenges affect 1 in 5 Canadians, and young adults have the highest rate of mental health problems and illnesses.[50] The Canadian Maternal Experiences Survey identified that over 15% of Canadian women experienced depression prior to becoming pregnant.[51] The same study found an association between substance use (e.g., cigarette smoking, alcohol consumption, and use of non-prescription drugs) during pregnancy and prior mental illness.[51] Additionally, serious psychological distress among parenting adults (including mothers and parenting partners) has been found to be more prevalent among those with low incomes.[52] Socioeconomic deprivation is also strongly associated with maternal mental health, with mothers experiencing deprivation more likely to struggle with mental health issues.[53-55]

Figure 19: Proportion of New Mothers or their Parenting Partners in RCD with a History of Mental Illness Prior to Pregnancy



	DIMat	DISoc	DICmb
Least	19.9% (17.0 – 22.7)	17.9% (14.6 – 21.3)	17.7% (14.3 – 21.1)
Neutral	20.1% (18.2 – 22.1)	19.9% (17.9 – 21.9)	20.3% (18.4 – 22.2)
Most	27.6% (23.3 – 31.9)	25.9% (22.8 – 29.0)	26.5% (22.9 – 30.1)

Source: HBHC Screen, 2013-2016

For this indicator, a trend was observed where the highest proportion of mothers or parenting partners with a history of mental illness was found within the most deprived areas, across both material and social deprivation (Figure 19). The difference between the most and least deprived areas was statistically significant for material, social, and combined deprivation.

For combined deprivation, the proportion of mothers or their parenting partners with a history of mental illness prior to pregnancy was **1.5 times higher** in the most deprived areas **(26.5%)** than in the least deprived areas **(17.7%)**.

Health Opportunity: If everyone in RCD experienced the same opportunities for well-being as those within least deprived areas, there would be **11** fewer new mothers or their parenting partners with a history of mental illness prior to pregnancy. This represents a Population Attributable Fraction of **5.1%**.

10. Mental Health Concern During Pregnancy

The World Health Organization (WHO) emphasizes the importance of women's mental health at the various stages of life, including during pregnancy, childbirth and postpartum.[56]

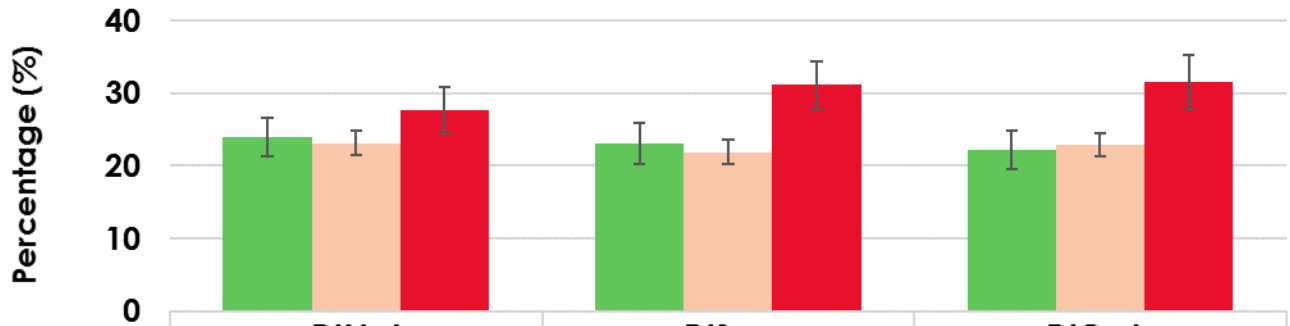
15.5% of women were diagnosed with depression or treated with anti-depressants before they became pregnant

12.5% of women reported most days were very stressful in the 12 months before childbirth

7.5% of women reported depressive symptoms postpartum

Source: Public Health Agency of Canada [57]

Figure 20: Proportion of New Mothers in RCD with a Mental Health Concern During Pregnancy



	DIMat	DISoc	DICmb
Least	23.9% (21.3 – 26.6)	23.1% (20.3 – 25.9)	22.2% (19.7 – 24.8)
Neutral	23.1% (21.4 – 24.8)	21.9% (20.2 – 23.6)	22.9% (21.3 – 24.6)
Most	27.7% (24.5 – 31.0)	31.1% (27.9 – 34.3)	31.5% (27.7 – 35.2)

Source: BORN, 2012-2016

The second indicator used to investigate maternal mental health was the proportion of new mothers who reported experiencing a mental health concern during their pregnancy. For this analysis, a trend was observed where the highest proportion of new mothers who reported experiencing a mental health concern during their pregnancy was found within the most deprived areas (Figure 20). The difference between the most and least deprived areas was statistically significant for social and combined deprivation.

For combined deprivation, the proportion of new mothers with a mental health concern during pregnancy was **1.4 times higher** in the most deprived areas (**31.5%**) than in the least deprived areas (**22.2%**).

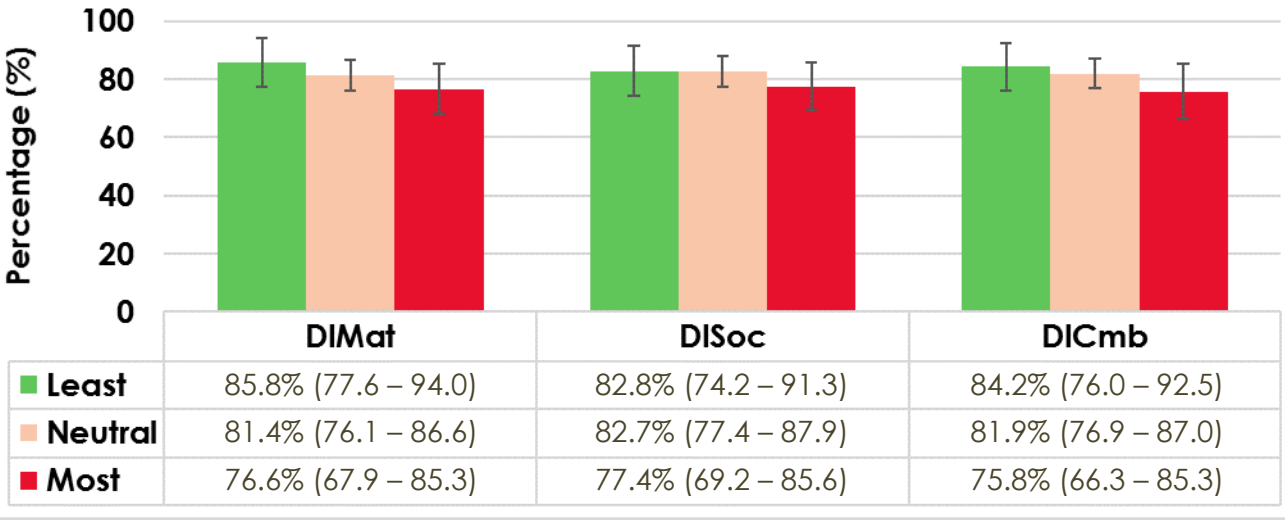
Health Opportunity: If all pregnant women in RCD experienced the same opportunities for health and well-being as those within the least deprived areas, **15** fewer women would experience mental health concerns during their pregnancy each year. This represents a Population Attributable Fraction of **5.7%**.

11. Intention to Exclusively Breastfeed

Health Canada recommends exclusive breastfeeding for the first six months of life, and continued breastfeeding for two years or longer with appropriate complementary feeding.[58] Exclusive breastfeeding means that the infant receives only breast milk. No other liquids or solids are given (not even water) with the exception of oral rehydration solution, or drops/syrups of vitamins, minerals or medicines.[58,59] Breast milk is easily and efficiently digested, and breastfeeding provides the appropriate quantity and quality of nutrients to support optimal growth, development and health. Other benefits to babies include: enhanced cognitive development, protection from gastro-intestinal infections, ear infections, respiratory tract infections, and sudden infant death syndrome, and protection against obesity later in life. [58] For mothers, breastfeeding reduces the risk of breast and ovarian cancer, type 2 diabetes, and postpartum depression.[60,61]

Breastfeeding has been linked to socioeconomic deprivation, with significantly fewer mothers in the lowest income category in Canada initiating breastfeeding.[62] Educational attainment is also related to breastfeeding initiation,[63] with significantly more mothers who were post-secondary graduates initiating breastfeeding.[62]

Figure 21: Proportion of New Mothers in RCD Intending to Exclusively Breastfeed



	DIMat	DISoc	DICmb
Least	85.8% (77.6 – 94.0)	82.8% (74.2 – 91.3)	84.2% (76.0 – 92.5)
Neutral	81.4% (76.1 – 86.6)	82.7% (77.4 – 87.9)	81.9% (76.9 – 87.0)
Most	76.6% (67.9 – 85.3)	77.4% (69.2 – 85.6)	75.8% (66.3 – 85.3)

Source: BORN, 2012-2016

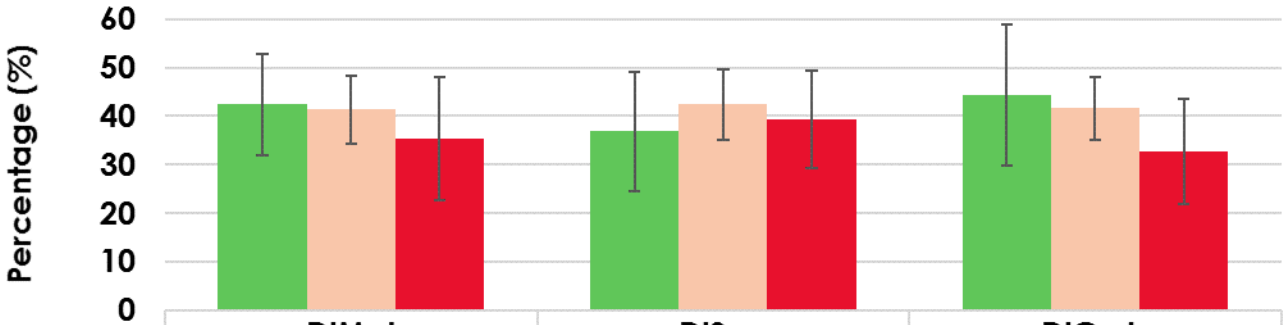
A potential trend was observed where the highest proportion of women intending to exclusively breastfeed was found in the least deprived areas (Figure 21). For combined deprivation, the proportion of mothers intending to exclusively breastfeed was highest in the least deprived areas (**84.2%**) compared to the most deprived areas (**75.8%**).

Although the differences between proportions in the least and most deprived areas were not statistically significant, the trends observed by levels of deprivation were also observed for socioeconomic factors at the provincial [63] and national levels [62] and are consistent with the academic literature.

12. Exclusive Breastfeeding at Two Months

In order to determine whether provision of breastmilk among new mothers in RCD was related to area-level deprivation, data on both the proportion of women exclusively breastfeeding at two months postpartum and the proportion of women providing any breastmilk at six months postpartum were analyzed. Only exclusive breastfeeding at two months is included in this report, as data on providing any breastmilk at six months did not show a significant relationship with area-level deprivation.

Figure 22: Proportion of New Mothers in RCD Exclusively Breastfeeding at Two Months Postpartum



	DIMat	DISoc	DICmb
Least	42.4% (32.0 – 52.8)	36.8% (24.6 – 49.0)	44.4% (29.9 – 59.0)
Neutral	41.3% (34.2 – 48.3)	42.4% (35.2 – 49.7)	41.6% (35.1 – 48.2)
Most	35.3% (22.7 – 47.9)	39.3% (29.3 – 49.4)	32.7% (21.9 – 43.5)

Source: RCDHU Infant Feeding Surveillance, 2014-2016

A potential trend was observed where the highest proportion of mothers exclusively breastfeeding at two months postpartum was found within the least deprived areas, though this trend was only observed across material and combined deprivation (Figure 22). For combined deprivation, the proportion of mothers exclusively breastfeeding at two months postpartum was highest in the least deprived areas (**44.4%**) compared to the most deprived areas (**32.7%**).

Although the differences between the least and most deprived areas were not statistically significant, the trend observed by level of material deprivation was also observed for socioeconomic factors at the provincial [63] and national levels [64] and is consistent with the academic literature.

By six months postpartum, the proportion of mothers providing any breastmilk (either exclusive or in combination with formula) had declined substantially, which is consistent with statistics at the national level.[64] No significant differences in the proportion of breastfeeding mothers were observed across levels of deprivation at six months postpartum.

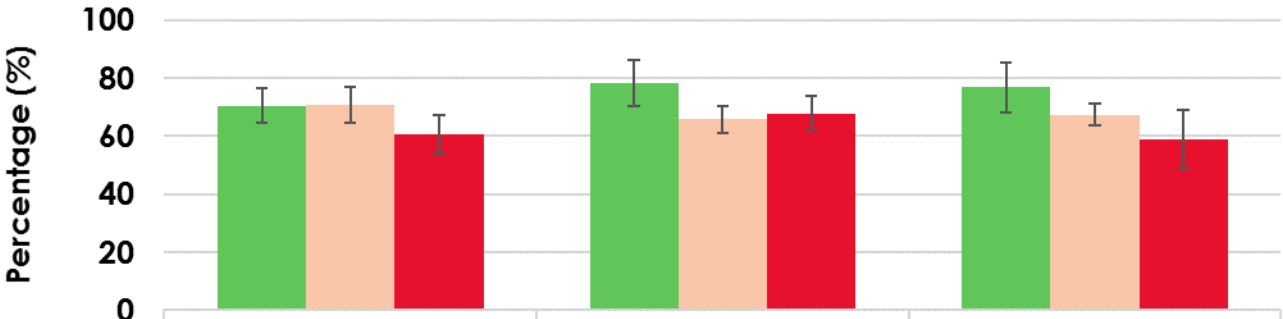
Health Service Utilization

13. Visited a Dentist

Oral health significantly affects physical, mental and social well-being and regular dental visits are important in maintaining oral health. In Canada, it is estimated that over two million school-days and over four million working-days are missed annually due to dental visits or dental sick-days.[65] Research suggests that there is a link between socioeconomic deprivation and visits to a dental professional.[66] In Ontario, those with lower income and less education are less likely to go to the dentist and more likely to only visit the dentist in cases of emergency.[67]

The indicator used for this analysis was the proportion of residents age 12 and over who reported visiting their dentist within the previous two years.

Figure 23: Proportion of RCD Residents Age 12+ Who Visited a Dentist in the Past 2 Years



	DIMat	DISoc	DICmb
Least	70.5% (64.4 – 76.7)	78.2% (70.4 – 86.0)	76.7% (68.1 – 85.2)
Neutral	70.6% (64.4 – 76.9)	65.8% (61.1 – 70.5)	67.3% (63.6 – 70.9)
Most	60.6% (53.8 – 67.4)	67.8% (61.8 – 73.8)	58.9% (48.8 – 69.1)

Source: CCHS, 2009-2010 and 2013-2014

A potential trend was observed where the lowest proportion of residents who visited a dentist in the past two years was found in the most deprived areas (Figure 23). For combined deprivation, the proportion of residents who visited their dentist in the past two years was highest in the least deprived areas (**76.7%**) compared to the most deprived areas (**58.9%**).

Although the differences in proportions between the least and most deprived areas were not statistically significant, the trend observed by level of material deprivation was also observed at the national level with measures such as income [66,68] and is consistent with the academic literature.

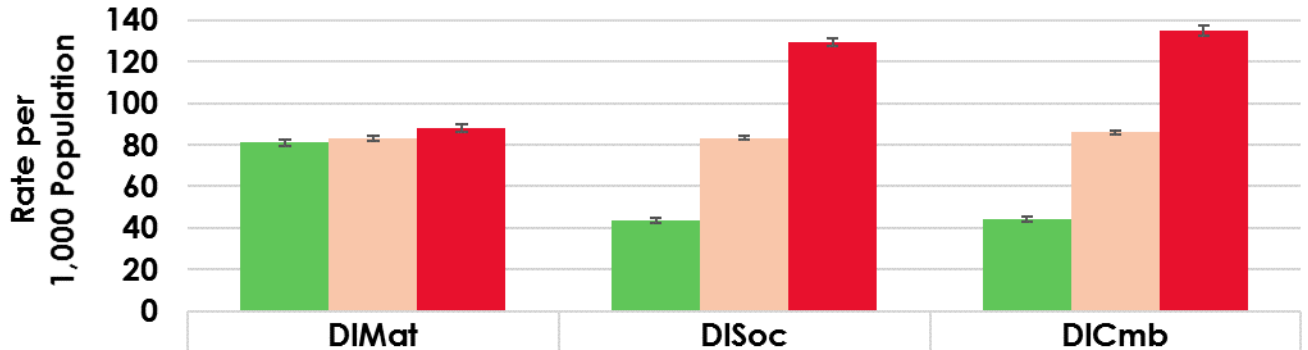
Health Opportunity: If everyone in the RCD area experienced the same opportunities for health and well-being as those within the least deprived areas, about **223** more people would visit their dentist. This represents a Population Attributable Fraction of **2.4%**.

14. All-Cause Hospitalizations

All-cause hospitalization refers to admission to a hospital for all causes, including illness, childbirth, surgery, and injury.

Hospitalizations have been linked to area-level material deprivation, with higher rates of hospitalization observed among residents of lower-income neighbourhoods.[69, 70] There is also research suggesting that hospitalizations (and length of stay) are linked to social deprivation.[71]

Figure 24: Rate of All-Cause Hospitalizations among RCD Residents (per 1,000 population)



	DIMat	DISoc	DICmb
Least	81.1 (79.5 – 82.6)	43.7 (42.6 – 44.9)	44.4 (43.1 – 45.7)
Neutral	83.1 (82.0 – 84.2)	83.4 (82.2 – 84.5)	85.9 (84.9 – 86.9)
Most	88.1 (86.3 – 90.0)	129.4 (127.3 – 131.6)	134.9 (132.3 – 132.3)

Source: IntelliHealth Ontario, 2012-2016

The highest rate of all-cause hospitalizations in RCD was found within the most deprived areas (Figure 24). A striking trend was observed across levels of social and combined deprivation, where the rate of all-cause hospitalizations increased as deprivation increased. The difference between most and least deprived areas was statistically significant for material, social and combined deprivation.

For combined deprivation, the rate of all-cause hospitalizations was **3.0 times higher** among residents in the most deprived areas (**134.9 per 1,000**) than in the least deprived areas (**44.4 per 1,000**).

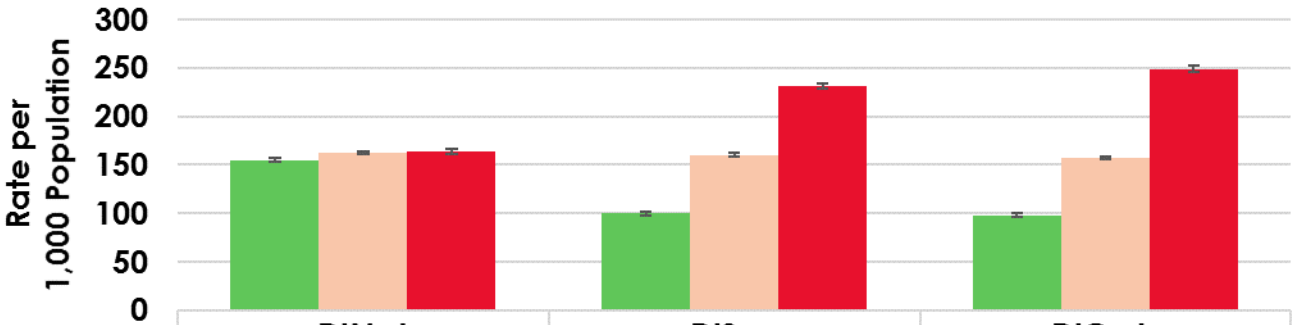
Health Opportunity: If everyone in RCD received the same opportunities for health and well-being as those within the least deprived areas, there would be **233** fewer hospitalizations each year. This represents a Population Attributable Fraction of **11%.**

15. Emergency Department Visits for Injuries

Unintentional injury is the fourth most common cause of death in Canada, and the leading cause of death for young Canadians under 25 years of age.[72] Falls, motor vehicle collisions, and cuts or piercings are some of the most frequent causes of hospital visits for injury across Canada.[73]

ED visits and hospitalizations for injury have been linked to area-level deprivation, with the burden of injury significantly greater among those with lower socioeconomic status.[73] One study found that social deprivation had a stronger relationship with rates of severe injury than material deprivation.[74]

Figure 25: Rate of ED Visits for Injuries by RCD Residents (per 1,000 population)



	DIMat	DISoc	DICmb
Least	155.0 (152.8 – 157.1)	99.9 (89.1 – 101.7)	98.2 (96.2 – 100.1)
Neutral	162.3 (160.8 – 163.9)	160.3 (158.7 – 161.8)	156.9 (155.6 – 158.3)
Most	164.2 (161.7 – 166.7)	231.1 (228.2 – 234.0)	249.0 (245.5 – 252.4)

Source: IntelliHealth Ontario, 2012-2016

As with all-cause hospitalizations, the highest rate of ED visits for all-causes of injury in RCD was found within the most deprived areas (Figure 25). A marked trend was also observed across levels of social and combined deprivation, where the rate of ED visits for all-causes of injury increased as deprivation increased. The difference between the most and least deprived areas was statistically significant for material, social and combined deprivation.

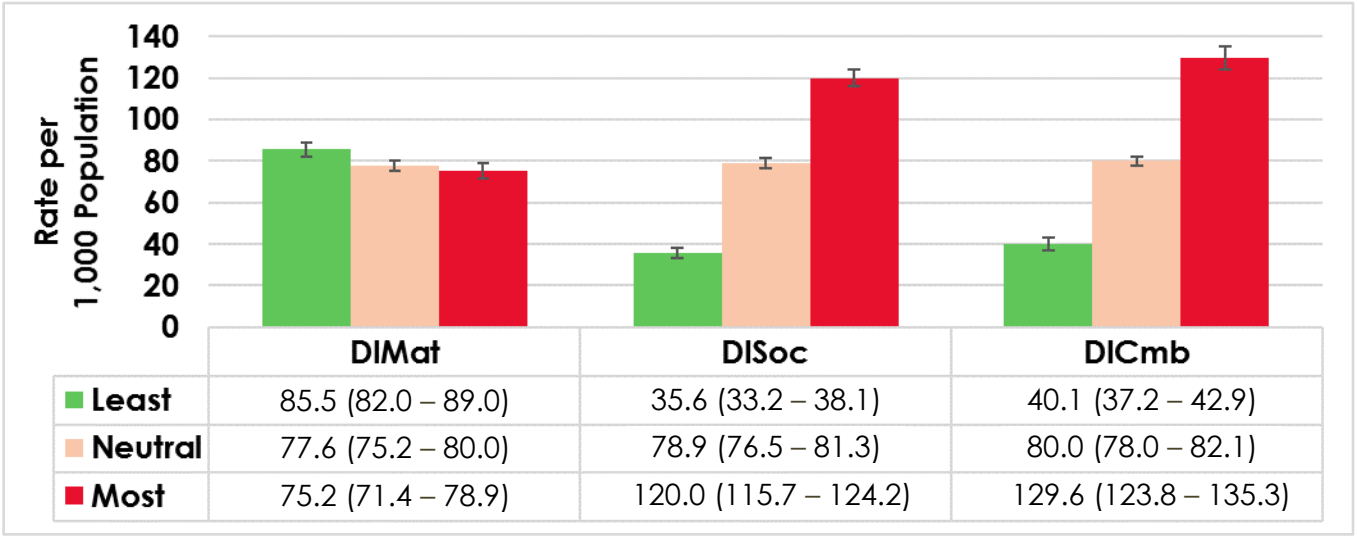
For combined deprivation, the rate of ED visits for all injuries in RCD was **2.5 times higher** among residents in the most deprived areas (**249.0 per 1,000**) than in the least deprived areas (**98.2 per 1,000**).

Health Opportunity: If everyone in RCD received the same opportunities for health and well-being as those within the least deprived areas, there would be **411** fewer ED visits for injuries each year. This represents a Population Attributable Fraction of **10.5%**.

16. Emergency Department Visits for Falls (65 years and older)

Falls are the leading cause of injury among older adults in RCD [75] and the second leading cause of deaths due to unintentional injury worldwide.[76] Adults older than 65 years suffer the greatest number of fatal falls.[76] Falls in older adults have been linked to lower socioeconomic status [77] and research also suggests that ED visits resulting from fall injuries are related to socioeconomic status.[78]

Figure 26: Rate of ED Visits for Injuries Caused by Falls for RCD Residents aged 65 years or older (per 1,000 population)



	DIMat	DISoc	DICmb
Least	85.5 (82.0 – 89.0)	35.6 (33.2 – 38.1)	40.1 (37.2 – 42.9)
Neutral	77.6 (75.2 – 80.0)	78.9 (76.5 – 81.3)	80.0 (78.0 – 82.1)
Most	75.2 (71.4 – 78.9)	120.0 (115.7 – 124.2)	129.6 (123.8 – 135.3)

Source: IntelliHealth Ontario, 2012-2016

The highest rate of fall-related ED visits among RCDHU residents aged 65 years or older was found within the most deprived areas (Figure 26). A trend was observed across levels of social and combined deprivation, where the rate of ED visits increased as deprivation increased. The opposite trend was observed across level of material deprivation, where the rate of ED visits decreased as deprivation increased. The difference in rates between the most and least deprived areas was statistically significant for social, material, and combined deprivation.

For combined deprivation, the rate of ED visits for fall-related injuries among residents aged 65 years and older was **3.2 times higher** among residents in the region's most deprived areas (**129.6 per 1,000**) than in the region's least deprived areas (**40.1 per 1,000**).

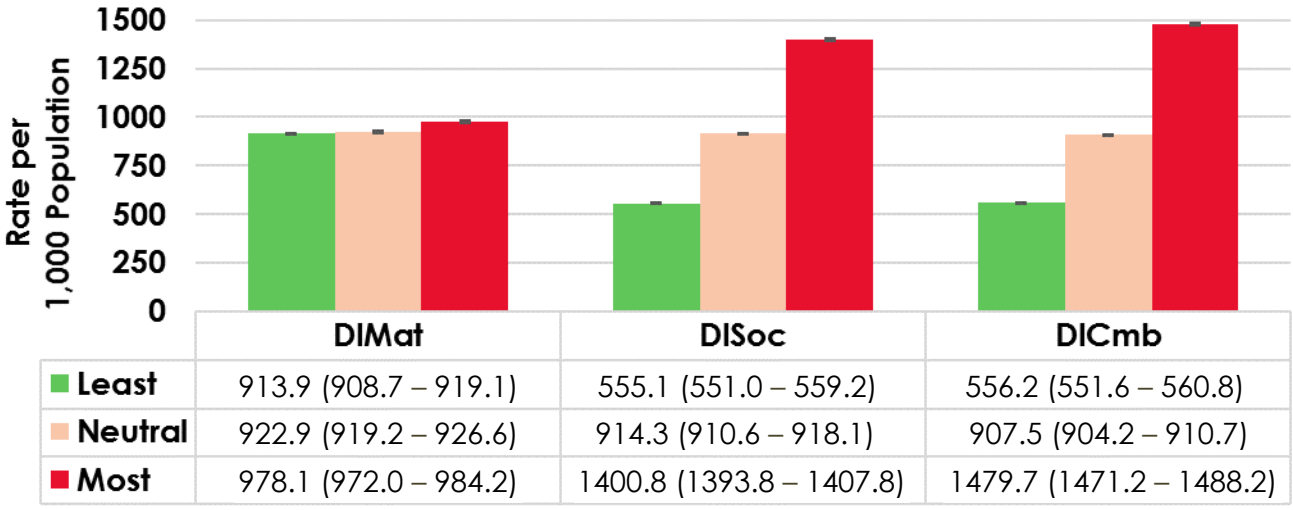
Health Opportunity: If everyone in RCD received the same opportunities for health and well-being as those within the least deprived areas, there would be **44** fewer ED visits for falls among residents aged 65 years and older each year. This represents a Population Attributable Fraction of **11.3%**.

17. All-Cause Emergency Department Visits

All-cause ED visits include any visit to an emergency department for any health-related ailments, including illness and injury.

ED visits have been linked to area-level material and social deprivation, with research in Ontario showing almost double the number of ED visits for the most deprived population compared to the least deprived population.[79]

Figure 27: Rate of All-Cause ED Visits by RCD Residents (per 1,000 population)



	DIMat	DISoc	DICmb
Least	913.9 (908.7 – 919.1)	555.1 (551.0 – 559.2)	556.2 (551.6 – 560.8)
Neutral	922.9 (919.2 – 926.6)	914.3 (910.6 – 918.1)	907.5 (904.2 – 910.7)
Most	978.1 (972.0 – 984.2)	1400.8 (1393.8 – 1407.8)	1479.7 (1471.2 – 1488.2)

Source: IntelliHealth Ontario, 2012-2016

The highest rate of all-cause ED visits per 1,000 population was found within the most deprived areas (Figure 27). A trend was observed across levels of deprivation, where the rate of ED visits increased as deprivation increased. The difference in rates between the most and least deprived areas was statistically significant for social, material, and combined deprivation.

For combined deprivation, the rate of all-cause ED visits in RCD was **2.6 times higher** among residents in the region's most deprived areas (**1,479.7 per 1,000**) than in the region's least deprived areas (**556.2 per 1,000**).

Health Opportunity: If everyone in RCD received the same opportunities for health and well-being as those within the least deprived areas, there would be **2,609** fewer all-cause ED visits each year. This represents a Population Attributable Fraction of **11.2%**.

Mortality

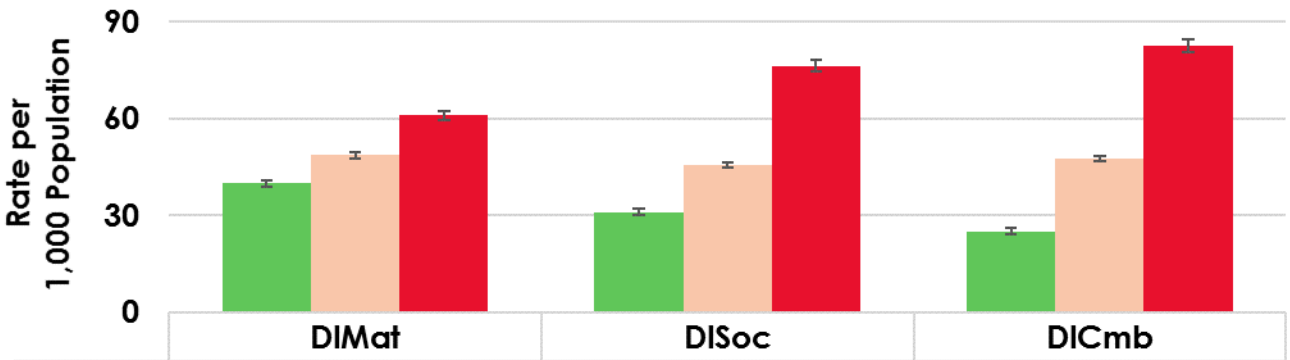
Two types of rates are reported in this section: potential years of life lost (PYLL) and mortality. PYLL refers to the number of years of life lost due to premature death. This is an estimate of the additional time a person would have lived had he or she not died prematurely. [80] Mortality rates reflect the annual "death rate," or rate of lives lost from all causes or a specific disease. In comparison to death rates, PYLL gives more weight to deaths that occur among younger people who may have lived longer if not for an illness or unintentional injury.[80]

In this section, mortality and PYLL rates are presented for all causes, cardiovascular disease, and all cancers. In general, mortality has been well linked to deprivation, with higher rates of mortality observed among individuals with lower socioeconomic status.[81,82]

18. All-Cause Potential Years of Life Lost

All-cause PYLL refers to the potential years of life lost due to premature death from all causes, including disease, unintentional injury, etc.

Figure 28: Rate of All-Cause PYLL in RCD Residents (per 1,000 population)



	DIMat	DISoc	DICmb
Least	39.9 (38.8 – 41.0)	31.0 (30.1 – 32.0)	25.0 (24.1 – 26.0)
Neutral	48.6 (47.8 – 49.5)	45.7 (44.9 – 46.6)	47.5 (46.8 – 48.3)
Most	60.9 (59.3 – 62.4)	76.3 (74.7 – 78.0)	82.4 (80.4 – 84.4)

Source: IntelliHealth Ontario, 2008-2012

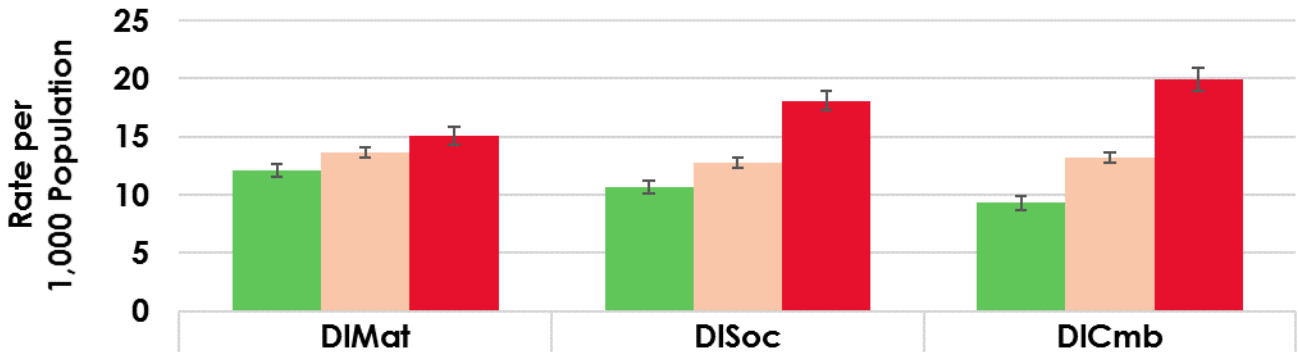
A trend was observed where the rate of all-cause PYLL increased as social and material deprivation increased, with the difference in rates between the most and least deprived areas statistically significant for social, material, and combined deprivation (Figure 28). For combined deprivation, the rate of all-cause PYLL was **3.2 times higher** among residents in the region's most deprived areas (**82.4 per 1,000**) than in the region's least deprived areas (**25.0 per 1,000**).

Health Opportunity: If everyone in RCD received the same opportunities for health and well-being as those within the least deprived areas, there would be **176** fewer potential years of life lost each year. This represents a Population Attributable Fraction of **13.3%.**

19. Cancer Potential Years of Life Lost

Cancer PYLL refers to the potential years of life lost due to premature death as a result of cancers, including breast, cervical, colorectal, lung, and prostate cancer. Data was not presented for individual cancers due to there being a small number of cases for each type of cancer.

Figure 29: Rate of Cancer PYLL in RCD Residents (per 1,000 population)



	DIMat	DISoc	DICmb
Least	12.1 (11.5 – 12.7)	10.7 (10.1 – 11.3)	9.3 (8.7 – 9.8)
Neutral	13.6 (13.1 – 14.0)	12.8 (12.4 – 13.3)	13.2 (12.8 – 13.6)
Most	15.1 (14.3 – 15.8)	18.1 (17.4 – 18.9)	19.9 (18.9 – 20.9)

Source: IntelliHealth Ontario, 2008-2012

A trend was observed where the rate of cancer PYLL increased as social and material deprivation increased, with the difference in rates between the most and least deprived areas statistically significant for social, material, and combined deprivation (Figure 29).

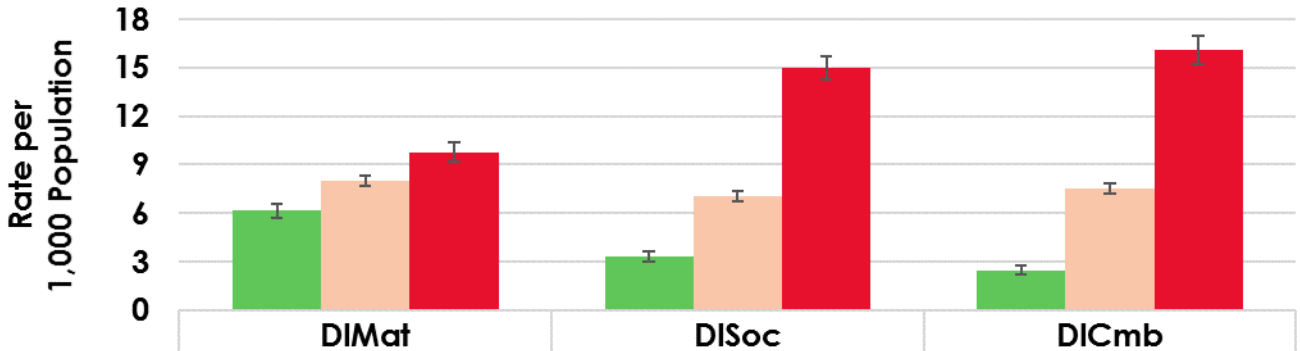
For combined deprivation, the rate of cancer PYLL was **2.1 times higher** among residents in the region's most deprived areas (**19.9 per 1,000**) than in the region's least deprived areas (**9.3 per 1,000**).

Health Opportunity: If everyone in RCD received the same opportunities for health and well-being as those within the least deprived areas, there would be **29** fewer potential years of life lost due to cancer-related deaths each year. This represents a Population Attributable Fraction of **9.1%.**

20. Cardiovascular Disease Potential Years of Life Lost

Cardiovascular disease PYLL refers to the potential years of life lost due to premature death as a result of cardiovascular disease. This includes a range of conditions affecting the heart or blood vessels, such as heart disease and cerebrovascular disease. The indicator used to assess this was the rate of cardiovascular PYLL per 1,000 population.

Figure 30: Rate of Cardiovascular PYLL in RCD Residents (per 1,000 population)



	DIMat	DISoc	DICmb
Least	6.2 (5.7 – 6.6)	3.3 (3.0 – 3.7)	2.5 (2.2 – 2.8)
Neutral	8.0 (7.7 – 8.4)	7.1 (6.7 – 7.4)	7.5 (7.2 – 7.8)
Most	9.8 (9.2 – 10.4)	15.0 (14.3 – 15.7)	16.1 (15.3 – 17.0)

Source: IntelliHealth Ontario, 2008-2012

A trend was observed where the rate of cardiovascular disease PYLL increased as social and material deprivation increased, with the difference in rates between the most and least deprived areas statistically significant for social, material, and combined deprivation (Figure 30).

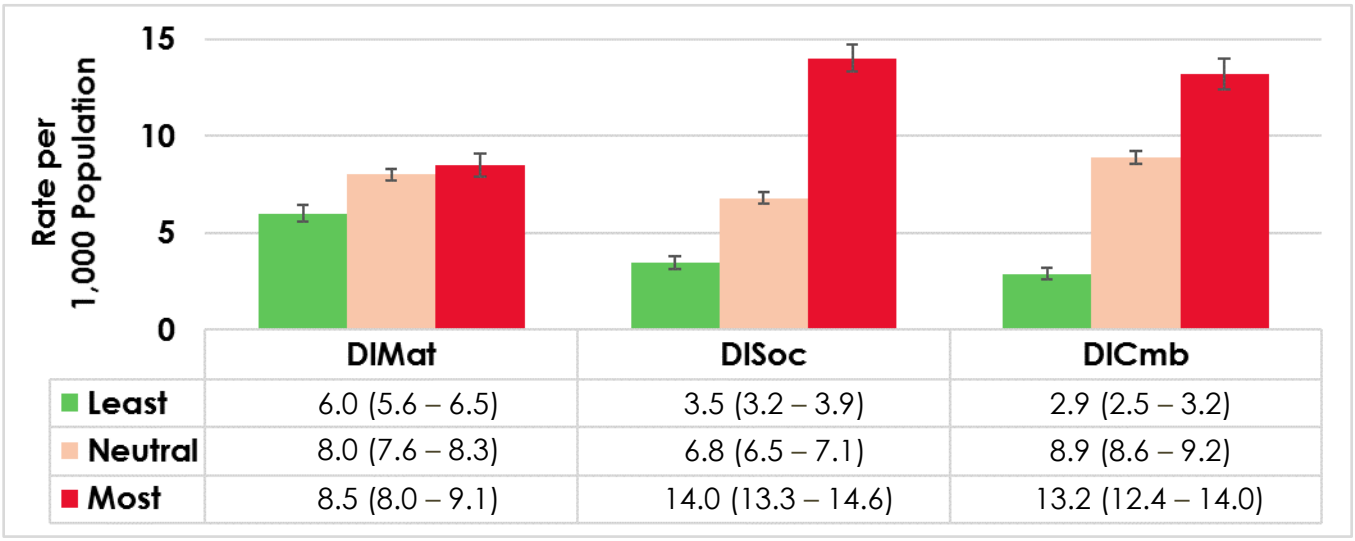
For combined deprivation, the rate of cardiovascular PYLL was **6.4 times higher** among residents in the region's most deprived areas (**16.1 per 1,000**) than in the region's least deprived areas (**2.5 per 1,000**).

Health Opportunity: If everyone in RCD received the same opportunities for health and well-being as those within the least deprived areas, there would be **52** fewer potential years of life lost due to cardiovascular-related deaths each year. This represents a Population Attributable Fraction of **20.0%.**

21. All-Cause Mortality

All-cause mortality refers to deaths due to all causes, including illness or injury.

Figure 31: Rate of All-Cause Mortality in RCD Residents (per 1,000 population)



	DIMat	DISoc	DICmb
Least	6.0 (5.6 – 6.5)	3.5 (3.2 – 3.9)	2.9 (2.5 – 3.2)
Neutral	8.0 (7.6 – 8.3)	6.8 (6.5 – 7.1)	8.9 (8.6 – 9.2)
Most	8.5 (8.0 – 9.1)	14.0 (13.3 – 14.6)	13.2 (12.4 – 14.0)

Source: IntelliHealth Ontario, 2008-2012

A trend was observed where the rate of all-cause mortality increased as social and material deprivation increased, with the difference in rates between the most and least deprived areas statistically significant for social, material, and combined deprivation (Figure 31).

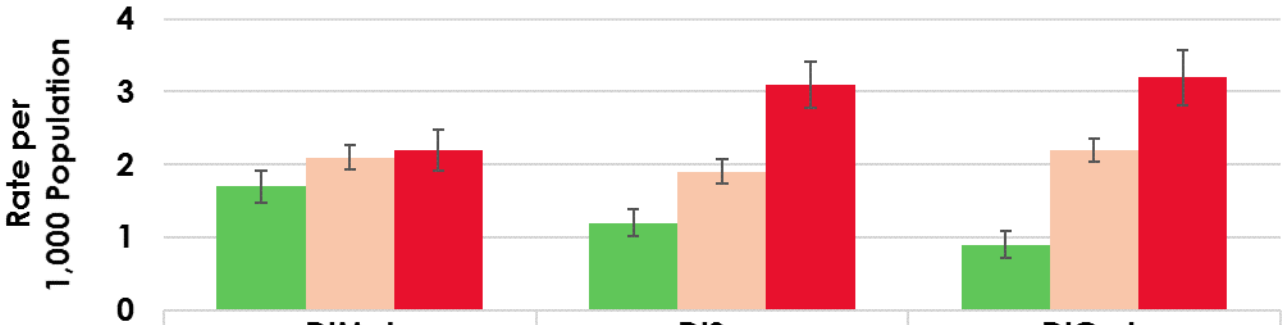
For combined deprivation, the all-cause mortality rate was **4.5 times higher** among residents in the region's most deprived areas (**13.2 per 1,000**) than in the region's least deprived areas (**2.9 per 1,000**).

Health Opportunity: If everyone in RCD received the same opportunities for health and well-being as those within the least deprived areas, there would be **23** fewer deaths each year. This represents a Population Attributable Fraction of **11.0%**.

22. Cancer Mortality

Cancer mortality refers to deaths due to cancers, including breast, cervical, colorectal, lung, and prostate cancer.

Figure 32: Rate of Cancer Mortality in RCD Residents (per 1,000 population)



	DIMat	DISoc	DICmb
Least	1.7 (1.5 – 1.9)	1.2 (1.0 – 1.4)	0.9 (0.8 – 1.1)
Neutral	2.1 (1.9 – 2.3)	1.9 (1.8 – 2.1)	2.2 (2.0 – 2.4)
Most	2.2 (1.9 – 2.5)	3.1 (2.8 – 3.4)	3.2 (2.8 – 3.6)

Source: IntelliHealth Ontario, 2008-2012

A trend was observed where cancer mortality rates increased as social and material deprivation increased, with the difference in rates between the most and least deprived areas statistically significant for social, material, and combined deprivation (Figure 32).

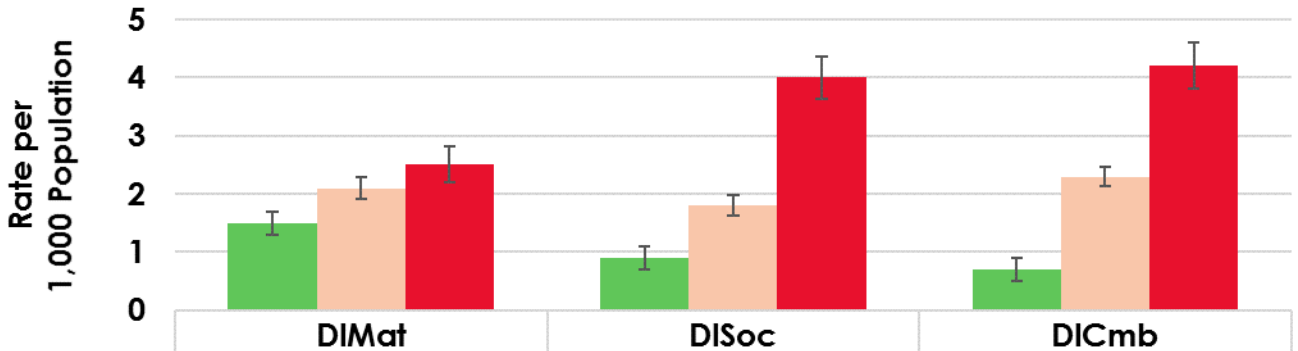
For combined deprivation, the rate of cancer mortality was **3.5 times higher** among residents in the region's most deprived areas (**3.2 per 1,000**) than in the region's least deprived areas (**0.9 per 1,000**).

Health Opportunity: If everyone in RCD received the same opportunities for health and well-being as those within the least deprived areas, there would be **5** fewer cancer-related deaths each year. This represents a Population Attributable Fraction of **9.8%**.

23. Cardiovascular Disease Mortality

Cardiovascular mortality refers to deaths due to cardiovascular disease. The indicator used to assess this health inequity in RCD was the rate of cardiovascular mortality per 1,000 population.

Figure 33: Rate of Cardiovascular Mortality in RCD Residents (per 1,000 population)



	DIMat	DISoc	DICmb
Least	1.5 (1.3 – 1.8)	0.9 (0.7 – 1.0)	0.7 (0.6 – 0.9)
Neutral	2.1 (2.0 – 2.3)	1.8 (1.6 – 2.0)	2.3 (2.2 – 2.5)
Most	2.5 (2.5 – 2.2)	4.0 (3.6 – 4.3)	4.2 (3.7 – 4.6)

Source: IntelliHealth Ontario, 2008-2012

A trend was observed where cardiovascular mortality rates increased as social and material deprivation increased, with the difference in rates between the most and least deprived areas statistically significant for social, material and combined deprivation (Figure 33).

For combined deprivation, the rate of cardiovascular mortality was **6 times higher** among residents in the region's most deprived areas (**4.2 per 1,000**) than in the region's least deprived areas (**0.7 per 1,000**).

Health Opportunity: If everyone in RCD received the same opportunities for health and well-being as those within the least deprived areas, there would be **10** fewer cardiovascular-related deaths each year. This represents a Population Attributable Fraction of **15.5%**.

Discussion

This report describes the relationship between 23 health indicators and area-level deprivation in RCD. Four types of health indicators were examined: health risk factors, maternal health, health service utilization, and mortality. Deprivation was explored at 3 levels: social deprivation, material deprivation, and combined social and material deprivation. In all four types of health indicators, a relationship was found between deprivation and health.

Although several of these relationships were not statistically significant, they are included in the report because they are known to be associated with area-level deprivation. The lack of statistical significance in RCD for the years investigated may be due, in some cases, to the small sample sizes available for calculating the relevant statistics. This is a challenge inherent in any research where we must use samples to make inferences about the "true" impact at a population-level. Furthermore, a relationship that is not statistically significant can still be meaningful for a community. For example, any exposure to second-hand smoke presents a meaningful health risk to residents, and any drug or alcohol use during pregnancy presents a meaningful health risk to both mothers and children.

It is also worth mentioning that some PAF levels may appear small, but this is due to a small population size in some circumstances. For example, the PAFs for maternal health indicators are based on about 1,000 births per year.

Health Risk Factors

This health equity analysis identified differences in the prevalence of health risk factors among residents living in the most deprived areas compared to those living in the least deprived areas (Table 10). Consistent with research at the national level, the prevalence of current smokers was highest among residents in the most deprived areas (Figure 9). Exposure to second-hand smoke was also highest in these areas (Figure 11). It is important to note that exposure to second-hand smoke was highest among youth aged 12 to 19 in households with current smokers (Figure 10). These findings suggest an opportunity for smoking-related interventions in RCD and the need for assessment of the socioeconomic conditions that impact health.

Next, we explored the prevalence of residents in RCD who drink in excess of the Low-Risk Alcohol Drinking Guidelines (LRADG). Although prevalence in the most deprived areas was not significantly different than in the least deprived areas, there may be a trend towards excess consumption in the least deprived areas (Figure 12). In Ontario, however, it has been noted that at comparable levels of drinking, individuals with lower socio-economic status experience more alcohol-related harms than those with higher socio-economic status.[23, 83]

Physical inactivity during leisure time was 1.5 times higher among residents in the most deprived areas than among those in the least deprived areas (Figure 14). While physical

inactivity is reported among individuals living in more deprived areas,[26] individuals in more deprived areas are also more likely to report barriers to accessing physical activity facilities.[27] Although the rates of physical inactivity in RCD are consistent with the Ontario average, there is an opportunity to improve the health of residents by developing interventions around healthy, active living, that consider the built environment, access and availability in more deprived areas.

Maternal Health

Although the sample sizes for maternal health indicators were small, we can make careful inferences about patterns concerning health equity in RCD. It is important to note that, as with any self-reported data, responses to questions about maternal health behaviours and experiences are subject to social desirability bias, particularly given that the use of substances during pregnancy is widely discouraged. As a result, these results may be underestimates of the true prevalence of these behaviours in RCD.

These results indicate that women who live in the most deprived areas of RCD are less likely to take folic acid supplements before or during pregnancy than those in the least deprived areas (Figure 15). Similarly, prevalence estimates for smoking, alcohol use, and drug use during pregnancy were higher in the most deprived areas than least deprived areas (Figure 16, Figure 17, Figure 18). Significant differences are noted for folic acid use (Figure 15), cigarette smoking (Figure 16) and drug use (Figure 18), but not for alcohol use (Figure 17).

As was observed with the substance use indicators, higher prevalence of a history of mental illness in new mothers or their parenting partners (Figure 20), and mental health concerns during pregnancy (Figure 20) were observed among residents in the most deprived areas. The prevalence of new mothers or their parenting partners with a history of mental illness prior to pregnancy was 1.5 times higher in the most deprived areas. The prevalence of self-reported mental health concerns during pregnancy was 1.4 times higher among women in the most deprived areas.

Although not statistically significant, the proportion of mothers intending to exclusively breastfeed was higher in Ontario than RCD in 2015 (Table 7). We observed, for the years 2012-2016, a greater proportion of mothers who intended to exclusively breastfeed in the least deprived RCD areas than in the most deprived areas (Figure 21). Again, these differences are not statistically significant. Similarly, RCDHU's Infant Feeding Surveillance data showed that although 40.2% of RCD mothers reported exclusive breastfeeding at 2 months postpartum, this proportion was lowest in the most deprived areas of RCD (Figure 22). There are no comparable data for Ontario for this health indicator. Although these results are not statistically significant, we encourage action to support women in the most deprived areas to breastfeed, as research in Canada has shown an association between socioeconomic factors and lower rates of breastfeeding initiation and breastfeeding.[62-64]

Health Service Utilization

The proportion of those visiting a dentist in the past two years in RCD is not significantly different from the Peer Group or Ontario. Those in the most deprived areas are less likely to visit a dentist than those in the least deprived areas, but these differences are not statistically significant (Figure 23).

Rates of all-cause hospitalizations, all-cause ED visits, injury-related ED visits, and ED visits for injuries caused by falls, (age 65 and over) are all significantly higher for the most deprived areas compared to the least deprived areas in RCD (Figure 24, Figure 25, Figure 26, Figure 27). Rates ranged from 2.5 to over 3 times higher for residents of the most deprived areas.

For fall-related ED visits among older adults, a significantly higher rate of ED visits was observed among residents in more socially deprived areas, while the reverse was demonstrated for materially deprived areas. That is, the rate of fall-related ED visits was highest among older adults residing in the least materially deprived areas, and the most socially deprived areas. These findings suggest an opportunity for the development of interventions to reduce social isolation among older adults across the population, as well as to increase awareness of the risk of falls among the least materially deprived populations.

Mortality

For all mortality indicators, there were significant differences between the least and most deprived populations in RCD, with the highest rates observed in the most deprived areas (Figure 28, Figure 29, Figure 30, Figure 31, Figure 32, Figure 33). A clear trend was observed across mortality indicators and level of deprivation; as level of deprivation increased, so too did the rates of mortality. This analysis demonstrated a relative risk for mortality 2.1 to 6.4 times higher in the most deprived areas.

Conclusions

Health inequities exist in Renfrew County and District. Some people are experiencing systematic and unfair disadvantages that contribute to poor health. This knowledge provides a compelling case for action to reduce health inequities. All people in Renfrew County and District should have the opportunity to reach their full health potential, and should not be disadvantaged because of their socioeconomic status or other socially determined circumstances.

Next Steps

The findings in this report can be used to inform an evidence-based approach in developing strategies to reduce health inequities. The health unit and community partners can work in collaboration with people experiencing health inequities to:

- Have discussions about the local impact of health inequities and establish effective strategies for reducing health inequities
- Modify and orient programs and services to meet the unique needs of disadvantaged groups
- Lead, support and participate in the analysis, development and advancement of policies that improve the social and economic conditions that support health.

The Renfrew County and District Health Unit is sharing this report with community partners, stakeholders, and policy-makers. We have developed knowledge translation resources to help with sharing and using the findings of this report. Together, we can reduce health inequities and increase opportunities for optimal health for all.

References

1. Ontario. Ministry of Health and Long-Term Care. Ontario public health standards: requirements for programs, services, and accountability, 2018. Toronto, ON: Queen's Printer for Ontario; 2018. Available from: http://www.health.gov.on.ca/en/pro/programs/publichealth/oph_standards/default.aspx
2. Ontario. Ministry of Health and Long-Term Care. Health Equity Guideline, 2018. Toronto, ON: Queen's Printer for Ontario; 2018. Available from: http://www.health.gov.on.ca/en/pro/programs/publichealth/oph_standards/docs/protocols_guidelines/Health_Equity_Guideline_2018_en.pdf

3. Canadian Medical Association. Health care in Canada: what makes us sick?: Canadian Medical Association Town Hall Report. Ottawa, ON: Canadian Medical Association; 2013. Available from: https://www.cma.ca/Assets/assets-library/document/fr/advocacy/What-makes-us-sick_en.pdf

4. National Collaborating Centre for Determinants of Health. Let's talk: Populations and the power of language. Antigonish, NS: National Collaborating Centre for Determinants of Health, St. Francis Xavier University; 2014. Available from: http://nccdh.ca/images/uploads/Population_EN_web2.pdf

5. National Collaborating Centre for Determinants of Health. Let's talk: Health equity. Antigonish, NS: National Collaborating Centre for Determinants of Health, St. Francis Xavier University; 2013. Available from: http://nccdh.ca/images/uploads/Lets_Talk_Health_Equity_English.pdf

6. World Health Organization. Closing the gap: policy into practice on social determinants of health [Internet]. Rio de Janeiro, Brazil; 2011 [cited 2018 Feb 13]. Available from: http://www.who.int/sdhconference/Discussion-paper-EN.pdf

7. Public Health Agency of Canada. Rio political declaration on social determinants of health: A snapshot of Canadian actions 2015. Ottawa, ON: Public Health Agency of Canada; 2015. Available from: http://www.healthycanadians.gc.ca/publications/science-research-sciences-recherches/rio/alt/rio2015-eng.pdf

8. Chief Medical Officer of Health of Ontario. Mapping Wellness: Ontario's Route to Healthier Communities. Toronto, ON; 2015. Available from: http://www.health.gov.on.ca/en/common/ministry/publications/reports/cmoh_15/default.aspx

9. Sudbury & District Health Unit. Opportunity for All: The Path to Health Equity. Sudbury, ON; 2013. Available from: https://www.phsd.ca/resources/research-statistics/health-statistics/opportunity-path-health-equity-highlights/opportunity-path-health-equity-report

10. National Collaborating Centre for Determinants of Health. Let's talk: Public health roles. Antigonish, NS: National Collaborating Centre for Determinants of Health, St. Francis Xavier University; 2013. Available from: http://nccdh.ca/images/uploads/PHR_EN_Final.pdf

11. Pampalon R, Hamel D, Gamache P, Raymond G. A deprivation index for health planning in Canada. Chronic Dis Can. 2009;29(4):178–91.

12. Pampalon R, Hamel D, Gamache P, Philbert M, Raymond G, Simpson A. An area-based material and social deprivation index for public health in Québec and Canada. Can J Public Health. 2012;103(Suppl. 2):S17-S22.

13. Statistics Canada. 2011 Census Dictionary: Dissemination area (DA) [Internet]. Ottawa, Ontario: Statistics Canada Catalogue no. 98-301-XWE; 2012 [cited 2018 Sept 26]. Available from: https://www12.statcan.gc.ca/census-recensement/2011/ref/dict/geo021-eng.cfm

14. Statistics Canada. 2017. Ontario [Province] and Renfrew County and District Health Unit, [Health region, December 2017], Ontario (table). Census Profile. 2016 Census. Statistics Canada Catalogue no. 98-316-X2016001. Ottawa, Ontario. Released November 29, 2017. [Accessed September 26, 2018]. Available from: http://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/details/page.cfm?Lang=E&Geo1=PR&Code1=35&Geo2=HR&Code2=3557&Data=Count&SearchText=Renfrew&SearchType=Begins&SearchPR=01&B1=All&TABID=1

15. World Health Organization. WHO global report: mortality attributable to tobacco. Geneva; 2012.

16. Jha P, Ramasundarahettige C, Landsman V, Rostron B, Thun M, Anderson RN, et al. 21st-Century Hazards of Smoking and Benefits of Cessation in the United States. N Engl J Med. 2013;368(4):341–50.

17. Corsi DJ, Boyle MH, Lear SA, Chow CK, Koon,Teo K, Subramanian S V. Trends in smoking in Canada from 1950 to 2011: progression of the tobacco epidemic according to socioeconomic status and geography. Cancer Causes Control. 2014;25(1):45–57.

18. Ontario Agency for Health Protection and Promotion (Public Health Ontario). Summary Measures of Socioeconomic Inequalities in Health [Internet]. Toronto; 2013 [cited 2018

Mar 12]. Available from: https://www.publichealthontario.ca/en/eRepository/Summary_Measures_Socioeconomic_Inequalities_Health_2013.pdf

19. Public Health Agency of Canada. The Chief Public Health Officer's report on the state of public health in Canada 2015: Alcohol consumption in Canada [Internet]. Ottawa, ON; 2016 [cited 2018 Aug 16]. Available from: https://www.canada.ca/en/public-health/services/publications/chief-public-health-officer-reports-state-public-health-canada/2015-alcohol-consumption-canada.html

20. World Health Organization. Global status report on alcohol and health 2014 [Internet]. Geneva; 2014 [cited 2018 Mar 6]. Available from: http://www.who.int/substance_abuse/publications/alcohol_2014/en/

21. Butt P, Beirness D, Gliksman L, Stockwell T. Alcohol and health in Canada: a summary of evidence and guidelines for low-risk drinking. Ottawa, ON; 2011.

22. Keyes KM, Hasin DS. Socio-economic status and problem alcohol use: the positive relationship between income and the DSM-IV alcohol abuse diagnosis. Addiction. 2008;103(7):1120–30.

23. Collins SE. Associations Between Socioeconomic Factors and Alcohol Outcomes. Alcohol Res. 2016;38(1):83–94.

24. Canadian Society for Exercise Physiology. Canadian Physical Activity Guidelines: Adults 18-64 [Internet]. 2018 [cited 2018 Feb 13]. Available from: http://csepguidelines.ca/adults-18-64/

25. Canadian Society of Exercise Physiology. Canadian 24-hour movement guidelines for children and youth 5-17 [Internet]. Ottawa; 2018 [cited 2018 Feb 13]. Available from: http://csepguidelines.ca/children-and-youth-5-17/

26. Giles-Corti B, Donovan RJ. Socioeconomic Status Differences in Recreational Physical Activity Levels and Real and Perceived Access to a Supportive Physical Environment. Prev Med (Baltim). 2002;35(6):601–11.

27. Harrington D, Jarvis J, Manson H. Parents' Perceived Barriers to Accessing Sports and Recreation Facilities in Ontario, Canada: Exploring the Relationships between Income, Neighbourhood Deprivation, and Community. Int J Environ Res Public Health. 2017;14(12):1272.

28. Expert Advisory Group on National Nutrition Pregnancy Guidelines. Prenatal nutrition guidelines for health professionals - folate. Ottawa, Ontario: Health Canada; 2009 [cited

2018 Sept 26]. Available from: https://www.canada.ca/content/dam/hc-sc/migration/hc-sc/fn-an/alt_formats/hpfb-dgpsa/pdf/pubs/folate-eng.pdf

29. Centers for Disease Control. Folic Acid Helps Prevent Some Birth Defects [Internet]. 2018 [cited 2018 Jan 23]. Available from: https://www.cdc.gov/features/folicacidbenefits/index.html

30. Centers for Disease Control and Prevention. Spina bifida and anencephaly before and after folic acid mandate - United States 1995-1996 and 1999-2000. Morb Mortal Wkly Rep. 2004;53(17):362–5.

31. Milunsky A, Jick H, Jick SS, Bruell CL, MacLaughlin DS, Rothman KJ, et al. Multivitamin/ Folic Acid Supplementation in Early Pregnancy Reduces the Prevalence of Neural Tube Defects. J Am Med Assoc. 1989;262(20):2847.

32. Scholl TO, Johnson WG. Folic acid: influence on the outcome of pregnancy. Am J Clin Nutr. 2000;71(5 Suppl).

33. Public Health Agency of Canada. Folic acid use among pregnant women in Canada [Internet]. Government of Canada. 2016 [cited 2018 Jan 30]. Available from: https://www.canada.ca/en/public-health/services/publications/healthy-living/folic-acid-use-among-pregnant-women-canada.html

34. Relton CL, Hammal DM, Rankin J, Parker L. Folic acid supplementation and social deprivation. Public Health Nutr. 2005;8(3).

35. PROOF. Household food insecurity is a serious public health problem that affects 1 in 8 Canadian households. [Internet]. Toronto, Ontario: PROOF; 2017 [cited 2018 Sept 26]. Available from: http://proof.utoronto.ca/

36. Public Health Agency of Canada. The sensible guide to a healthy pregnancy. Government of Canada. Ottawa, ON; 2011. Available from: http://www.phac-aspc.gc.ca/hp-gs/pdf/hpguide-eng.pdf

37. Centers for Disease Control and Prevention. Tobacco Use and Pregnancy [Internet]. 2017 [cited 2018 Jan 23]. Available from: https://www.cdc.gov/reproductivehealth/maternalinfanthealth/tobaccousepregnancy/index.htm

38. Rogers JM. Tobacco and pregnancy: Overview of exposures and effects. Birth Defects Res Part C Embryo Today Rev. 2008;84(1):1–15.

39. Shah T, Sullivan K, Carter J. Sudden infant death syndrome and reported maternal smoking during pregnancy. Am J Public Health. 2006;96(10):1757–9.

40. Cui Y, Shooshtari S, Forget EL, Clara I, Cheung KF. Smoking during Pregnancy: Findings from the 2009–2010 Canadian Community Health Survey. PLoS One. 2014;9(1):e84640.

41. Räisänen S, Kramer MR, Gissler M, Saari J, Hakulinen-Viitanen T, Heinonen S. Smoking during pregnancy was up to 70% more common in the most deprived municipalities — A multilevel analysis of all singleton births during 2005–2010 in Finland. Prev Med (Baltim). 2014;67:6–11.

42. Pickett KE, Wakschlag LS, Rathouz PJ, Leventhal BL, Abrams B. The working-class context of pregnancy smoking. Health Place. 2002;8(3):167–75.

43. Canadian Centre on Substance Use and Addiction. Canada's low-risk alcohol drinking guidelines. Ottawa, ON; 2017. Available from: http://www.ccsa.ca/Resource%20Library/2012-Canada-Low-Risk-Alcohol-Drinking-Guidelines-Brochure-en.pdf

44. Patra J, Bakker R, Irving H, Jaddoe V, Malini S, Rehm J. Dose–response relationship between alcohol consumption before and during pregnancy and the risks of low birthweight, preterm birth and small for gestational age (SGA)—a systematic review and meta-analyses. Int J Obstet Gynaecol. 2011;118(12):1411–21. Khalil A, O'Brien P. Alcohol and pregnancy. Obstet Gynaecol Reprod Med. Elsevier; 2010;20(10):311–3.

45. Walker MJ, Al-Sahab B, Islam F, Tamim H. The epidemiology of alcohol utilization during pregnancy: an analysis of the Canadian Maternity Experiences Survey (MES). BMC Pregnancy Childbirth. 2011;11(1):52–60.

46. Finnegan L. Substance Abuse in Canada: Licit and Illicit Drug Use during Pregnancy: Maternal, Neonatal and Early Childhood Consequences. Ottawa; 2013.

47. Quesada O, Gotman N, Howell HB, Funai EF, Rounsaville BJ, Yonkers KA. Prenatal hazardous substance use and adverse birth outcomes. J Matern Fetal Neonatal Med. 2012;25(8):1222–7.

48. Hayatbakhsh MR, Flenady VJ, Gibbons KS, Kingsbury AM, Hurrion E, Mamun AA, et al. Birth outcomes associated with cannabis use before and during pregnancy. Pediatr Res. 2012;71(2):215–9.

49. Porath-Waller AJ. Clearing the Smoke on Cannabis: Maternal Cannabis Use during Pregnancy - An update. Ottawa; 2015.

50. Mental Health Commission of Canada. Strengthening the case for investing in Canada's mental health system: economic considerations. Ottawa; 2017.

51. Public Health Agency of Canada. Pregnancy and women's mental health in Canada: results from the Canadian Maternity Experiences Survey. Ottawa; 2014.

52. Herman-Stahl M, Ashley OS, Penne MA, Bauman KE, Weitzenkamp D, Aldridge M, et al. Serious psychological distress among parenting and nonparenting adults. Am J Public Health. 2007;97(12):2222–9.

53. Hein A, Rauh C, Engel A, Häberle L, et al. Socioeconomic status and depression during and after pregnancy in the Franconian Maternal Health Evaluation Studies (FRAMES). Arch Gynecol Obs. 2014;289:755–63.

54. Goyal D, Gay C, Lee KA. How Much Does Low Socioeconomic Status Increase the Risk of Prenatal and Postpartum Depressive Symptoms in First-Time Mothers? Women's Heal Issues. 2010;20(2):96–104.

55. Yang S, Kestens Y, Dahhou M, Daniel M, Kramer MS. Neighborhood Deprivation and Maternal Psychological Distress During Pregnancy: A Multilevel Analysis. Matern Child Health J. 2015;19(5):1142–51.

56. Ontario Agency for Health Protection and Promotion (Public Health Ontario), Mensah G, Singh T. Evidence brief: Exploring interventions to address perinatal mental health in a public health context. Toronto, ON: Queen's Printer for Ontario; 2016.

57. Public Health Agency of Canada. Pregnancy and women's mental health in Canada: results from the Canadian Maternity Experiences Survey. Ottawa; 2016.

58. Health Canada, Canadian Paediatric Society, Dietitians of Canada and Breastfeeding Committee for Canada. Nutrition for Healthy Term Infants: Recommendations from birth to six months. [Internet] Government of Canada; 2015 [Cited 2018 August 31]. Available from: https://www.canada.ca/en/health-canada/services/food-nutrition/healthy-eating/infant-feeding/nutrition-healthy-term-infants-recommendations-birth-six-months.html#a4

59. World Health Organization. Exclusive breastfeeding for optimal growth, development and health of infants [Internet]. Geneva: World Health Organization; 2018 [cited 2018 Sept 04]. Available from: http://www.who.int/elena/titles/exclusive_breastfeeding/en/#.W7Joo9PMYUk.email

60. World Health Organization. 10 facts on breastfeeding [Internet]. Geneva: World Health Organization; 2017 [cited 2018 Sept 04]. Available from: http://www.who.int/features/factfiles/breastfeeding/en/

61. Kramer MS, Kakuma R. Optimal duration of exclusive breastfeeding. Cochrane Database Syst Rev. 2012;(8):CD003517.

62. Statistics Canada. Breastfeeding Initiation in Canada: Key Statistics and Graphics (2009-2010) - Canada.ca [Internet]. Statistics Canada. 2012 [cited 2018 Mar 9]. Available from: https://www.canada.ca/en/health-canada/services/food-nutrition/food-nutrition-surveillance/health-nutrition-surveys/canadian-community-health-survey-cchs/breastfeeding-initiation-canada-key-statistics-graphics-2009-2010-food-nutrition-surveillance-health-canada.html#a2

63. Alton G, Procter T, Bobadilla A, Baby Friendly Initiative Ontario Project Team. Breastfeeding Surveillance in Ontario LDCP Breastfeeding Surveillance Project Team [Internet]. 2013 [cited 2018 Mar 13]. Available from: http://www.bfiontario.ca/wp-content/uploads/2013/02/LDCP-Phase-1-Report-Breastfeeding-Surveillance-in-Ontario-May-2013.pdf

64. Gionet L. Breastfeeding Trends in Canada. Health at a Glance. Ottawa; 2013.

65. Canadian Dental Association. The State of Oral Health in Canada [Internet]. Ottawa; 2017 [cited 2018 Feb 27]. Available from: https://www.cda-adc.ca/stateoforalhealth/_files/TheStateofOralHealthinCanada.pdf

66. Bhatti T, Rana Z, Grootendorst P. Dental Insurance, Income and the Use of Dental Care in Canada. J Can Dent Assoc (Tor). Canadian Dental Association; 2007;73(1):57–64.

67. Chief Medical Officer of Health of Ontario. Oral Health – More Than Just Cavities. Toronto, ON; 2012. Available from: http://www.health.gov.on.ca/en/common/ministry/publications/reports/oral_health/oral_health.pdf

68. Health Canada. Report on the Findings of the Oral Health Component of the Canadian Health Measures Survey 2007-2009 [Internet]. Ottawa; 2010 [cited 2018 Feb 27]. Available from: http://publications.gc.ca/collections/collection_2010/sc-hc/H34-221-2010-eng.pdf

69. Roos LL, Walld R, Uhanova J, Bond R. Physician visits, hospitalizations, and socioeconomic status: ambulatory care sensitive conditions in a Canadian setting. Health Serv Res. 2005;40(4):1167–85.

70. Canadian Institute for Health Information. Hospitalization Disparities by Socioeconomic Status for Males and Females[Internet]. Ottawa; 2010. Available from: https://secure.cihi.ca/free_products/disparities_in_hospitalization_by_sex2010_e.pdf

71. Yilmaz E, Raynaud D. The influence of social deprivation on length of hospitalisation. Vol. 14, The European Journal of Health Economics. 2013. p. 243–52.

72. Statistics Canada. Leading causes of death, by sex, CANSIM Table 102-0561 [Internet]. Statistics Canada. 2018 [cited 2018 Mar 6]. Available from: http://www.statcan.gc.ca/tables-tableaux/sum-som/l01/cst01/hlth36a-eng.htm

73. Canadian Institute for Health Information. Injury Hospitalizations and Socio-Economic Status [Internet]. Ottawa; 2010. Available from: www.cihi.ca

74. Lawson F, Schuurman N, Amram O, Nathens AB. A geospatial analysis of the relationship between neighbourhood socioeconomic status and adult severe injury in Greater Vancouver. BMJ Journals - Inj Prev. 2015;21(4):260–5.

75. Renfrew County and District Health Unit. Injuries caused by falls among older adults in Renfrew County and District. [Internet] Pembroke, ON; 2017. [cited 2018 Aug 16]. Available from: https://www.rcdhu.com/wp-content/uploads/2017/12/Injuries-Caused-by-Falls-Among-Older-Adults-in-Renfrew-County-and-District-2017-Report.pdf

76. World Health Organization. Falls – Key Facts. [Internet]. Geneva: World Health Organization; 2018 [cited 2018 Oct04]. Available from: http://www.who.int/news-room/fact-sheets/detail/falls

77. World Health Organization. WHO Global Report on Falls Prevention in Older Age [Internet]. Geneva; 2007 [cited 2018 Mar 6]. Available from: http://www.who.int/ageing/publications/Falls_prevention7March.pdf

78. Shankar KN, Liu SW, Ganz DA. Trends and Characteristics of Emergency Department Visits for Fall-Related Injuries in Older Adults, 2003-2010. West J Emerg Med. 2017;18(5):785–93.

79. Tozer AP, Belanger P, Moore K, Caudle J. Socioeconomic status of emergency department users in Ontario, 2003 to 2009. Canadian Journal of Emergency Medicine. 2014; 16(3):220-5.

80. Canadian Institute for Health Information. Canada's International Health System Performance over 50 Years – Examining Potential Years of Life Lost. Ottawa, Ontario: CIHI; 2016.

81. Bourbeau R, Ouellette N. Trends, patterns and differentials in Canadian mortality over nearly a century, 1921-2011. Canadian Studies in Population. 2016;43(1-2):48-77.

82. Steenland K, Hu S, Walker J. All-cause and cause-specific mortality by socioeconomic status among employed persons in 27 US states, 1984-1997. Am J Public Health. 2004;94(6):1037–42.

83. Cancer Care Ontario. Prevention System Quality Index: health equity. Toronto: Queen's Printer for Ontario; 2018. Available from: https://www.cancercareontario.ca/en/statistical-reports/prevention-system-quality-index

Appendices

Appendix 1: Overview of Data Sources

Canadian Community Health Survey

Statistics Canada gathers health-related data at sub-provincial levels of geography (i.e. region or combined health region) through the Canadian Community Health Survey (CCHS). The CCHS is a cross-sectional survey which has been conducted annually since 2007. Data from the CCHS is primarily used to inform health surveillance and population health research. Because all responses to the CCHS are self-reported and voluntary, a degree of bias in responses is expected. This bias is referred to as selection bias, as those who "self-select" into the study (i.e. choose to participate), typically tend to belong to a higher socioeconomic bracket, to be employed, and healthier than the general population. The CCHS is conducted on a national scale; therefore, the RCD sample size is relatively small with high variability for some survey questions.

Better Outcomes Registry and Network

The Better Outcomes Registry & Network (BORN) is Ontario's pregnancy, birth and childhood registry and network. The BORN Information System collects critical information for each birth in the province.

Healthy Babies Healthy Children Screen

Ontario's Healthy Babies Healthy Children (HBHC) screen dataset contains surveillance data on children from the pre-natal period until the transition to school. The HBHC program is delivered through Ontario's public health units in partnership with hospitals and other community partners. It includes universal screenings with targeted assessments and interventions; data includes demographics, and various measures associated with screening.

Infant Feeding Surveillance

In October 2014, RCDHU began Infant Feeding Surveillance (IFS) which monitors infant feeding practices in Renfrew County and District.

IntelliHealth Ontario

IntelliHealth Ontario contains clinical and administrative data collected from various sectors of the Ontario healthcare system. Data collected by IntelliHealth Ontario is received directly from healthcare providers after going through the Canadian Institute for Health Information (CIHI). Subsets of the data extracted from IntelliHealth Ontario includes the National Ambulatory Care Reporting System (NACRS), which contains data for all hospital-based and community-based ambulatory care, and the Discharge Abstract Database (DAD), which captures administrative, clinical, and demographic information on hospital discharges (including deaths, sign-outs and transfers).

Appendix 2: Table of All Health Indicators Investigated

The following table displays all health indicators that were investigated in the initial analysis phase. Note: the numbers in the table below do not correspond to health indicators used in the report, the indicators in **bold** below are included in the report and are also summarized in Table 3.

Table A-1: Health Indicators Investigated in Initial Analysis

	Health Indicator	Data Source
Infectious and Communicable Diseases Prevention and Control		
1	Incidence rates of reportable diseases: i. *campylobacter* enteritis, ii. chlamydial infections, iii. cryptosporidiosis, iv. giardiasis, v. gonorrhoea (all types), vi. group A streptococcal disease–invasive, vii. hepatitis C, viii. influenza, ix. pertussis, x. salmonellosis, xi. *streptococcus pneumoniae*–invasive, xii. syphilis–infectious	PHO Query (Integrated Public Health Information System, iPHIS)
2	Proportion of population aged 15-49 having two or more sexual partners in the past 12 months, by whether they used a condom the last time they had sex	CCHS
Healthy Growth and Development		
Maternal Health		
3	**Percentage of women taking folic acid supplemental prior to and during pregnancy**	BORN
4	**Percentage of women who experienced any mental health concern during pregnancy. Includes anxiety, depression, history of postpartum depression, addiction, bipolar, schizophrenia or other**	BORN
5	**Percentage of women that smoked cigarettes during pregnancy**	BORN
6	Percentage of women with gestational weight gain within the recommended range	BORN
7	Percentage of women who gained more weight than recommended during pregnancy	BORN
8	**Percentage of women who intend to exclusively breastfeed**	BORN
9	**Percentage of new mothers who used alcohol during pregnancy**	HBHC Screen
10	**Percentage of new mothers who used drugs during pregnancy**	HBHC Screen
11	**Percentage of new mothers or their parenting partner who have a history of depression, anxiety or other mental illness**	HBHC Screen
12	**Percentage of new mothers who smoked cigarettes during pregnancy**	HBHC Screen
13	Percentage of new mothers who have premature birth	HBHC Screen

	Health Indicator	Data Source
Birth		
14	High birth weight rate (live births with a birth weight of 4500g or more, expressed as a percentage of all live births with known birth weight).	IntelliHealth Ontario
15	Low birth weight rate (live births with a birth weight of less than 2500 grams as a percentage of all live births with known birth weight).	IntelliHealth Ontario
Infant Feeding		
16	**Percentage of mothers exclusively breastfeeding at 2 months**	RCDHU IFS
17	Percentage of mothers providing any breastmilk at 6 months	RCDHU IFS
Chronic Disease and Injury Prevention, Wellness and Substance Misuse		
Food Security		
18	Proportion of households that were food insecure in the past 12 months due to lack of money (including marginal, moderate and severe)	CCHS
Smoking		
19	**Proportion of the population age 12 and over who are current cigarette smokers (daily or occasional).**	CCHS
20	**Proportion of the non-smoking population age 12 and over who reported that at least one person smoked inside their home every day or almost every day.**	CCHS
Alcohol Consumption		
21	Proportion of the population who exceeded LRADG for chronic disease (guideline #1) age 19 and over	CCHS
22	Proportion of the population who exceeded the LRADG for injury (guideline #2) age 19 and over	CCHS
23	**Proportion of the population who exceeded either LRADG (guideline #1 or #2) age 19 and over**	CCHS
Drug Use		
24	Proportion of the population who have used an illicit drug in the past 12 months (self-reported).	CCHS
25	Proportion of the population who have ever used an illicit drug (self-reported)	CCHS
26	Proportion of the population who have used cannabis in the past 12 months (self-reported)	CCHS
27	Proportion of the population who have ever used cannabis (self-reported).	CCHS

	Health Indicator	Data Source
Physical Activity		
28	**Proportion of the population aged 12 and over who were inactive during leisure time**	CCHS
Vegetable and Fruit Consumption		
29	Proportion of the population age 12 and over who consumed vegetables and fruits less than 5 times per day	CCHS
Overweight and Obesity		
30	Proportion of the population age 18 and over with a body mass index in the overweight or obese range according to self-reported height and weight (combined)	CCHS
31	Proportion of the population age 18 and over with a body mass index in the obese range according to self-reported height and weight	CCHS
32	Proportion of youth age 12–17 with a body mass index in the overweight or obese range (combined)	CCHS
33	Proportion of youth age 12–17 with a body mass index in the obese range	CCHS
Wellness		
34	Proportion of the population age 12 and over who reported perceiving their own health status as being excellent or very good	CCHS
35	Proportion of the population age 12 and over who reported perceiving their own mental health status as being excellent or very good	CCHS
36	Percentage of the population age 12 and over who reported that they have been diagnosed by a health professional with a mood disorder such as depression, bipolar disorder, mania, or dysthymia	CCHS
37	Proportion of the population aged 12 and over who reported good to full functional health (score of 0.8 to 1.0) based on 8 dimensions of functioning (i.e., vision, hearing, speech, mobility, dexterity, feelings, cognition and pain)	CCHS
Chronic Disease Prevalence		
38	Proportion of the population age 12 and over who reported that they have been diagnosed by a health professional as having Type 1 or Type 2 diabetes Includes females 15 and over who reported that they have been diagnosed with gestational diabetes	CCHS
39	Proportion of the population aged 35 and over who reported being diagnosed by a health professional as having chronic bronchitis, emphysema or chronic obstructive pulmonary disease	CCHS

	Health Indicator	Data Source
40	Proportion of the population aged 12 and over who reported that they have been diagnosed by a health professional as having asthma	CCHS
Injury		
41	Proportion of the population age 12 and over who sustained injuries in the past 12 months and who sought medical attention from a health professional in the 48 hours following the injury	CCHS
42	Emergency department visit rates for injuries caused by intentional self-harm per 1,000 population	
Health Service Utilization		
43	**All-cause hospitalization rates per 1,000 population from (a) Discharge Abstract Database (DAD); (b) National Ambulatory Care Reporting System (NACRS)**	IntelliHealth Ontario
44	**ED visits rates for injury (ED visits for all causes of injury per 1,000 population)**	IntelliHealth Ontario
45	**ED visit rates for fall-related injuries per 1,000 population for (a) all population; (b) aged 65 years and older**	IntelliHealth Ontario
46	**All-cause ED visit rates per 1,000 population**	IntelliHealth Ontario
47	**Proportion of the population who visited a dentist in the past year 2 years**	CCHS
48	Proportion of the population age 12 and over who report that they have a regular medical doctor	CCHS
Mortality		
49	**Premature mortality (dying before age 75) for (a) all causes; (b) all cancers; (c) cardiovascular disease (*cancer includes individual and aggregate assessment of lung cancer, breast cancer, colorectal cancer, cervical cancer, prostate cancer)**	IntelliHealth Ontario
50	**All-cause mortality**	IntelliHealth Ontario
51	**Cardiovascular disease mortality**	IntelliHealth Ontario
52	**Cancer mortality (*Includes individual and aggregate assessment of lung cancer, breast cancer, colorectal cancer, cervical cancer, prostate cancer)**	IntelliHealth Ontario
53	Life expectancy, males and females	Statistics Canada

Appendix 3: Limitations

Limitations of Deprivation Indices

The Deprivation Index uses six sociodemographic indicators from the Canadian census and deprivation was ranked taking into consideration data at the provincial (Ontario) level. It is possible that using a different index comprised of different indicators, or deriving a new index based on local data, may have led to a different categorization of local Dissemination Areas by level of deprivation. However, the indicators typically used to derive proxy measures of material and social deprivation are often similar across indices, so it is unlikely that the choice of index is a large source of error in these results.

Following consultation with RCDHU representatives, the decision was made to display the data in this report by the Deprivation Index alone, rather than also including an analysis of the data by the Ontario Marginalization Index (OMI), an alternative deprivation index investigating four elements of deprivation: material deprivation, dependency, residential instability, and ethnic concentration. Very little difference was observed in the results between indices in the initial summary reports. While the use of a single deprivation index simplified the analysis and improved readability of the report, it does produce a more general analysis of health inequities than the OMI may have provided.

The decision was made to display data by both material and social deprivation indices in addition to the combined material/social deprivation index. Throughout this report, the combined index is used to calculate the relative risk between the most and least deprived areas, as well as the health opportunity (population attributable fraction). While we could have included an interpretation of the relative risk and population attributable fraction for each material, social, *and* combined deprivation, displaying these values for combined deprivation only, greatly improved the readability of the report.

Limitations of Dissemination Areas

For the purposes of this report, deprivation was assessed by using predefined geographic regions (dissemination areas) as the basis for analysis. Grouping individuals together in an area and treating them as if they were the same has the potential to mask differences that may exist between residents of that geographic area. For example, it is possible that some residents who fall into the "most deprived" category may live in a dissemination area categorized as "least deprived." This has the potential to underestimate the impact of deprivation on health outcomes. Therefore, it is possible that if the boundaries of the dissemination areas had been drawn differently, the results of this report may have changed.

Limitations of Data Sources

Sample size: Data pulled from the CCHS was based on small sample sizes (CCHS samples consisted of 1,000 - 3,000 residents compared to samples of 50,000 or more for IntelliHealth

Ontario data) with a large amount of variation, which was reflected in the wide confidence intervals observed for CCHS indicators presented throughout this report. Small sample sizes make it difficult to evaluate statistically significant differences and can sometimes provide misleading results. As a result, all indicators derived from CCHS data should be interpreted with caution.

In an effort to increase sample sizes and make the data more interpretable, multiple years of data were combined for each indicator throughout this report. This may mask trends in the data that appear over time.

Missing data: Certain dissemination areas were excluded from this analysis due to Deprivation Index methodology, which excludes dissemination areas with large proportions of residents living in collective dwellings (i.e, nursing homes, retirement homes). The methodology also excludes dissemination areas where socioeconomic data was not available. It is possible that the exclusion of some of these areas may have impacted the results of this report.

Social Desirability Bias: Health survey data are subject to self-report bias. This bias occurs when the respondent feels pressured to respond to questions in a way that is considered to be "acceptable" or "socially desirable." For this reason, observed values for several of the more sensitive indicators included in this report are likely to be underestimates of the true prevalence of the behaviour, particularly where there is a significant stigma associated with the behaviour (i.e., substance use during pregnancy, drinking in excess of low risk drinking guidelines, self-reported mental illness).

Appendix 4: Description of Calculations

Three elements are considered when measuring how commonly a health outcome occurs in a population:

1. the number of "events" (or number of times an outcome occurred),
2. the population at risk for developing the outcome, and
3. a measure of time.

Health inequities throughout this report are reported as either proportions or incidence rates.

Proportions

Proportions (also referred to as prevalence estimates) indicate the proportion of the population affected by the outcome of interest at a single point in time. For example, the proportion of current smokers in RCD is calculated by dividing the number of survey respondents reporting that they smoke by the total number of respondents. This is multiplied by 100 to express the prevalence as a percentage.

$$P = \frac{\text{\# existing cases of outcome}}{\text{Total \# respondents}} \times 100$$

In this report, proportions are calculated for data drawn from the CCHS, BORN, HBHC Screen, and RCDHU's Infant Feeding Surveillance databases.

Rates

Incidence rates measure the occurrence of new cases of injury, illness, or death that develop in a population over a specified time period. This report includes three types of incidence rates: emergency department (ED) visit rates, hospitalization rates, and mortality rates.

Incidence rates can be calculated for a specific cause of injury, illness, or death, or for all causes combined. The population size of RCD is approximately 103,000 people (with about 1,000 births/year) so the numbers available for analysis are relatively small. For this reason, data has been combined over several years to improve estimates. All rates are expressed per 1,000 people in the population to facilitate comparison of different sized groups (i.e. ED visits for injuries per 1,000 population).

$$Rate = \frac{\text{\# new cases (of illness, injury, or death)}}{\text{Total population at risk}} \times 1{,}000$$

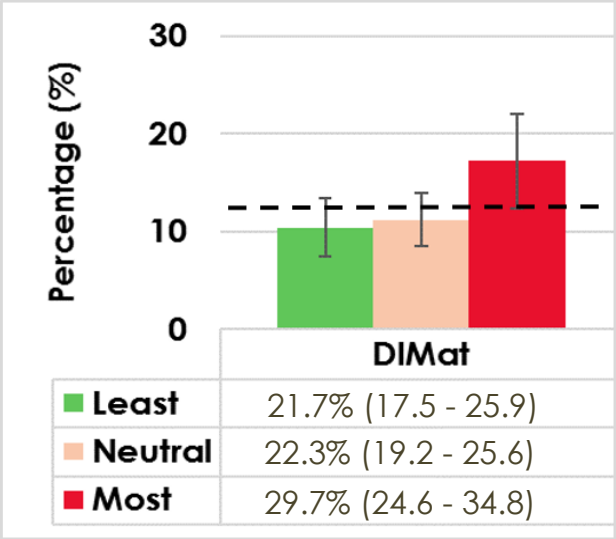
Confidence Intervals

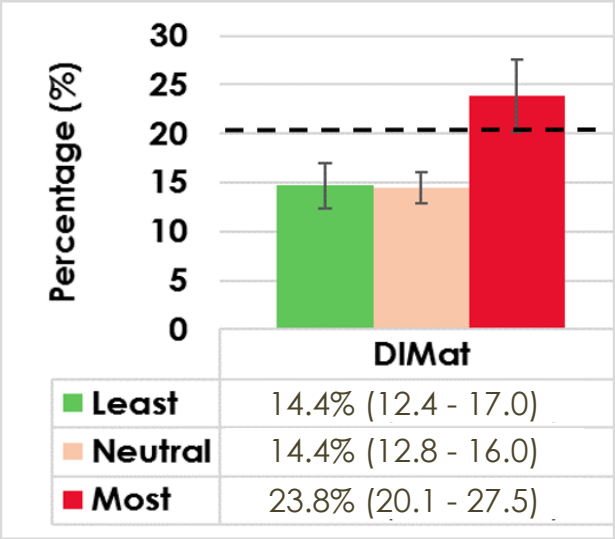
Confidence intervals allow us to determine how the result may change if the analysis was repeated several times among a different sample of people in the same area. It provides us with a "margin of error." For this report, we have used a confidence level of 95%. This means that the upper and lower limits of the confidence interval tell us the range of our estimate for 95% of the possible repetitions. In 5% of these repetitions, the estimate would fall outside of the range.

How to Interpret a Confidence Interval: When comparing data across groups (i.e. area-level deprivation), it is important to consider whether observed differences have occurred by chance, or due to actual differences between groups (in this case, our groups are geographic areas – dissemination areas – with different levels of deprivation). We can use confidence intervals to determine this.

In general, the greater the numerical range of a confidence interval, the more variation there is in the data. Narrower confidence intervals indicate a more precise estimate. When 95% confidence intervals of two population means don't overlap, there will be a statistically significant difference between the means. However, the opposite is not necessarily true as shown in Figure A-1.

Figure A-1: Non-overlapping confidence intervals (right) indicates statistical significance, while overlapping confidence intervals (left) do not necessarily mean the opposite





For example, in this report it is estimated that the prevalence of current cigarette smokers in the most deprived areas is 35%. The confidence interval for this value is 27.4% - 42.5%. If we were to take several more samples of the individuals in the most deprived areas and derive an estimate of the proportion of smokers each time, the values would fall somewhere between 27.4% and 42.5% about 95% of the time (and 5% of the time, they would be outside of this range). For this reason, if the confidence intervals for the two groups we are comparing overlap, we cannot say that the difference between the two is statistically significant, since depending on the sample drawn, the same estimate could very well be drawn for each.

Confidence intervals for proportions are found using the formula below ($\hat{p}$ is the point estimate, n is the sample size, and 1.96 is the value used to calculate a 95% confidence interval):

$$\hat{p} \pm 1.96 * \sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$$

Relative Risk

Relative risk indicates the number of times higher or lower the risk for a health outcome is within the "exposed" group compared to the risk within the "unexposed" group. In the context of this report, level of deprivation is considered the "exposure."

For each health indicator, we have included a relative risk that compares the "most" deprived to the "least" deprived areas, ignoring the neutral category. These relative risks are calculated using the following formula:

$$RR = \frac{Rate\ for\ most\ deprived}{Rate\ for\ least\ deprived}$$

A different relative risk is calculated for use in the calculation of the Population Attributable Fraction (next section). In order to provide a more accurate picture of health at a population level, the relative risk used in the PAF calculation includes the "neutral" category. In this case, residents in the "most" deprived areas are considered to be "exposed" while residents in the "neutral" or "least" deprived areas are considered to be "unexposed." These relative risks are calculated using the following formula:

$$RR = \frac{Rate\ of most\ deprived}{Rate\ of\ neutral\ and\ least\ deprived}$$

Health Opportunity (Population Attributable Fraction)

The measure reported as "Health Opportunity" in this report is referred to in the academic literature as the population attributable fraction (PAF). It is **an estimate of the proportion of a health outcome that would be prevented in the exposed group if the exposure in question was eliminated**, assuming a causal relationship. In this report, the exposure in question is high deprivation. Though each indicator is displayed across social, material, and combined deprivation, we have used combined deprivation in this calculation throughout the report.

The population attributable fraction is calculated as follows:

$$PAF = \frac{P_e(RR-1)}{1+P_e(RR-1)} \times 100\%$$

P_e is the prevalence of the exposure within the study population, and RR is a ratio of rates of illness between the exposed (those living in the most deprived areas) and unexposed (those living in the neutral and least deprived areas).

$$P_e = \frac{Study\ population\ in\ most\ deprived\ areas}{Total\ study\ population}$$

The total number of cases prevented annually is equal to the product of the PAF and the estimated number of "cases" (in this example, smokers) per year in the "exposed" group (individuals residing in the most deprived areas). For multi-year IntelliHealth Ontario data, the average number of cases each year was taken. For data derived from the CCHS, the estimated prevalence of the health indicator of interest was multiplied by the overall population estimate for all RCD residents falling within the "most deprived" category.

$$\#\ cases\ prevented = \frac{PAF}{\#\ cases\ in\ exposed\ group}$$

The graph below shows a comparison between an exposed and non-exposed group for a risk factor (i.e. smoking). There is a higher prevalence of smoking in the exposed group. The light green portion of the exposed bar represents the proportion of the risk factor that is due to the exposure, while the remaining darker green proportion is the "background risk" (or proportion of smoking) in this group that occurs regardless of the presence of the exposure.

This light green section is the proportion of smoking that could be removed if the exposure (in the case of this report, high levels of deprivation) were removed. The dark green section is the proportion of smoking that would remain, as it is not caused by the exposure. Removing high levels of deprivation would not remove all of the smoking among those in the most deprived group, as smoking in this group was not purely caused by high levels of deprivation.

Appendix 5: Supplementary Maps

See below expanded views of Combined Deprivation (**DICmb**) for Arnprior (Figure A-2), Deep River (Figure A-3), Pembroke (Figure A-4), Petawawa (Figure A-5) and Renfrew (Figure A-6).

Figure A-2: Dissemination Areas by Combined Deprivation (DICmb) for Arnprior

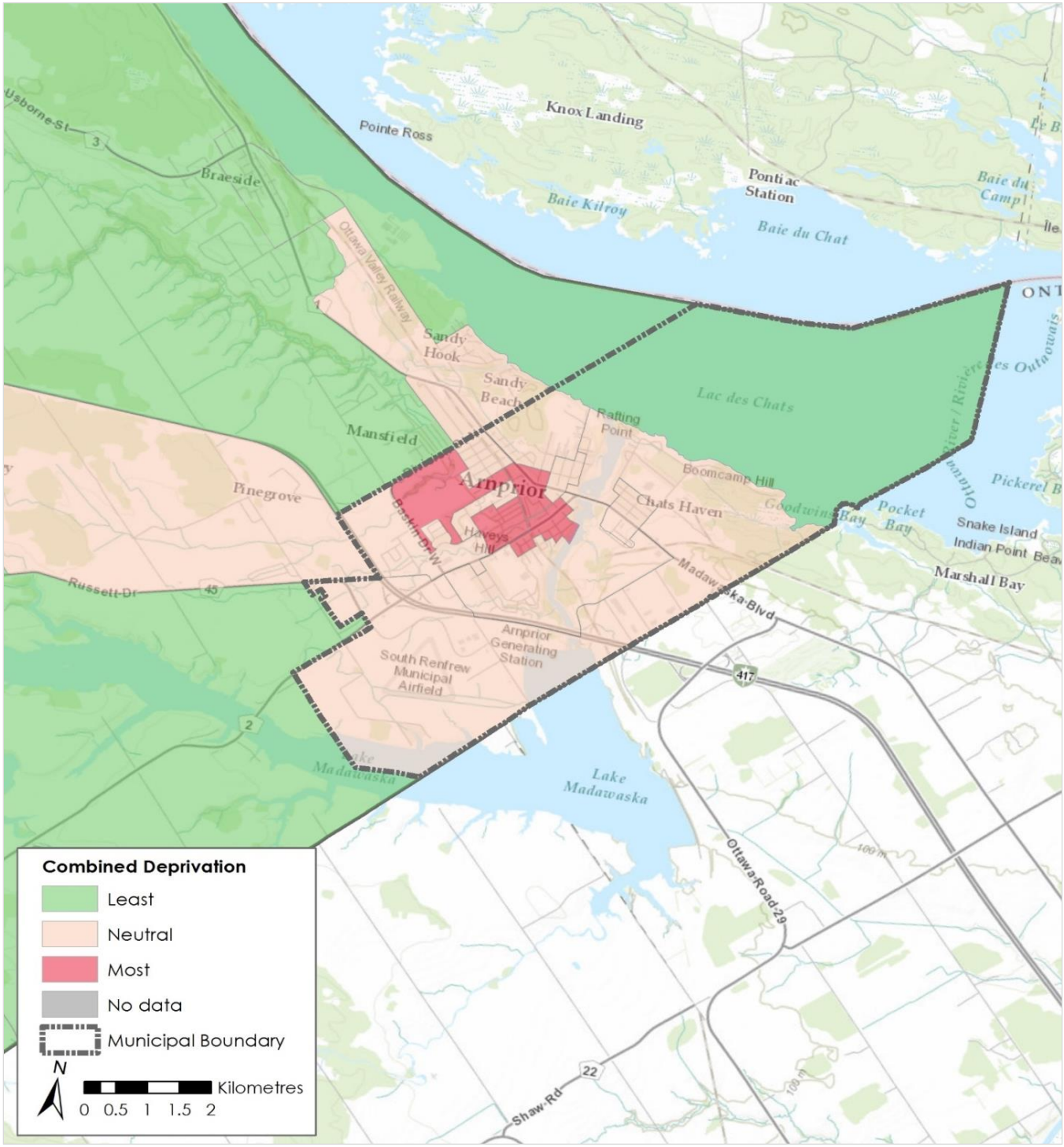


Figure A-3: Dissemination Areas by Combined Deprivation (DICmb) for Deep River

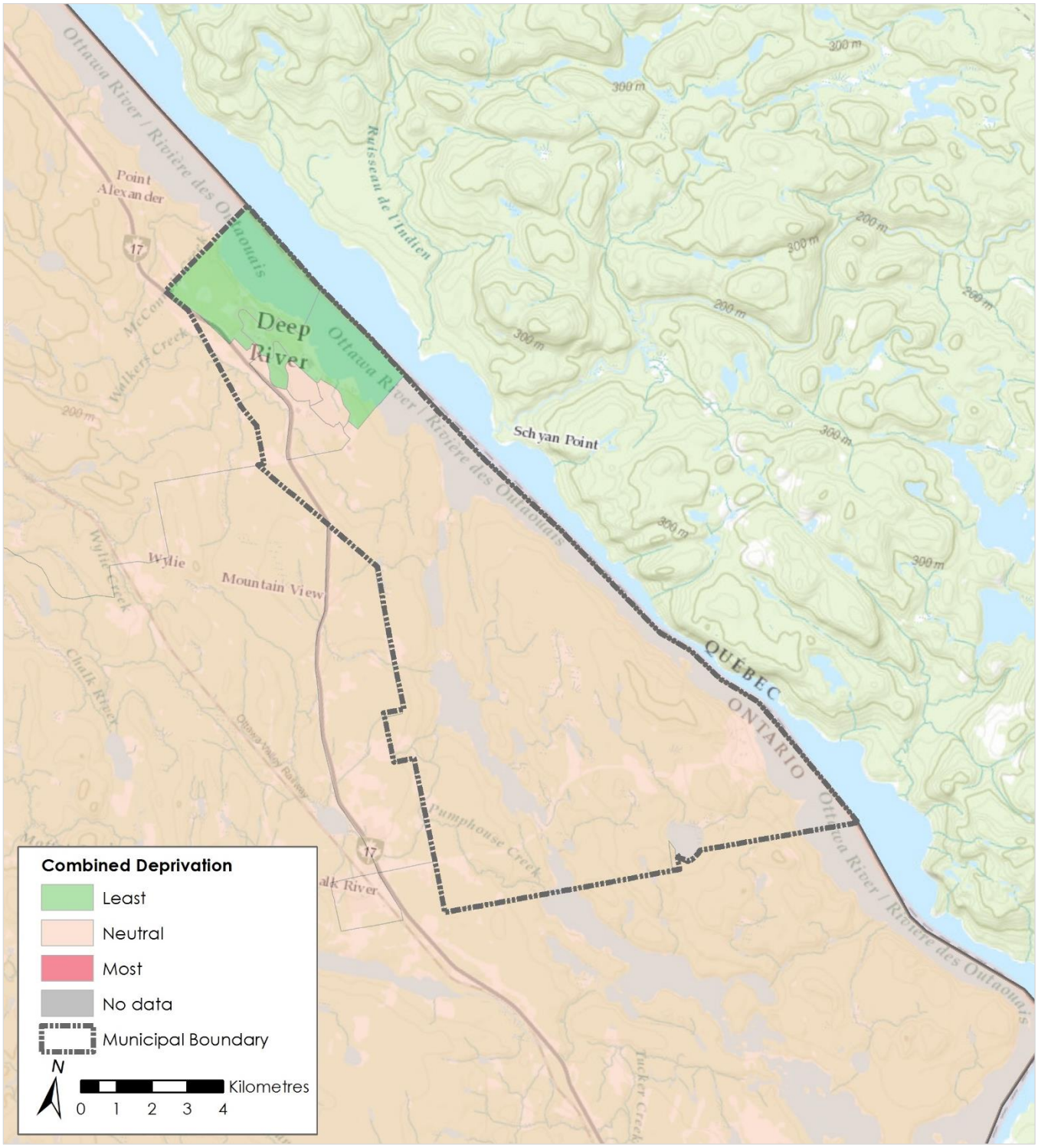


Figure A-4: Dissemination Areas by Combined Deprivation (DICmb) for Pembroke

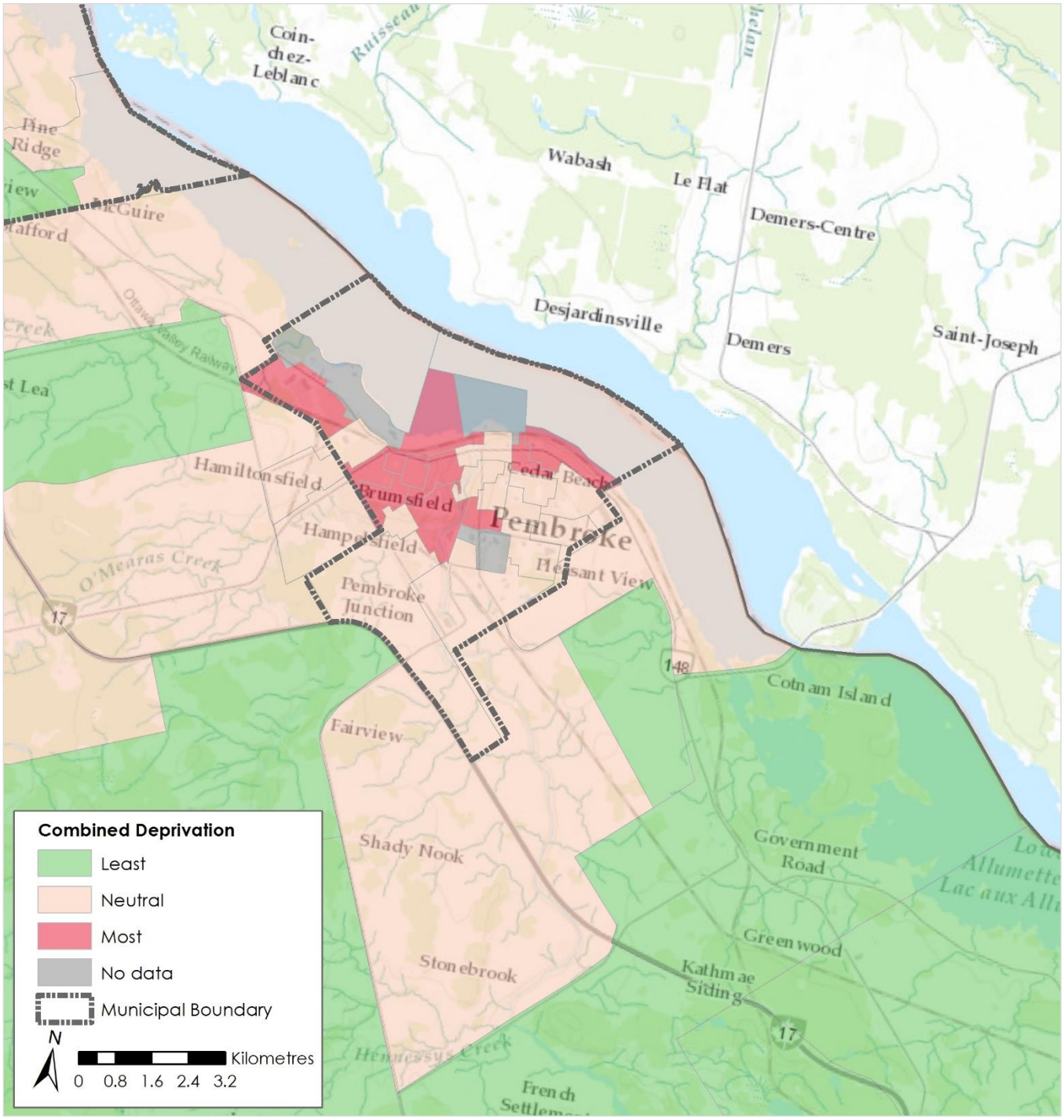


Figure A-5: Dissemination Areas by Combined Deprivation (DICmb) for Petawawa

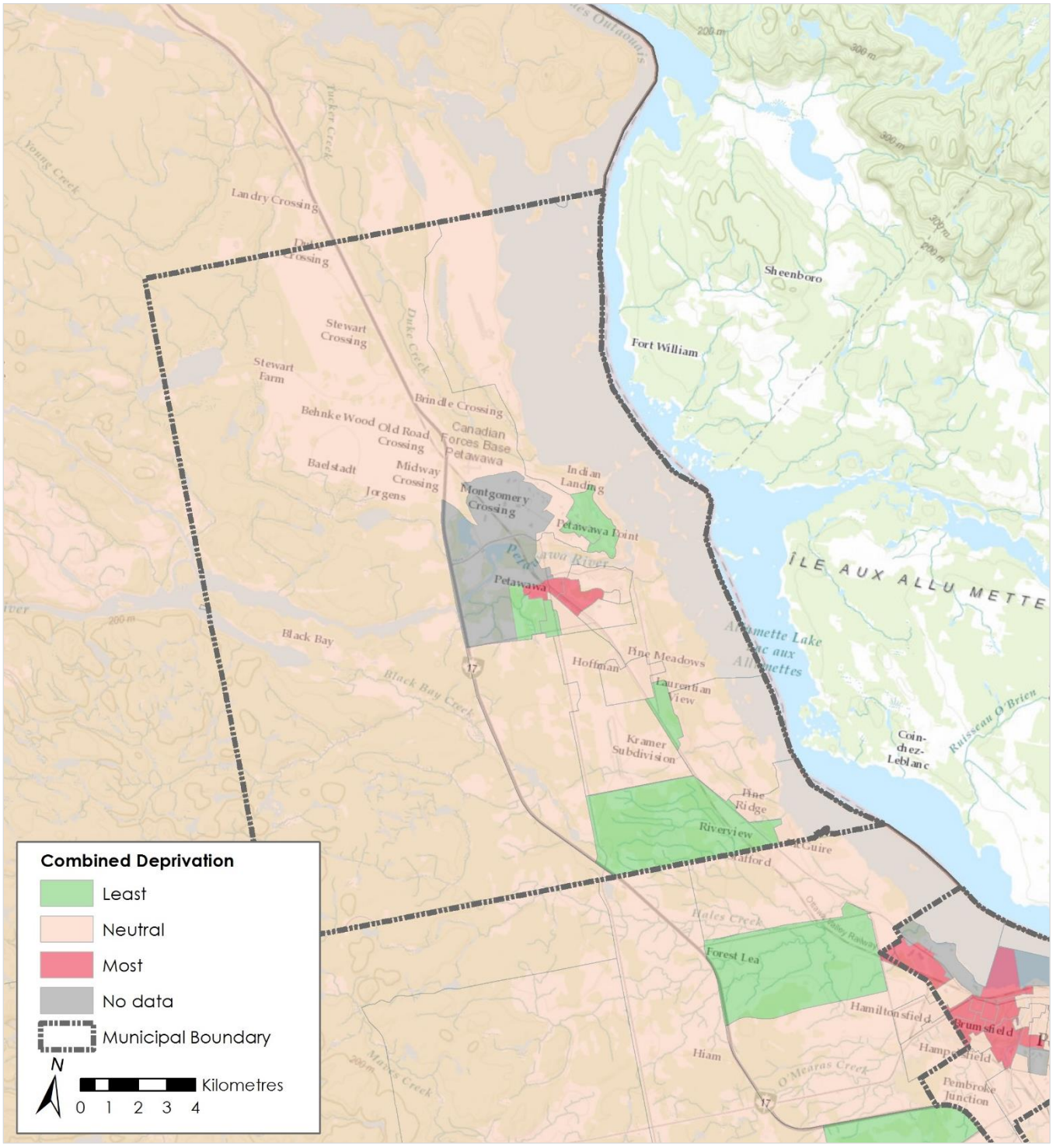


Figure A-6: Dissemination Areas by Combined Deprivation (DICmb) for Renfrew