



# Careful Measures

## An Exploration of the Sex and Gender Dimensions of a Deprivation Index

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# Executive Summary

The connection between health and socio-economic status has been well documented internationally and in Canada. Increasing attention has been paid in Canada in recent years to the potential of deprivation indices to measure disadvantage and its impact on health. Interest in deprivation indices is growing, in part, because they are designed to measure *social* as well as *material* deprivation. Researchers and policymakers in Canada have long understood that well-being is affected by social as well as economic disadvantage, as evidenced by the emergence and evolution of the social determinants of health framework. One such index was developed by Robert Pampalon and his colleagues at L'Institut national de santé publique du Québec (INSPQ) for Quebec and later for Canada. This deprivation index, which is based on the work of Peter Townsend and others, includes six indicators from national Census data.

Although composite indices have been found to be stronger measures of disadvantage than a single measure of either social or material deprivation, one of the limitations in applying deprivation indices is that although some researchers report their findings by sex, most do not analyze the results for gender considerations. This practice continues despite the wealth of evidence demonstrating that women are more likely than men to experience multiple forms of disadvantage and greater health inequity. Furthermore, researchers and policymakers have typically not explored the extent to which individual indicators are gender-sensitive, that is, able to describe the gendered, diversity and equity experiences of men and women.

Sex- and gender-based analysis (SGBA) involves asking new questions of indicators and data: Do women and men (girls and boys) have the same experiences of material and social deprivation and of health (e.g., life expectancy, disease prevalence, morbidity)? How do we account for these similarities or differences in terms of indicator development and structure? This project explored the opportunities for and the limitations of the INSPQ deprivation index to represent the different experiences of men and of women in Canada by conducting a sex- and gender-based analysis of the indicators included in the index and calculating the index by sex for the Census Metropolitan Areas of Vancouver, Winnipeg and Halifax. Our purpose was to examine the gendered dimensions of the indicators included in the index and the potential implications of its application by sex for addressing health disparities.

To set the context for this analysis, in Part I we offer some background on the concept that underlies deprivation indices as well as other concepts and models that have been developed to understand and reduce inequality in socio-economic status and health. By tracing the roots of the concept of deprivation, we are able to better understand the challenge of operationalizing complex aspects of social life using available data. Notably, sex and gender have received relatively little consideration in the development of these ideas.

Part II provides a brief overview of how the concept of deprivation has been translated into quantitative measures and analyses. We briefly look at how women and men have described deprivation in their lives before examining how the concept of deprivation has been operationalized in research so that population-level quantitative data can be used to investigate the relationship between deprivation and health. We see that researchers are faced with having to use existing measures that both relate to what men and women say is meaningful to them and that can be used at a population-level. Three indices developed in Canada are described to understand different ways deprivation has been represented.

In Part III we explore the sex- and gender-based dimensions of each of the six indicators in the INSPQ deprivation index, including how they relate to the underlying assumptions of deprivation. Through a review of the literature, we see that understanding the gendered context and influences of each of the six indicators in the INSPQ deprivation index reveals how the indicators may be measuring different things for males and for females.

Part IV offers a description of our statistical analysis of the deprivation index, in which we replicated the INSPQ principal components analysis for women and men separately using Statistics Canada's 2006 Census of Canada data for Vancouver, Winnipeg and Halifax Census Metropolitan Areas. Our results suggest that the current structure of the deprivation index is not equally applicable to men and women, and that future refinements of the INSPQ deprivation index should explore additional or alternate variables that will reflect differences in deprivation for all segments of the population.

Further explorations of sex and gender differences in health outcomes associated with the INSPQ deprivation index—or some variation of it—and the complexity of reasons for those differences are warranted. If the goal of population health planning is to reduce health disparities by reducing the inequities that create disparity, then it is essential to understand where and how inequities originate. Reducing health disparities, in work such as the development and application of an area-level deprivation index, requires the time and effort of sex- and gender-based analysis.

## Résumé

Le lien qui existe entre la santé et le statut socio-économique a été très bien documenté au Canada et dans de nombreux autres pays. Au cours des dernières années, le potentiel qu'offrent les indices de privation pour mesurer la défavorisation d'une population et son impact sur la santé fait l'objet d'une attention croissante au Canada. L'intérêt que suscitent les indices de privation croît en partie à cause du fait qu'ils sont conçus pour mesurer la privation *sociale* aussi bien que la privation *matérielle*. Le monde de la recherche et les décideurs canadiens comprennent depuis longtemps qu'un désavantage social aussi bien qu'économique influe sur le bien-être d'une personne, comme le démontre de façon probante l'émergence et l'évolution du cadre de travail axé sur les déterminants sociaux de la santé. L'un de ces indices a été élaboré par Robert Pampalon et ses collègues, de l'Institut national de santé publique du Québec (INSPQ), à l'intention du Québec, puis du Canada. Cet indice de défavorisation, fondé sur le travail de Peter Townsend et autres, comporte six indicateurs tirés des données du recensement national.

Bien que le recours à des indices composés pour mesurer la défavorisation se révèle plus précis que le recours à un unique indice, soit sociale ou matérielle, l'une des limites liées à l'utilisation de tels indices est le fait que certains effectifs du milieu de la recherche ne procèdent pas à une analyse sexospécifique des résultats de leurs recherches, même si ceux-ci sont ventilés selon le sexe. Cette pratique perdure malgré l'abondance de données probantes démontrant que les femmes sont plus à risque que les hommes d'être défavorisées à plusieurs égards et de vivre des iniquités relativement à la santé. De plus, le milieu de la recherche et les décideurs n'étudient généralement pas l'impact du genre sur les indicateurs individuels, lesquels pourraient décrire les expériences que vivent les hommes et les femmes quant au sexe et au genre, à la diversité et à l'équité.

L'analyse comparative entre les sexes (ACS) exige l'élaboration de nouvelles questions concernant les indicateurs et les données : Les femmes et les hommes (filles et garçons) vivent-ils les mêmes expériences de privation matérielle et sociale et les mêmes expériences relativement à la santé (p. ex. espérance de vie, prévalence de maladies, morbidité)? De quelle façon prenons-nous en compte ces similitudes ou ces différences pour ce qui est de l'élaboration d'indicateurs et leur organisation? Cette étude explore les possibilités et les limites de l'indice de privation de l'INSPQ en ce qui a trait à sa capacité de représenter les diverses expériences des hommes et des femmes au Canada. Elle analyse les indicateurs de

l'index selon les perspectives du genre et du sexe et calcule l'indice selon le sexe à partir de données tirées du recensement pour la région métropolitaine de Vancouver, Winnipeg et Halifax. Notre étude avait pour objectif d'examiner les dimensions sexospécifiques des indicateurs de l'indice et les implications possibles d'une application selon le sexe en vue de traiter la question des disparités en matière de santé.

Pour établir un contexte avant de procéder à l'analyse, la première partie du rapport présente de l'information de fond concernant le concept qui sous-tend les indices de privation, ainsi que d'autres concepts et modèles élaborés pour cerner et réduire les inégalités en matière de statut socio-économique et de santé. En remontant aux racines du concept de privation, nous pouvons mieux comprendre le défi que représente l'opérationnalisation d'aspects complexes de la vie sociale à l'aide de données disponibles. Notamment, les questions de sexe et de genre ont reçu relativement peu d'attention dans l'exploration de ces idées.

La deuxième partie du rapport fait brièvement état de la manière dont le concept de privation a été traduit en termes de mesures quantitatives et d'analyses. Les auteures se penchent succinctement sur les descriptions que livrent les femmes et les hommes de la privation dans leur vie pour ensuite examiner la façon dont le concept de privation a été opérationnalisé en recherche afin que les données quantitatives recueillies au sein de la population puissent être utilisées pour étudier la relation entre la privation et la santé. Selon leur constat, le monde de la recherche est contraint d'utiliser des mesures existantes qui font état de ce que les hommes et les femmes indiquent comme important et qui peuvent être appliquées à l'échelle de la population. Les chercheuses présentent trois indices d'origine canadienne pour cerner diverses représentations de la privation.

La troisième partie du rapport présente les six indicateurs figurant à l'indice de privation de l'INSPQ sous l'angle du sexe et du genre, y compris la façon dont ils se situent par rapport aux hypothèses sous-jacentes concernant la privation. Par la voie d'une analyse documentaire, les auteures constatent que la compréhension du contexte sexospécifique et des influences qu'exercent chacun des six indicateurs de l'indice de privation de l'INSPQ mène à conclure que les aspects mesurés par les indicateurs sont peut-être différents selon le sexe.

La quatrième partie du rapport présente une analyse statistique de l'indice de privation dans le cadre de laquelle les chercheuses ont appliqué les principales composantes d'analyse de l'INSPQ auprès de femmes et d'hommes de façon séparée, en utilisant des données tirées du recensement de 2006 de Statistique

Canada pour les régions métropolitaines de Vancouver, Winnipeg et Halifax. Les résultats obtenus suggèrent que la structure actuelle de l'indice de privation ne peut s'appliquer de la même façon pour les hommes et les femmes, et que de futurs efforts pour améliorer l'indice de privation de l'INSPQ devraient inclure une exploration de variables supplémentaires ou de rechange qui refléteront les différences des diverses tranches de la population pour ce qui est de la privation.

Il y aurait lieu d'explorer davantage les écarts liés au sexe et au genre en ce qui a trait aux résultats sur la santé, en lien avec l'indice de privation de l'INSPQ – ou une variation – ainsi que les raisons complexes qui expliquent ces différences. Si la planification en santé des populations a pour objectif de réduire les disparités en santé en réduisant les iniquités responsables de ces disparités, il est impératif de comprendre la provenance de ces iniquités et la façon dont elles naissent. Afin de réduire les disparités en santé, dans le cadre d'une démarche visant entre autres à élaborer et à mettre en œuvre un indice de privation portant sur une région ou un territoire, il faut consacrer le temps et l'énergie nécessaire pour mener une analyse différenciée selon le sexe.

## Resumen Ejecutivo

La relación entre salud y estatus socio-económico ha sido claramente documentada a nivel internacional y en Canadá. En Canadá, los últimos años la atención se ha enfocado en la promesa de los índices de pobreza para medir situaciones de desventaja y su impacto en la salud. El interés en los índices de pobreza ha crecido, en parte debido a que éstos han sido diseñados para medir pobreza *social* así como pobreza *material*. Los investigadores y planificadores de políticas en Canadá han entendido por mucho tiempo que el bienestar se encuentra influenciado por desventaja sociales tanto como económicas lo cual ha sido demostrado por el surgimiento y la evolución del marco conceptual de los determinantes sociales de salud. Uno de estos índices de pobreza que mide la desigualdad material y social fue desarrollado por Robert Pampalon y sus colegas en L'Institut National de Santé Publique de Québec (INSPQ) para Québec y posteriormente para Canadá. Este índice de la pobreza que está basado en el trabajo de Peter Townsend y de otros, incluye seis indicadores a partir de datos nacionales tomados del Censo.

Aunque los índices compuestos se han considerado como medidas más ventajosas para medir la pobreza, que las medidas simples de pobreza social o material, una de las limitaciones para aplicar el índice de desigualdad material y social es que aunque algunos investigadores informan sus conclusiones utilizando la variable sexo, cuando la mayoría, no considera los resultados en un análisis basado en género. Esta práctica continúa a pesar de la amplia evidencia que demuestra que es más probable que las mujeres padecen mayores y múltiples formas de desventaja y desigualdad en salud que los hombres. Además, los investigadores y planificadores de políticas típicamente exploran hasta dónde los indicadores individuales son sensibles al tema de género, lo cual implica la capacidad de describir género, diversidad y experiencias de equidad de hombres y mujeres.

El análisis de género y sexo implica hacer nuevas preguntas a los indicadores y datos: ¿Tienen las mujeres y los hombres (niñas y niños) las mismas experiencias de pobreza material y social y de la salud (por ejemplo, esperanza de vida, prevalencia de enfermedad, y morbilidad)? ¿Cómo justificamos estas similitudes o diferencias en términos de desarrollo de indicadores y su construcción? Este proyecto exploró las oportunidades y las limitaciones del índice de pobreza que mide la desigualdad material y social del INSPQ para representar las experiencias diferenciales entre hombres y mujeres en Canadá. Realizamos un análisis de sexo y género de los indicadores incluidos en el índice utilizando la variable sexo en los datos del Censo para las Áreas Metropolitanas de Vancouver, Winnipeg y Halifax. Nuestro propósito fue examinar las dimensiones de género de los indicadores

incluidos en el índice y las posibles implicaciones de esta aplicación para tratar las disparidades de salud por sexo.

Para establecer el contexto de este análisis, en Parte I ofrecemos antecedentes del concepto que subyace en los índices de pobreza así como otros conceptos y modelos que han sido desarrollados para entender y reducir la desigualdad socioeconómica y de la salud. Al buscar las raíces del concepto de pobreza, podemos entender mejor el desafío de operacionalizar aspectos complejos de la vida social utilizando la información disponible. En particular, sexo y género han recibido relativamente consideración limitada en el desarrollo de estas ideas.

En Parte II proporcionamos una perspectiva general de cómo el concepto de pobreza ha sido traducido en medidas cuantitativas y de análisis. Describimos brevemente cómo mujeres y hombres entienden o definen la pobreza en sus vidas antes de estudiar cómo el concepto de pobreza ha sido operacionalizado en la investigación a nivel poblacional usando información cuantitativa para investigar la relación entre pobreza y salud. Vemos que investigadores se encuentran utilizando medidas existentes que se relacionan a lo que hombres y mujeres dicen es significativo para ellos y que pueden ser utilizadas a nivel poblacional. Aquí describimos tres índices desarrollados en Canadá para entender las diferentes maneras en que la pobreza ha sido representada.

En la Parte III exploramos las dimensiones de sexo y género en cada uno de los seis indicadores del índice de pobreza que mide la desigualdad material y social del INSPQ, inclusive cómo se relacionan los supuestos o preconcepciones acerca de la pobreza. A través de una reseña de la literatura observamos el entendimiento del rol de género en contexto y las influencias en cada uno de los seis indicadores en el índice de pobreza que mide la desigualdad material y social del INSPQ revela cómo los indicadores pueden estar midiendo cosas diferentes para hombres y para mujeres.

La Parte IV ofrece una descripción de nuestro análisis estadístico del índice de pobreza que mide la desigualdad material y social, en el que repetimos el INSPQ y sus componentes principales de análisis para mujeres y hombres utilizando separadamente datos de Estadística del Censo Canadá 2006 de las Áreas Metropolitanas de Vancouver, Winnipeg y Halifax. Nuestros resultados sugieren que la estructura actual del índice de pobreza no es igualmente aplicable a hombres y mujeres, y que futuros refinamientos del índice de pobreza del INSPQ deberían explorar variables adicionales o alternativas que puedan reflejar diferencias en pobreza para todos los segmentos de la población.

Futuras investigaciones en relación a las diferencias de sexo y género en relación a los resultados de salud asociados con el índice de pobreza que mide la desigualdad material y social del INSPQ— o algunas variaciones de este — así como la complejidad de razones de esas diferencias se necesitan. Si el objetivo de planificación de salud de población es reducir disparidades de salud reduciendo la inequidad que crean disparidad, entonces es esencial comprender dónde y cómo estas inequidades se originan. Reducir las disparidades de salud, en trabajo tal que el desarrollo y uso en un índice de pobreza de área-nivel requiere tiempo y esfuerzo de análisis de sexo y género.

# Introduction

**M. J. Haworth-Brockman**

Canada is a developed country with publicly funded universal health care. Although this means that most people receive the care they need (1), there are still distinct health disparities within the population, with some sub-populations having considerably poorer health than others. There is concern among policymakers and practitioners to reduce such health disparities and to improve health status and outcomes by applying economic and other resources where they will make the most difference at structural and political levels, rather than focusing alone on individual behaviours (2). That is, there is a desire to reduce health inequities and improve health for all.

The connection between health and socio-economic status has been well documented internationally (3-5) and in Canada (6,7). Within a population, as socio-economic status increases, health status improves; and the opposite is also true –that health status declines as socio-economic status decreases, creating a gradient across the population itself in both cases. This relationship has been demonstrated when socio-economic status is defined by income level (6,8), as well as by level of education (8,9). In Britain, researchers have similarly demonstrated that men with better social standing in terms of their employment have better health than their colleagues in lower job positions (10-12). Researchers and policy advisors who are familiar with this largely consistent connection between social and economic status and health, have been working over the past 15 years or more to establish ways that this knowledge can be applied to policies and programs that will improve health status and health outcomes.

As Susan Phillips noted, “The concept of a single causative agent is...appealing because embedded within it is the prospect of a resolution for the disease outcome via eradication or immobilization of that agent” (2). So it is with health determinants: debate about what is most important and what is the best way to measure disadvantage is an on-going part of the policy and research discussions. Some argue that *absolute* levels of income (creating a threshold of poverty) represent the best measure of disadvantage while others contend that it is more appropriate to examine *relative* differences between individuals and sub-populations related to income or other status-conferring factors such as home ownership, employment, job satisfaction, education, and so on (13).

At the same time, there are persistent questions about what constitutes disadvantage, how much disparity endangers health, and how particular measures (or indicators) can be used to inform health policy. Composite indices derived from several indicators have been developed and tested in a number of countries for their possible effectiveness in answering these questions (13-20). These deprivation indices use a number of population-level indicators to produce a single deprivation score for small geographic areas. Using administration data to look at the characteristics and health of a population can be an inexpensive research method, compared with surveying area residents directly. Deprivation indices then can potentially quantify how different factors contribute to socio-economic status individually, how in combination they relate to health status and health outcomes, and how the results can be used in health planning (13,19,21,22).

In recent years, increasing attention in Canada has been paid to the potential of deprivation indices to measure disadvantage and its impact on health. One such index was developed by Robert Pampalon and his colleagues at L'Institut national de santé publique du Québec (INSPQ) for Quebec (21) and later for Canada (23). This deprivation index, which is based on the work of Peter Townsend (24) and others (25,26), includes six indicators from Census data (see Box). The pan-Canadian version of the index has been used by the Canadian Population Health Initiative of the Canadian Institute for Health Information (CIHI) to compare gradients in health status for 15 Canadian urban areas (27).

Interest in deprivation indices is growing, in part, because they are designed to measure *social* as well as *material* deprivation. Researchers and policymakers in Canada have long understood that well-being is affected by social as well as economic disadvantage, as evidenced by the emergence and evolution of the social determinants of health framework (28,29). However, most studies of disadvantage have tended to focus on economic dimensions (30) and while it has been relatively easy to measure material factors such as education or low income, and to track their association with health, there has not been consistent attention paid to measuring the social dimensions of deprivation and to assessing

#### **Indicators in the INSPQ Deprivation Index:**

**Education** - proportion of individuals aged 15 + years with no high school diploma

**Employment** - proportion of individuals aged 15+ years who are employed

**Income** - average personal income for individuals aged 15+ years

**Living alone** - proportion of individuals aged 15+ years living alone

**S/D/W** - proportion of individuals aged 15+ years who are separated, divorced or widowed

**Lone parent** – proportion of lone parent families

their influence on health. Deprivation indices are intended to be one potential solution to this dilemma. Several indices have been developed in Canada (30-33), but currently the INSPQ deprivation index is attracting some attention and it is the only one to have been tested or applied in a national-scale study (13,30,34,35).

Although composite indices have been found to be stronger measures of disadvantage than a single measure of either social or material deprivation (31,36), one of the limitations in applying deprivation indices is that while some researchers report their findings by sex (17,37-39), most do not analyze the results for gender considerations. This is despite the wealth of evidence demonstrating that women are more likely than men to experience multiple forms of disadvantage and greater health inequity (40,41), and that disadvantaged men will likely die sooner than women who are disadvantaged or other men (2,40,41). Gender<sup>1</sup> has significant implications for both socio-economic status and for health. For example, women in Canada have lower average incomes than men (42) and earn, on average, less than their male counterparts performing the same jobs (43). Women's domestic responsibilities, including caring for children and other dependants, frequently lead to interruptions in earnings that affect their income immediately as well as when they are older (44).<sup>2</sup> Not all men and all women are the same however. Aboriginal women and women with disabilities are more likely to live in poor housing and have very low incomes, and their health is more likely to suffer as a result than other men and women (45). Men with physical disabilities are also much more likely to be unemployed or underemployed than their same-age counterparts who do not live with a disability (46). According to other studies, women and men who live in rural Canada may have shorter life expectancies than those who live in the cities (47).

Given these known differences in the economic and social situations between and among women and men, it is reasonable to posit that there should be differences in deprivation index scores for women and men that are based on gendered influences. While the studies described above found some differences in deprivation and health for women and men, they have not explored the gendered implications and influences that may be creating the differences. Furthermore, researchers and policymakers have typically not explored the extent to which

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<sup>1</sup> "Gender describes those characteristics of women and men that are socially constructed, while sex refers to those which are biologically determined." (50). See the text box on the next page for a fuller definition.

<sup>2</sup> These gender differences are described more fully in subsequent sections of this document.

individual indicators are gender-sensitive, that is, able to describe the diverse, gendered and equity experiences of men and women (4).

Pampalon and colleagues at the INSPQ compared deprivation index scores for individuals and populations and noted that there were significant differences between individual and population-level versions of the index (48). They found that women and men did have different scores and that area-based measures may not capture deprivation as well for women as for men. The authors noted that further exploration of sex differences is warranted (48). As the goal of applying a deprivation index to health planning is to design interventions that will reduce health disparities in a population, it is important to understand how well the index represents deprivation among the populations to which it is applied.

Sex- and gender-based analysis (SGBA) involves asking new questions of the indicators and the data: Do women and men (girls and boys) have the same experiences of material and social deprivation and of health (e.g., life expectancy, disease prevalence, morbidity)? How do we account for these similarities or differences in terms of indicator development and structure? For example, does living alone serve as a useful and appropriate indicator of deprivation for women as opposed to men? Does employment provide the same benefits to men as to women? As the WHO and other organizations have demonstrated, integrating sex and gender analysis into programming and policy development can have a positive influence on many dimensions of health, including improved reproductive health outcomes, decreased partner violence, increased education for women, and increased self-rated health for women (41,49).

We decided to explore the sex and gendered dimensions of the INSPQ deprivation index for three reasons:

### **Sex- and Gender-Based Analysis**

Clow et al. explain SGBA in terms of four core concepts: 1) sex, 2) gender, 3) diversity and 4) equity (50). Sex describes the physical and physiological make-up of a human body. Most, but not all, people are chromosomally either male or female. Sex characteristics from the cellular to the organic level can influence the mechanisms of health and disease response (51). Gender describes what it means to *be* male or *be* female in a society, the imposed and adopted patterns of social behaviour norms, power and relationships. Many people do not identify with either masculine or feminine characteristics, and others may identify somewhere along a continuum of both (52). SGBA acknowledges that not only are there differences and similarities *between* women and men, but also *among* women and men, that there is a *diversity of* lived experiences and circumstances. Lastly, the intent of SGBA is to identify where *equity, fairness, in resources and opportunities* can lead to fewer health disparities (142).

- 1) The index has been in use for a number of years. It has been well tested and there are publications and resources related to the deprivation index that can be easily retrieved;
- 2) The index uses Census data and can therefore be calculated and used across most of Canada; and
- 3) The index could be replicated and tested by sex for this study.

As noted, the INSPQ deprivation index has six indicators which were selected to represent the social and material dimensions of deprivation as conceived by Townsend<sup>3</sup>. The indicators have known links to health, have been previously used as geographic proxies (that is, to represent demographic characteristics for a population in a defined geographic area), and are consistently available at the smallest Census level (23). Material deprivation in this index is represented by education level (persons without a high school certificate), employment and personal pretax income. Social deprivation is represented by living alone, marital status (being separated, divorced or widowed), and single parent families.

This project explored the opportunities and the limitations for the INSPQ deprivation index to represent the different experiences of men and of women in Canada by conducting a sex- and gender-based analysis of the indicators included in the index and calculating the index by sex for the Census Metropolitan Areas of Vancouver, Winnipeg and Halifax. Our purpose was to examine the gendered dimensions of the indicators included in the index and the potential implications of its application by sex to address health disparities. Our guiding research questions were:

- Are there sex and gender differences for the indicators used in the INSPQ deprivation index and if there are, do any differences have implications for the utility of the deprivation index to reduce health disparities?
- What would a gender-based analysis reveal about the indicators used in this deprivation index?
- What are the resulting implications for the application of the deprivation index in health planning?

The intent of the research was to examine how well this deprivation index reflects deprivation for women and men separately, and together.

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<sup>3</sup> Townsend's theory of deprivation is explained in Part I.

Although much of the discussion and analysis in this document could apply to cities across Canada, we focused our index calculations on Vancouver, Winnipeg and Halifax because of our familiarity with the very different material, social and gendered dimensions of deprivation in the three cities. In future research we could expand our findings to test the index by sex in other cities and apply the sex-specific index scores to health outcomes using administrative or survey health data.

This document is divided into five parts. Part I provides background on the concept that underlies deprivation indices as well as other concepts and models that have been developed to understand and reduce inequality in socio-economic status and health. It also examines the extent to which sex and gender have been considered in the development of these ideas. Part II provides a brief overview of how the concept of deprivation has been translated into quantitative measures and analyses. In Part III we explore the sex- and gender-based dimensions of each of the six indicators in the INSPQ deprivation index, including how they relate to the underlying assumptions and objectives about deprivation. Part IV is a description of our statistical analysis of the deprivation index, in which we replicated the INSPQ principal components analysis for women and men separately using Statistics Canada's 2006 Census of Canada data for Vancouver, Winnipeg and Halifax Census Metropolitan Areas. Finally in Part V, we discuss how the findings from our investigation can inform future use of the deprivation index for health planning and subsequent research on sex, gender, deprivation and health.

## Part I

# Theories and Constructs of Disadvantage: Where are Sex and Gender?

**B. Clow, M. J. Haworth-Brockman, A. Papan, S. Chasey**

Deprivation indices are developed to reflect concepts of relative disadvantage. While growing enthusiasm for deprivation indices in Canada reflects a genuine interest in the best way to measure and quantify the multiple influences and dimensions of disadvantage on health, it is important to be aware of the meanings attached to the term “deprivation”. The way in which the concept is defined and used frames the analysis of problems, as well as any remedies that might be devised.

As we learned more about deprivation indices and their history, it became apparent that the term “deprivation” was inconsistently defined in the literature. Some researchers concede that their concepts of deprivation (however defined) are constrained by the indicators and data available to them at the point of developing a composite index (14,37). Part II provides some exploration of these limitations in administrative and health data. However, we think it is valuable to understand the theory behind the application, what is meant by deprivation, before continuing to investigate how a particular index reflects the concept, not to mention the usefulness of the index in measuring health outcomes. We decided to review how researchers write about deprivation as the basis of investigations into its association with poor health. We wondered as well if other frameworks overlap with the concept of deprivation or have greater explanatory power, particularly with respect to the roles of sex and gender in creating or perpetuating health disparities.

The purpose of this section is to contribute to discussions about deprivation indices and health by assessing the extent to which concepts of poverty, social determinants of health, social and economic inclusion and exclusion, capability and deprivation relate to each other, and how well each includes or allows for attention to the role of sex and gender. Our analysis of these concepts sheds light on the strengths and limitations of the deprivation approach to addressing the relationship between social and material disadvantage and health. We found that while there are important differences among these concepts, there is some overlap. Moreover, ensuring that sex and gender are included in discussions of health disparities is a challenge regardless of which concept is being used.

## Poverty

At its most basic, poverty is defined as the condition of having insufficient economic resources. People are poor when they cannot afford food, clothing, shelter, medicine and other necessities of life. According to Amartya Sen, “the characterization of poverty as simply shortage of income ... is, of course, very ancient and still fairly common in the established literature on deprivation and destitution” (53). Poverty is most frequently described in health literature in terms of low income. In other words, if lack of money is seen as the cause of suffering then the solution is more money, or money that is more fairly distributed. Given this view, some social justice movements and international campaigns have focused on the re-distribution of wealth as a means to end poverty around the world (54,55).

Awareness of the effects of poverty on health also has a lengthy history (56,57). According to Deaton, the gradient of income and health was first “scientifically documented” by René Villermé in Paris during the 1820s (58). The British government also recognized “the relationship between disease, dirt and destitution” in the 1830s, and responded with public health measures designed to improve work and living environments, which were most deplorable in the poorest communities and neighbourhoods (59). Daly credits Seebhom Rowntree with “having originated the scientific study of poverty” at the turn of the 20<sup>th</sup> century (60). Early efforts to address the health consequences of poverty were driven at least as much by political economy as by social justice. As Brown and Fee observed, “Sanitary measures were needed on the grounds of economy as well as humanity” (59). Gradually other reforms that were based more on citizenship and human rights emerged, including – in some parts of the world – the creation of social welfare and publicly-funded health care systems (57,61). Establishing a link between poverty and health was a challenge taken up by researchers, activists and policymakers. According to Canning and Bloom, “The positive correlation between health and income per capita is one of the best-known relationships in international development” (62).

Despite the lengthy history of work in the area of poverty and health, researchers and policymakers have demonstrated a limited appreciation that poverty could affect and be experienced differently by women and men, and thus potentially also affect their health in different ways. Towards the end of the 1970s, Pearce coined the phrase “feminization of poverty” to draw attention to the fact that the burden of poverty tends to fall more heavily on women’s shoulders than on men’s (60,63). According to Daly, the earliest work on women and poverty though, consisted

mainly of “‘adding women on’ rather than developing and applying a systematic framework for and analysis of the gendered nature of poverty” (60). In other words, researchers used existing definitions of, and tools for, measuring poverty, but focused their attention on specific sub-populations of women, notably women living alone, elderly women, and women raising children on their own: “In mainstream poverty research, if women are considered at all it tends to be in terms of what proportion of female-headed households falls below a poverty-line” (60).

Through the 1980s and 1990s a feminist critique of the concept of poverty emerged. Researchers pointed out that defining poverty as low income and measuring low income at the level of the household was founded on two assumptions: first, that “nobody in households that are above the poverty line can be counted as poor”; and second that, “all are equally poor in poor households” (60). Lesley Doyal and Sylvia Chant, among others, observed that research and policy have neglected the nature of women’s poverty, that is, discussions of women’s poverty do not adequately describe its gendered roots. These include a persistent gender gap in wage earnings (44,64,65), unequal power and decision-making about income use in a household and in a community (66), and gender-based violence, which can keep women dependant in a home and unable to leave, or conversely which can force women to flee a household and reside elsewhere without dependable income and resources (66,67). Women’s greater domestic responsibilities also have to be taken into account; the concept of time poverty has been used to get at the fundamentally different ways that women and men cope with low income (66). As Ruspini observed, “Women go without more often than men” (68). Women’s poverty is not only different than men’s poverty, but it is often either underestimated, rendered invisible by conventional definitions and measures, or fundamentally misunderstood (60,69).

Well into the 20<sup>th</sup> century, research on health and income did not necessarily even include women. For example, the Whitehall study, a landmark investigation of health and employment class (which included income) in the United Kingdom during the 1960s and 1970s, was conducted entirely with male British civil servants (70). The second installment of the Whitehall study was undertaken with the express purpose of redressing the absence of women in the original research, but it was not initiated until 20 years later (12). Even as researchers began to include women in studies of poverty and health, they did not necessarily disaggregate data by sex, report on differences between women and men, or consider the gender dimensions of poverty in the analyses. Nevertheless, new research did begin to document the effects of poverty and low income on women,

from self-rated health, to cervical cancer mortality, to the inability to genuinely “choose” a healthy lifestyle (eating well or getting recreational exercise) (67).

Although researchers in the area of women and poverty have contributed to a growing recognition that low income is an important dimension of health disparities, it is still the case that single mothers are often the only representation of women with low income, without critical assessment of why women are poor and what it means for women to be poor. Many women are disadvantaged not only by income, but by other social, political and other gendered factors. Elderly women, women who are visible minorities, and women who are disabled, for example, experience low income in different ways. Furthermore, SGBA encourages us to not only look at poverty among women, but also among men who can face similar multiple disadvantages while living in poverty. More nuanced concepts that include the causes and outcomes of low income (housing, for example, or employment or education) are needed,<sup>4</sup> including social disadvantages, with a sex- and gender-based analysis. Some of these concepts are explored below.

## **Social and Economic Inclusion and Exclusion**

Against the backdrop of the evolving discourse on poverty, the concept of social and economic inclusion and exclusion emerged<sup>5</sup>. The term “social and economic exclusion” originated in France in the early 1970s in response to major economic restructuring and social transformations that left specific populations at significant social and economic disadvantage (71,72). While the idea of exclusion was initially equated with poverty and unemployment, it rapidly expanded to include social as well as economic disadvantage. At the same time, the idea of inclusion was added to the concept, thereby focusing attention the importance of fostering and enabling participation in society (71-73). Most of the discourse on this concept now refers to both inclusion and exclusion.

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<sup>4</sup> We examine the gender influences of low income on women’s health in more detail in Part III, because income (in this case, pre-tax personal income) is one of the indicators in the INSPQ deprivation index. As noted, however poverty is measured, it is critical to understand its gendered dimensions and how it is differently experienced by women and men and why.

<sup>5</sup> As will be seen, although the arguments around social exclusion and social inclusion were at first separate, the terms are now seen to represent a single concept, called SEI.

According to Sen the idea that people could be socially as well as materially disadvantaged was not new in 1970s Europe, having been discussed since Aristotelian times (74). Yet the language of social and economic inclusion and exclusion sparked interest and gained currency by “forcefully emphasizing – and focusing attention on – the role of relational features in deprivation” (74). In other words, the introduction of these terms helped to elucidate the reality that exclusion and inclusion are both economic and social and only have meaning in relation to the norms and expectations of a particular society, in a particular place, at a particular time (73). For example, low income only becomes poverty when measured against specific standards of wealth. When low income is the norm in a society or community, exclusion, where it occurs, may be more likely to arise from non-material factors. Luxton contends that “the term social exclusion was quickly taken up in policy debates as an alternative, or successor, to the term poverty, ... Social exclusion was considered a more useful concept than poverty because it is multi-dimensional, going beyond financial or material hardship to include a range of social and political relations of inequality that contribute to both material and social deprivation or oppression” (75). Moreover, the concept of social and economic inclusion represented a significant departure from the poverty discourse because it explicated the centrality of power differentials and the importance of systemic discrimination in social and health inequities (76).

During the 1980s and 1990s, interest in social and economic inclusion and exclusion spread throughout Europe and into the United Kingdom and the concept was increasingly incorporated into official policy frameworks (71,77). In 1997, for example, the Blair Labour government formed the Social Exclusion Unit and two years later the Scottish Executive launched the Scottish Social Inclusion Network (71,78). In 2000, leaders of the European Union established the Social Inclusion Process to foster national strategies and policy coordination between member states with the aim of “building a more inclusive Europe” that enjoys “sustained growth, more and better jobs and greater social cohesion” (79). International organizations, including the World Health Organization and the United Nations, also embraced the concept of social and economic inclusion and exclusion, while some non-European countries, including Canada and Australia, took steps to explore and/or integrate this concept into policy and planning (71,73). In Canada, a number of federal government departments, provincial governments and municipalities have used the concept to explore social issues and to guide policy analysis (72,80). Non-government organizations and research institutes also employed the concept as an analytical tool (81-83).

While the concept of social and economic inclusion and exclusion began to reshape the discourse on poverty and disadvantage, initially it did not include attention to or analysis of sex and gender. Even as the concept has become entrenched in policy, planning and population surveillance, particularly in the UK and Australia, more attention has been paid to gathering sex-disaggregated data than to exploring the gendered dimensions of social and economic inclusion and exclusion. Indeed, in the development of indicators for measuring social and economic inclusion and exclusion in the European Union, the terms sex and gender are used interchangeably and incorrectly (that is, not as they are used in SGBA or population health discussions) (84). As a result, surveillance studies have generated evidence about differences between women and men, but little or no analysis of the diverse causes and experiences of social and economic inclusion and exclusion among women and men.

A number of resources have emerged in recent years to help focus the attention of planners and policymakers on the gender dimensions of inclusion and exclusion. For example, a recent partnership in Atlantic Canada, supported by the Public Health Agency of Canada, led to the development of an inclusion lens (85) while the European Union created a gender mainstreaming manual for use by member states (86). The extent to which these resources will influence policy and program development or surveillance, however, remains to be seen.

Despite the growing interest in this concept during the past 20 years, as with other concepts discussed in this section, there is still much debate and confusion about how to define and measure social and economic inclusion and exclusion (73,87,88). Indeed, critics of the social and economic inclusion and exclusion concept have complained that it lacks analytical rigour and has been invoked to explain any and every social and economic problem (74). Nonetheless, the concept represented an important step forward in understanding disadvantage for populations.

## **Social Determinants of Health**

During the 1970s the complementary concept of the social determinants of health began to take shape in the health sector. The roots of the social determinants of health concept are somewhat different than those of poverty and SEI. The discourse about poverty began as a response to observable material disadvantage and its effects on economic and social well-being while the concept of SEI emerged as an alternative explanation of disadvantage that looked beyond income and economic

resources. Neither concept was initially focused on health. In contrast, the social determinants of health framework was explicitly developed in response to the persistent burden of illness disadvantaged people faced and rising costs of health care. In the late 19<sup>th</sup> and early 20<sup>th</sup> centuries, advances in public health and sanitation, as well as innovations in medicine had contributed to improvements in population health, particularly in mortality due to infectious diseases. As the tide of infectious diseases receded, chronic conditions took on greater significance and they were often costly to treat. At the same time, the growth of the welfare state in many countries encouraged citizens to expect or demand publicly-funded health care<sup>6</sup>. Lord William Beveridge, a British academic and social commentator, along with others, began writing about social welfare. Beveridge gradually turned his attention to health improvements that could be achieved through changes to policies and programs that were not part of the health care system (89,90). He argued that health could be improved – and health care costs contained – if more attention was paid to improving housing, education, and other determinants of health. This approach to health and health care funding did not gain much traction until the 1970s, when governments became alarmed by the ever-rising costs of health care. At that time, Canada took a leading role in formalizing the concept of the social determinants of health.

In 1974, a few short years after the introduction of Medicare in Canada, the Canadian government released a report, *A New Perspective on the Health of Canadians* by Marc Lalonde, the federal Minister of Health and Welfare (28). In his seminal report, Lalonde introduced the idea of the “health field”, arguing as Beveridge had done, that good health was not only achieved or hindered by the medical profession and the health care system, but also by individual biology and lifestyle as well as the environments in which people lived and worked. Practitioners, politicians, policymakers, researchers and the public were all encouraged by Lalonde to shift away from the prevailing biomedical approach to assessing, treating and paying for health, to a new understanding of how investing in “hitherto neglected fields”, could lead to more equitable health care delivery and improved health, thus curtailing rising costs (28). Lalonde does make his case with examples

Lalonde’s Health Field Concept was a framework for organizing the “thousands of pieces” that influence health into these areas: HUMAN BIOLOGY, ENVIRONMENT, LIFESTYLE and HEALTH CARE ORGANIZATION (28).

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<sup>6</sup> These policy discussions were prompted in large part by the return of soldiers from World War I who demanded compensation for the sacrifices they had made for their countries (89).

that include health differences for women, however sex and gender – as well as race, ethnicity or culture – were conspicuously absent from his manuscript.

Lalonde's health field concept gradually evolved over the following years to include many more influences on health and well-being, such as early childhood development and literacy (91). According to Raphael, "The term *social determinants of health* appears to have grown out of the search by researchers to identify the specific exposures by which members of different socio-economic groups come to experience varying degrees of health and illness" (91); governments were also interested in developing the concept and working out how to keep health care costs contained while reducing disparities (91,92,93). The 1986 Ottawa Charter for Health Promotion, which resulted from international interest in tackling the social determinants of health, pledges a commitment to health and equity in all sectors; to counteract unhealthy environments, to focus attention on public health, and to "tackle the inequities in health produced by the rules and practices" of society (94). The Charter begins with a statement about the need for equity in health promotion to ensure that people can achieve their greatest potential for health and that "this must apply equally to women and men" (94). Raphael notes that the Charter led to a range of domestic and international documents intended to change policy in areas (from agriculture to transportation) that could lead to improved health (91), although typically without consideration of sex or gender.

As the list of health-determining influences grew, researchers arranged them in various frameworks as a means to facilitate conceptualization and consideration of how the influence of the health determinants could be measured (95)(96). Benoit and Shumka noted, "the goal of [a health determinant framework] is not merely to understand how various factors individually affect health within a population ... [but also] to identify the reasons why there are differences in disease states and health outcomes and how these differences are shaped by individuals' unequal access to key resources" (97). According to Link and Phelan, health determinants can be categorized as fundamental, meso and proximal. At the fundamental level they place money, power, prestige and social connections. Meso level health determinants include public health care, housing and transportation. They place personal risk factors (the focus of interest in early public health) such as overcrowded living conditions, unhealthy diets and exercise at the proximal or micro level (98). The ability for a woman or a man to "choose" a healthy lifestyle is predicated on an equitable distribution of the fundamental determinants, or policies that redress inequities (98).

International work in women’s health led to the inclusion of “gender” as one of the social determinants by the World Health Organization. Health Canada’s official list of determinants also eventually included gender by the late 1990s. Interestingly, as with the SEI concept, the terms sex and gender are often conflated in these lists, with the result that it is difficult to decipher whether the terms denote a focus on biology, on society, or both. At the same time, sex and gender are not on everyone’s list of determinants (Table 1) and furthermore, static framework models cannot depict how the determinants interact with sex and with gender (96,97).

Besides leading to the creation of lists of determinants, the social determinants of health perspective noted that some sub-populations are at

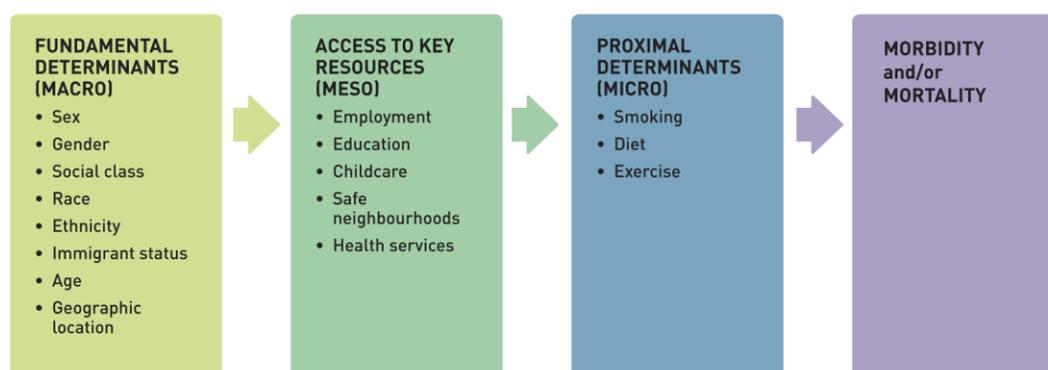
greater risk or are more marginalized than the majority population. That is, the effects of the various determinants were compounded by being a member of a particular sub-population. New lists were developed: low income, disability, immigrants and so on. Women were often one sub-population among the list of the disadvantaged. The irony is that women nearly always were also part of the other named sub-populations.

Internationally, the success of fully incorporating sex and gender in health research and policy has been uneven. The World Health Organization Commission on the Social Determinants of Health did ultimately support a Women and Gender Equity Knowledge Network (99), leading to the inclusion of sex and gender considerations in the final report and specific recommendations (41). Discussions of gender and sex necessarily include a focus on women because in less wealthy and wealthy countries alike, gender inequalities in politics, employment, income, and rights put women and girls at particular disadvantage (97,100,101). Benoit and Shumka noted that as “gender-based inequalities are often based on sex-based differences, sex should remain a primary concern” (97). In 2009, Benoit and Shumka created a new model for

**Table 1.** Three examples of social determinants lists. From Benoit and Shumka (97). Used with permission.

WORLD HEALTH ORGANIZATION	PUBLIC HEALTH AGENCY OF CANADA	DENNIS RAPHAEL
Income and social status	Income and social status	Income and its distribution
Social support networks	Social support networks	Social safety net
Education	Education and literacy	Education
Economic environment	Employment/working conditions	Employment/working conditions
Social environment	Social environments	Social exclusion
Physical environment	Physical environments	Housing
Personal individual characteristics and behaviour	Personal health practices and coping skills	--
--	Healthy child development	Early life
Genetics	Biology and genetic endowment	--
Health services	Health services	Health-care services
Gender	Gender	--
--	Culture	Aboriginal status
--	--	Food security
--	--	Unemployment and employment security

understanding the social determinants of health, in which sex and gender are among the fundamental determinants (Figure 1), on “equal footing” with race, ethnicity, migrant status, geographic location and age (97). For example, healthy lifestyle “choices” such as eating well and quitting smoking may not be truly choices available to women and men who are constrained by the societal inequities where they live.



**Figure 1:** A dynamic gender-inspired health determinants model. From Benoit and Shumka (97), Used with permission.

The social determinants of health concept is an improvement over the concept of poverty because it recognizes that life conditions other than income can hinder or improve health. Like the SEI concept, it serves to focus attention on sources of health disparities and, in doing so, helped to demonstrate that some sub-populations are at greater risk of ill health and are more marginalized than the majority population. In such cases, the effects of the various determinants are compounded by being a member of a particular sub-population. As with the concepts of poverty and SEI however, sex differences and gendered influences are not consistently incorporated into analyses of the social determinants of health.

## Capability

The capability approach was first introduced by Amartya Sen in 1979 in his Tanner Lecture entitled, “*Equality of What?*” (102). While Sen’s work has focused on issues relating to economic development of the Global South, it has been extremely influential globally in country, sector, community and individual-based social and economic policy. His key arguments are that simple measures of Gross National Product are not enough to assess standard of living, and that governments should be measured against the concrete capabilities of their citizens. His thinking revolutionized notions of welfare economics, and in turn, measurements of social

welfare by involving a multi-variate approach to well-being. Ingrid Robeyns summarizes:

*“The capability approach postulates that when making normative evaluations, the focus should be on what people are able to be and do, and not on what they can consume, or on their incomes. The latter are only the means of well-being, whereas evaluations and judgments should focus on those things that matter intrinsically, that is, on a person’s capabilities.” (103).*

Sen criticizes evaluation that focuses exclusively on utilities (happiness), access to resources or income. He critiques how economists identify “utility as a focal variable in theoretical work, but translate this into a focus on income in their applied work” (104). For Sen, “while income generally is an important means to well-being and freedom, it can only serve as a rough proxy for what intrinsically matters, namely people’s capabilities” (102). Instead, his work aims to include information that has been normally excluded in evaluation. He identifies these as *functionings, capabilities, and agency*.

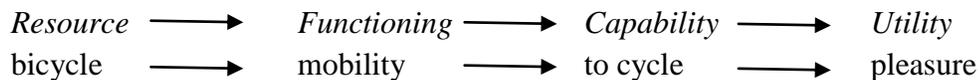
- *Functionings* are the valuable activities and states that make up people’s well-being – such as a healthy body ...having a warm friendship, an educated mind, a good job. Functionings are related to goods and income but describe what a person is able to do or be as a result. When people’s basic need for food (a commodity) is met, they enjoy the functioning of being well-nourished.
- *Capabilities* are the various combinations of functionings (beings and doings) that the person can achieve. They are ‘the substantive freedom [a person] enjoys to lead the kind of life he or she has reason to value.’ Capabilities are a kind of opportunity of freedom... [and] describe the real actual possibilities open to a person.

An example of a bicycle is often used as a way of explaining the relationship between function and capability, Sen wrote:

*“Take a bicycle.... Having a bike gives a person the ability to move about in a certain way that he may not be able to do without the bike. So the transportation characteristic of the bike gives the person the capability of moving in a certain way. That capability may give the person utility or happiness if he seeks such movement or finds it pleasurable. So there is, as*

*it were, a sequence from a commodity (in this case, a bike), to characteristics (in this case, transportation), to capability to function (in this case, the ability to move), to utility (in this case, pleasure from moving).” (105).*

It is illustrated this way (106):



- *Agency* is the ability to pursue goals that one values and has reason to value. In this perspective, people are viewed to be active, creative, and able to act on behalf of their aspirations. The opposite of a person with agency is someone who is forced, oppressed or passive.

The capability approach unites the valuable beings and doings (functionings) and freedom (agency) (107). For Sabine Alkire, Sen’s capability approach “is a moral framework. It suggests that *social arrangements should be primarily evaluated according to the extent of freedom people have to promote or achieve functionings they value*” ((107), emphasis in original).

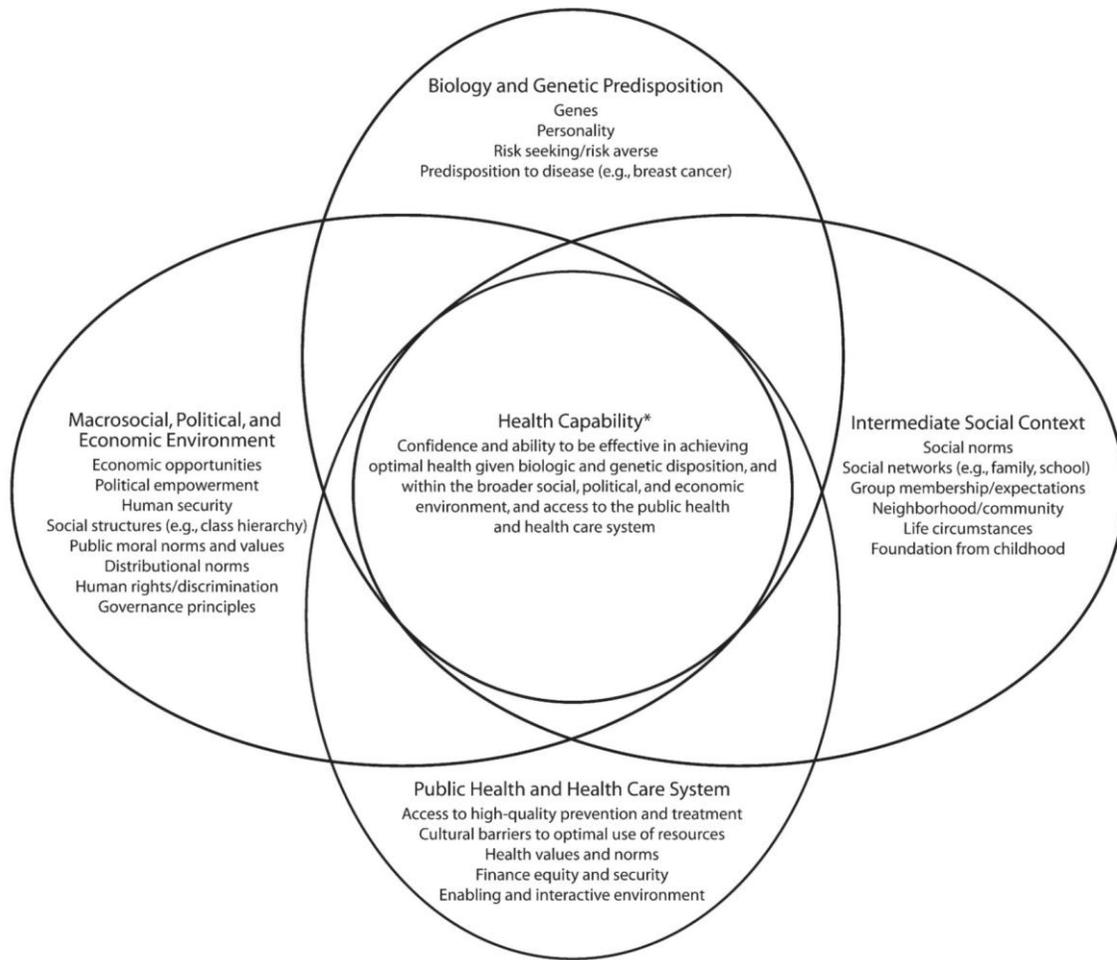
From the beginning of his work on capability, Sen engaged with sex and/or gender dimensions of social and economic well-being, including in “*Equality of What?*” in which he discusses dimensions of ‘equal pay for equal work’ (102). In December 1990, he wrote a controversial article in *The New York Review of Books* entitled “*More Than 100 Million Women Are Missing*” analyzing the mortality impact of gender inequality particularly in Asia. In this article, Sen contends that:

*“The fate of women is quite different in most of Asia and North Africa. In these places the failure to give women medical care similar to what men get and to provide them with comparable food and social services results in fewer women surviving than would be the case if they had equal care.... The result is a lower proportion of women than would be the case if they had equal care—in most of Asia and North Africa, and to a lesser extent Latin America.” (108).*

Moreover, his work has played an important role in identifying the need for sex- and gender-based indicators. In his paper entitled “*Gender and Cooperative Conflicts*” he asserts “... for some problems income and class categories are over-

aggregative and even misleading, and there is a need for gender classification. In fact, the importance of gender as a crucial parameter in social and economic analysis is complementary to, rather than competitive with, the variables of class, ownership, occupations, incomes and family status” (109). In an example, Sen argues that “the systematically inferior position of women inside and outside the household in many societies points to the necessity of treating gender as a force of its own in development analysis” (109). The United Nations Development Programme (UNDP) has used the work of Sen and others on capabilities as the foundation for the Human Development Index (HDI), which has become the most authoritative international source of welfare comparisons between countries. Sen’s influence is also evident in the Gender-related Development Index (GDI) and the Gender Empowerment Measure (GEM), which were first introduced in 1995. In 2010, these measures were succeeded by the Gender Inequality Index (GII), which deals explicitly with the ways women experience disadvantages in terms of reproductive health, empowerment and the labour market. The GII is designed to reveal the extent to which national human development achievements are eroded by gender inequality, and to provide empirical foundations for policy analysis and advocacy efforts (110).

Observations relating to health are used in a variety of case studies and examples in Sen’s work. The capability approach has inherent links to health and poverty research in that capabilities and well-being, and how they are served by and promoted through healthy living, are regularly included. However, as Jennifer Prah Ruger indicates: “health is constitutive of, but different from, well-being or quality of life” (111). While aligned with notions of the determinants of health, the capability approach shifts the discussion one step further by acknowledging agency and for example, the personal satisfaction many smokers associate with smoking, while fully knowing the potentially negative effects on their health. Ruger’s *health capability paradigm* seeks to enable individuals to exercise personal responsibility for their health through health agency (111). She argues, “rather than justifying health, health care, or public health through equality of opportunity, this approach rests on human flourishing as the philosophical justification for enabling all to be healthy. It holds that health functioning and health agency are the ultimate ends of justice, not equality of opportunity” (111). For Ruger, individual and societal factors must be considered to discover interactive influences. As such, she suggests a non-linear model of overlapping circles that “allow for a more nuanced, sequentially interactive, iterative, and multidimensional understanding”, as illustrated in her “Conceptual model of health capability” (Figure 2) (111). We note that neither sex nor gender is included in this depiction.



**Figure 2.** Conceptual model of health capability. From Ruger, J. Health capability: conceptualization and operationalization. *American Journal of Public Health* 2010; 100(1):41-49 (111). Used with permission.

For Ruger the “ability to be healthy” is constructed by both individual (or internal) and societal (or external) constructs (111). She identifies internal factors to health capability as:

*“Health status and health functioning; the ability to acquire accurate health-related knowledge and obtain health-related resources and to use both to prevent the onset and exacerbation of morbidity; the ability to link knowledge of potential health benefits and harms of behaviors and interventions to health outcomes; health-seeking skills, beliefs, and self-efficacy; values of health and health goals; self-governance and self-management to achieve health outcomes ; and, positive expectations about achieving outcomes.” (111)*

At the societal level, Ruger identifies external influences as including:

*“Social norms; social networks and social capital related to health outcomes; decisional power or latitude in familial and social contexts; group influences; material and social circumstances; economic, political and social security; access to and utilization of health-related goods and services; and the extent to which the public health care systems create an environment in which individuals can improve their health.” (111)*

Ruger’s adaptation of Sen’s capability model, and its focus on individual agency is a shift from the social determinants of health model in that it “incorporates external factors into the individual level rather than trying to draw inferences about individual health based on group- or macro-level characteristics (e.g. race or socioeconomic status)” (111). For Ruger this approach is significantly different from the social determinants of health, epidemiological, or health economic literatures, arguing that these other approaches use group-level variables that can lead to “inferential fallacies”, which draw assumptions about groups based on individual-level data and vice versa (111). As noted in the overlapping circles in Figure 2, Ruger’s health capability approach aims to identify “group-level factors that may have individually heterogeneous effects” (111). Unlike Sen’s capability approach which has been adapted to deal explicitly with the ways in which women and girls experience disadvantages (i.e. the GII), it is not clear how cultural dynamics or traditions which do not originate with the individual, for example, are affecting girls and women’s agency. By introducing functionings, capabilities and agency, Sen’s capability approach has played an important role in shifting notions of well-being. Ruger’s health capability approach is one example of how the capability approach has been adapted into health economic literature.

## **Deprivation**

The word “deprivation” conjures up a variety of images, including insufficient rest (sleep deprivation), insufficient stimuli (sensory deprivation), and poverty (material deprivation). The Oxford Dictionary defines deprivation as “a damaging lack of material benefits considered to be basic necessities in a society” (112). According to Sen, the term deprivation has also long been used to signify non-material or social forms of impoverishment. He points out that Adam Smith, writing in the 18<sup>th</sup> century, applied the term deprivation to an “inability to appear in public without shame” (Smith quoted in (53)). In other words, exclusion from social life, from possibilities and opportunities, has been an important dimension of the concept of

deprivation, as it is in the concepts of social and economic inclusion and exclusion (above). The Whitehall studies were among the earliest to document how gradients in social standing (such as class of employment, not just employment income) is associated with similar gradients in morbidity and mortality (11). In 1987, Peter Townsend, a Professor of Social Policy at the University of Bristol, developed the concept more clearly in a seminal article on deprivation (24), a manuscript that is cited by others as their starting framework for subsequent work in the field (32,113,114).

Like the proponents of social determinants of health and SEI, Townsend recognized the need to consider the social as well as the material roots of inequity (24,115). His goals were three-fold: to highlight the social dimensions of disadvantage, which were often missing or not well articulated in standard socio-economic analyses (as seen in the social determinants of health models); to shift attention from the individual to broader social structures (similar to the goals of social and economic inclusion); and to move from the notion of absolute to relative deprivation, as is done in some poverty models.

Townsend noted that deprivation takes a variety of forms, but that there is a common understanding that the term implies a situation that is “unacceptably below some minimum standard. If inequality can be seen as a hill, deprivation is a ravine into which people should not be allowed to fall” (24). He commented that the systematic study of deprivation was still in its infancy in 1987, although some aspects of disadvantage, such as housing, were already well documented for their influence on health. Even here, however, he argued that the effects were not straightforward. Bad housing was usually understood in “material” terms if it were in need of repair, mouldy, or in some other way hazardous to health. Townsend emphasized the need to also examine the “social” aspects of bad housing: “Housing as space to fulfill individual and family and other social potentialities”, he wrote, “is different from housing as a hygienic environment in which to serve food, get rid of waste and protect human bodies from exposures” (24). He described his ideas of social deprivation as a means to generalize “the condition of those who do not or cannot enter ordinary forms of family and other social relationships”, noting that this facet of deprivation was still largely undeveloped, but still distinguished from “material” deprivation (24).

Townsend’s essay included two other critical aspects. One was that some individuals and sub-populations could experience multiple forms of deprivation, while others might only have to cope with a single form of deprivation. That is, while social and economic inclusion and exclusion highlights the importance of an

individual's relationship to his or her context – one may feel disadvantaged in relation to those in the society around – Townsend noted that an individual may be socially disadvantaged despite material advantages, and the reverse may also be true. Furthermore, there may be compounding factors in each category, social or material. Consequently, it may be difficult “to disentangle the relative importance of different forms of deprivation on health” (24).

The second aspect Townsend considered critical was that deprivation is socially structured, and that investigators and policymakers alike had to be alert for inherent racism, ageism and sexism, “The needs of some groups are suppressed in thought and meaning and not simply neglected in fact” (24). However, he noted that it is also critical to separate population descriptors (women, immigrants, the elderly, etc) from the political and social structures that create deprivation. That is, deprivation is not caused by being a member of a particular sub-population, but rather may be experienced by sub-populations because of social and political discrimination. In these two ways Townsend's arguments mirror the concepts of social and economic inclusion and capability.

For both reasons – the nature of deprivation (multiple or simple) and its social structuring – any examination of deprivation requires a more general explanation of context. Townsend elaborated on this analysis, citing examples from his own work in which a series of consultations with community members generated lists of material and social conditions that women and men felt caused them to be deprived (see Box) (24).

Examples of items that London residents cited as making them deprived:

- No shoes for inclement weather;
- No special meal or roast most weeks;
- Subject to one week's termination of employment or less;
- In illness no expected source of help.

See Table 2 in Part II for the complete list of indicators derived by Townsend (24).

Townsend acknowledged that numerical indicators typically used to measure social and material conditions of deprivation at a population level were dependant on existing data which were themselves dependant on prior decisions made for political and other reasons. He advocated for new research to examine combinations of social and material factors in deprivation. The challenge he put to his peers was to explicitly clarify the function of any particular indicators used to measure deprivation (24).

Townsend's thumbnail definition of deprivation is often quoted:

*“The concept has to be distinguished from poverty. People can be said to be deprived if they lack the material standards of diet, clothing, housing, household facilities, working, environmental and locational conditions, and facilities which are ordinarily available in their society, and do not participate in or have access to the forms of employment, occupation, education, recreation and family and social activities and relationships which are commonly experienced or accepted. If they lack or are denied resources to obtain these conditions of life and for this reason are unable to fulfill membership of society they can be said to be in poverty. The first turns on the level of conditions or activities experienced, the second on the incomes and other resources directly available.” (24)*

While this is a compelling quotation, it misses the sophistication and nuances of Townsend's analysis, which included a keen awareness of neglected elements, including sex and gender. Few authors who invoke Townsend's definition pay full attention to the social and political contexts in their work, despite the fact that many appear to have given considerable thought to the reasons they have chosen particular indicators to measure deprivation (17,37-39). In particular, the results of analyses of deprivation and health often do not include any sex-specific results or gender analysis (14,26,114,116-118). Returning to the original manuscript in its entirety can help to reinforce the attention to sex and gender that Townsend himself noted are important to understanding the causes and implications of deprivation.

## **Summary**

As this brief exploration demonstrates, there has been considerable thought about how living conditions affect health and lead to health disparities in populations, as well as how poor living conditions and health can be improved. Furthermore, each of the concepts implies that the strain of disadvantage is as important as the living conditions themselves. Labonte suggests that in some cases there has been some professional jostling about which concept should have primacy for determining how population health research will be undertaken (119).

At the same time, there are some important distinctions between concepts. The social determinants of health approach marked a significant shift in how we think about health disparities, arising from an understanding that comfortable living conditions (better housing, safe work places, more education) allow populations to

move from merely *surviving* in their society to *participating*. Social and economic inclusion and exclusion focuses more attention on structural barriers to health and well-being while capability emphasizes agency and human rights. Social and economic inclusion and exclusion examines structural and political processes which contribute important distal factors to disadvantage for sub-populations, an aspect Benoit and Shumka also noted in their social determinants of health model, as they argue for including gender at the foundational level of health determinants (97). As Navarro has pointed out, the politics behind the social determinants are at least as important in creating disparities in health (120).

Despite the differences among the five concepts discussed here, there is a common understanding that the interaction of health with living conditions and circumstances are context-specific. So, whereas unemployment may be highly important to feeling deprived in one setting, in another place employment that exposes workers to toxins or other hazards may be the cause of poor health (114).

None of the concepts covered here in Part I was initially developed with women in mind, or with any integration of gender considerations, although there was brief mention of women's different health needs in Lalonde's report (28) and in the early documents for health promotion that followed (94). As the concept of gender did not formally take shape until the late 1980s and 1990s, this oversight may be thought to be understandable, but the history of the women's health movement is much older than just the last few decades (50). Additionally, there is a frequent assumption that gender only needs to be considered when women are a focus of interest – so, women and gender are sometimes used interchangeably (40). Furthermore, as Reid et al. point out, by thinking of women's health and gender as “difference”, opportunities to address the social and political constraints on individuals and sub-populations are lost (121). These are the same constraints that the concepts described here are endeavouring to address, but they have not consistently incorporated gender.

## Part II

# Measuring Deprivation: Losing Sight of Sex and Gender

M. J. Haworth-Brockman and H. Isfeld

In Part I we saw that the concept of deprivation arose among other similar paradigms, all of which endeavour to explain and address disadvantage. In the realm of health, the social determinants of health, social and economic inclusion and capability perspectives provide context for population-level and individual-level health status. So too does deprivation. If we use Townsend's 1987 essay as our starting place, deprivation describes the material and social context of how individuals feel they do or do not "measure up" to their neighbours, the disadvantage they feel relative to the society around them. Poverty, meanwhile, has been largely simplified to mean low income.

Context is essential to understanding *how* disadvantage has arisen and *how* it is manifested, as well as some of the reasons *why*. The gendered influences are a critical aspect of this context. As we have seen, they play into the foundational levels of political and social systems that underpin the macro level conditions that lead to disadvantage.

Population health researchers, however, are still faced with a dilemma of how to apply the concept of disadvantage, and in this case deprivation, to population and individual health outcomes in a meaningful way. That is, what are the best ways to measure *what* is happening, *where*, and to *whom*?

In this part we take a brief look at how women and men have described deprivation in their lives, before examining how the concept of deprivation has been operationalized in research so that population-level quantitative data sets can be used to investigate the relationship between deprivation and health. Three indices developed in Canada are described to understand different ways deprivation has been represented. In particular we see that for large cross-sectional or longitudinal studies, the measurement of deprivation is largely determined by existing data sets, and that sex and gender have frequently been neglected in index development and analysis.

## From Personal Descriptions to Population Measurements

In the 1980s, Townsend and his colleagues asked women and men in London, England what made them feel deprived (24). The researchers arrived at a list of 77 indicators that fit under the headings of either material or social deprivation. As Table 2 shows, they range on the material side from weather-appropriate footwear to basic clothing, from a list of home appliances to housing structure; and on the social side from entitlements in the workplace to experiences of harassment in the community, from having any recreational time to a vacation away, as well as citizenry and volunteering.

**Table 2.** Material and Social Indicators of Deprivation Generated by Community Consultation in London, UK (from Townsend 1987 (24))

### Material Deprivation

#### Dietary deprivation

- At least one day in last fortnight with insufficient to eat;
- No fresh meat or fish most days of week (alternative formulation for vegetarians);
- No special meal or roast most weeks;
- No fresh fruit most days;
- Short of food on at least one occasion in last 12 months.

#### Clothing deprivation

- Inadequate footwear for all weather;
- Inadequate protection against heavy rain;
- Inadequate protection against severe cold;
- No dressing gown;
- Fewer than three pairs socks/stockings in good repair;
- Bought second hand clothing in last 12 months.

#### Housing deprivation

- No exclusive use of indoor WC and bath or shower;
- External structural defects;
- Internal structural defects;
- No electricity;
- All rooms not heated winter evenings;
- Housing not free of damp;
- Housing not free of infestation;
- Poor state of internal and/or external paintwork and decoration;
- Poor access to accommodation;
- Overcrowded (fewer rooms – excluding kitchen and bathroom – than persons);
- No spare room for visitor to sleep.

**Deprivation of home facilities:**

- No car;
- No television;
- No radio;
- No washing machine;
- No refrigerator;
- No freezer;
- No electric iron;
- No gas or electric cooker;
- No vacuum cleaner;
- No central heating;
- No telephone;
- Lack of carpeting in main rooms.

**Deprivation of environment**

- No garden;
- Nowhere for children under five to play safely outside;
- Nowhere for children aged five to ten to play safely nearby;
- Industrial air pollution;
- Other forms of air pollution;
- Risk of road accidents around home;
- Problem of noise from traffic, aircraft, building works.

**Deprivation of location**

- No open space (like park) within easy walking distance;
- No recreational facilities for young people or older adults nearby;
- No shops for ordinary household goods within 10 minutes' journey;
- Problem of litter and debris in local streets;
- Doctor's surgery or hospital outpatients' department not within 10 minutes' journey.

**Deprivation at work**

- Poor working environment (polluted air, dust, noise, vibration and high or low temperature);
- Stands or walks about more than three-quarters of the working day;
- Works 'unsocial hours';
- Either poor outdoor amenities of work; or poor indoor amenities at work.

**Social Deprivation****Lack of Rights in Employment**

- Unemployed for two weeks or more during previous 12 months;
- Subject to one week's termination of employment or less;
- No paid holiday;
- No meals paid or subsidised by employer;
- No entitlement to occupational pension;
- Not entitled to full pay in first six months of sickness;
- Worked 50 or more hours previous week.

**Deprivation of family activity**

- Difficulties indoors for child to play;
- Children have not had holiday away from home in the last 12 months;
- Children have not had outing during the last 12 months;
- No days staying with family or friends in previous 12 months;
- Problem of the health of someone in family;
- Has care of disabled or elderly relative.

**Lack of integration into community**

- Being alone and isolated from people;
- Relatively unsafe in surrounding streets;
- Racial harassment;
- Experiences discrimination on grounds of race, sex, age, disability or sexual orientation;
- In illness no expected source of help;
- Not a source of care or help to others inside or outside the home;
- Moved house three or more times in last five years.

**Lack of formal participation in social institutions**

- Did not vote at last election;
- No participation in trade union or staff association, educational courses, sport clubs or associations, or political parties;
- No participation in voluntary service activities.

**Recreational deprivation**

- No holiday away from home in last 12 months;
- Fewer than five hours a week of specified range of leisure activities.

**Educational deprivation**

- Fewer than 10 years' education;
- No formal qualifications from school or subsequent educational courses or apprenticeships.

More than 20 years later, a research team in Ontario surveyed several thousand women and men to ask what deprivation means to them (Table 3) (13). It is not surprising that their list of indicators is considerably different from the one generated in England. Central heating, for instance, is a norm for Canadian homes

and thus is not on this list<sup>7</sup>, but the need for appropriate footwear and other clothing is found on the lists from both sides of the Atlantic.

**Table 3.** The Deprivation List for Ontario, Daily Bread Survey 2009. From Matern et al. (13)

- Do you eat fresh fruit and vegetables every day?
- Are you able to get dental care if needed?
- Do you eat meat, fish or a vegetarian equivalent at least every other day?
- Are you able to replace or repair broken or damaged appliances such as a vacuum or a toaster?
- Do you have appropriate clothes for job interviews?
- Are you able to get around your community, either by having a car or by taking the bus or an equivalent mode of transportation?
- Are you able to have friends or family over for a meal at least once a month?
- Is your house or apartment free of pests, such as cockroaches?
- Are you able to buy some small gifts for family or friends at least once a year?
- Do you have a hobby or leisure activity?

Both these examples used labour-intensive methods to gather information from people, providing important, current and local perspectives on what is meaningful to women and men. But surveys such as these are an expensive research method and difficult to replicate. Population health researchers have to balance what individuals have said makes them feel deprived with what indicator data are available (and relatively inexpensive) for larger population groups that have been demonstrably linked to health, and that can be used for public health and planning.

There are thus two key questions researchers contemplate. The first is what consistent measures are available for a population that is large enough for planning purposes, while representing the original concept? Macro-level population proxy measurements may or may not do justice to individual experience (and gender-distinct circumstances). The second question is how will the deprivation measurement data be related to health measurements? That is, how can the deprivation measurement be applied to information about health outcomes, making it possible to track where improvements have been made, or where improvements in programs and policies are needed?

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<sup>7</sup> Other research has shown, however, that the cost of heating a home can be so high that families do without adequate food or other necessities to pay the bills (144).

## **Small Area Analysis and Composite Indices for Deprivation**

Small area analysis is a technique that helps address the lack of demographic data in some administrative data sets. It allows for average values of demographic characteristics for the area to be assigned to the people who live in that area, thus increasing the information available about area residents (31). Personal income, education level and marital status are among the kinds of information that are not part of health administration data in Canada, thus the health data (physician visits, hospital stays, for example) must be linked to other data sets such as the Census to fill the gap. Small area analysis has been used in epidemiology for some years to demonstrate how variations in social and economic status can affect health status and the need for health care (1,122-124), or physicians' variations in health practice (124,125). Population data are divided into small areas based on geographical boundaries such as political health regions or neighbourhoods defined by postal codes. The characteristics of the small areas are then assigned to the people who reside in those areas, allowing statistical analysis to test whether there is more variation among the small areas than would be expected by chance alone (122).

As Schuurman and her colleagues found, size matters (126). Spatial scale influences the results of Canadian deprivation index scores, an assessment also made by other researchers (126-128). Schuurman et al. recommend that the problems that arise when inferences from spatial analyses of the same data change when administrative zones or scale change, can be ameliorated by using the smallest unit of analysis possible (126). That is, a smaller geographical area is more likely to have residents with similar backgrounds and experiences. This was the objective of the researchers at INSPQ. Pampalon et al. (23) derived their index at INSPQ to use the smallest geographical area possible for Census data, called dissemination areas.

A small area analysis can be done using a single indicator or a composite index. As one author has noted, an index created from several indicators is like a signal light on the dashboard of a car. A number of things could be going on inside the engine, but we are alerted when we see a single flashing red light (129). Because disadvantage is multi-faceted, composite deprivation indices are created from a number of indicators, in recognition of the multiple ways disadvantage compounds. This reflects the complexities described by Townsend (24) and summarized in Part I (above). Composite indices, like the INSPQ deprivation index, have been reliably validated as providing a truer depiction of disadvantage (36) than a single indicator such as employment or income alone. This means that if a geographic area includes

more people who live alone, and they are unemployed, have little education and thus have low income, their deprivation is reflected in a measurement that includes all of these factors of disadvantage.

The deprivation index we are considering in this study, like many others, was derived to provide a single marker of numerous factors operating together. The stronger the disadvantage, the brighter and faster our dashboard light flashes.

## **Canadian Deprivation Indices**

Health researchers in Canada have adapted the concept of material and social deprivation to existing Census data – which includes some material and social measures. Similar adaptations have been made by researchers in a number of countries including New Zealand (130), Sweden (20), the United States (131), and Scotland (132). Each of these deprivation indices is a compromise between what deprivation means to individuals in a society, and what can be measured on a large enough scale to be effective in policy. Our review of the literature has shown that sex differences and gendered experiences in such examples have rarely been considered.

To explore these compromises between what deprivation means to individuals in a society, and what can be measured on a large enough scale to be effective in policy further, let us look at three other Canadian examples.

Langlois and Kitchen used 1996 Census data to create a general deprivation index for the city of Montreal (30). Their index used 20 different indicators for “urban deprivation”, in the categories of demographics (age, single female parents, unmarried, and population growth); income; education; language (no official language ability); housing tenancy and value; and employment (for young people, and for males and females). While the authors note Townsend’s differentiation of material and social deprivation, they focused more upon Townsend’s other point, that deprivation can be multi-faceted (24). Langlois and Kitchen argued that poor income and employment create deprivation, and concentrated on an index that could look at multiple factors facing those with low incomes and poor employment opportunities; they were specifically interested in how the city of Montreal had changed as industries moved out of the city. For example, they found that being both young and having minimal education led to unemployment and thus a higher deprivation score for males. While the authors did not segment their index into material and social deprivation, *per se*, they included an indicator on language to

“take into account the possible impact of linguistic barriers on urban deprivation, especially when accessibility to the mainstream labour market is considered as a major factor for economic mobility and socio-linguistic integration” (30). Furthermore, while some of the indicators are sex-specific, the authors did not continue their analysis by sex.

At the other end of the country, the Vancouver Area Neighbourhood Deprivation Index (VANDIX) was derived by geographers at Simon Fraser University to be “a new means of identifying key socio-economic indicators of relative health outcomes within greater Vancouver” (33). To construct the index, the researchers invited provincial Medical Health Officers<sup>8</sup> to select from among 21 indicators, in the categories of material wealth (including value of dwelling), housing tenancy, demographics, mobility, education, employment and “other” (non-Canadian citizen and first language non-official). The initial list of 21 indicators, chosen because of their known association with material and social disadvantage as well as with health outcomes, was weighted according to the survey responses from the providers. Although “Elderly 65+ living alone” and having “Children under age 5” are two indicators in the list, the opportunity to consider sex differences was missed. In comparing their final results with other Canadian indices, the authors found that the VANDIX was comparable and that it also correlated well with self-reported health status reported in the Canadian Community Health Survey. However, the VANDIX more strongly reflected material rather than social deprivation than the INSPQ index (provincial level version) or the Manitoba Socio-Economic Factor Index (see below). What is also interesting is that when the authors looked across the original replies from the Medical Health Officers, there was not a very high level of agreement about which indicators were valuable from their perspective in the first place (33).

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<sup>8</sup> Having providers select the indicators of interest follows methods used by researchers in Britain in the early 1980s (25).

A third example comes from the Manitoba Centre for Health Policy at the University of Manitoba. Frohlich and Mustard (31) described their methods for deriving the Socio-Economic Factor Index (SEFI), which later was revised (SEFI2) and also adapted to look at specific risk factors for disadvantage (SERI). Frohlich and Mustard considered 23 indicators from Census data in the categories of dwelling characteristics, educational attainment, employment, income, mobility and social characteristics for municipalities. When normalized and then correlated individually to a previously derived health status index, six indicators were found to explain the maximum variance in the index measure of municipal health status (see Box). A second version of the index (SEFI2) was developed some years later to 1) take advantage of the smaller Census dissemination area size available; and 2) include average household income, an indicator which had not been available for SEFI 1 (133).

Socio-Economic Factor Index for Manitoba:

SEFI 1

- labour force unemployment in youth (ages 15-24);
- unemployment for adults aged 45-54; percent female lone-parent households;
- percent population with high school graduation (ages 25-34);
- female labour force participation; and
- average value of owner-occupied dwellings.

SEFI 2

- average household income;
- percent of single parent households;
- unemployment rate; and
- high school education rate.

Source: Manitoba Centre for Health Policy

We can see from these three examples that researchers are working with data and other resources available to them for their population-level analyses. Researchers at the Manitoba Centre, for example, are able to link health administrative records to Census data and other files, allowing for complex analyses about population health based on individual data, but similar data linkages are not possible in all parts of Canada. For our purposes, we note that in all three Canadian examples there is a nod to mothers who are single parents and the additional disadvantage that is entwined with lone parenting, but there is virtually no accompanying gender analysis. Chant (66) and Ruspini (134) caution us that not pursuing the influences on and the nature of women's disadvantage and poverty (see Part I above) means there is not enough contextualization for interpreting the results and taking action that is gender-sensitive.

## A Note about Poverty and Income Measures

In Canada there is no official measure of low income, and yet Statistics Canada regularly reports on Low Income Cut-Off (LICO) and Low Income Measures (LIM), as well as a Market Basket Measure (MBM). LICO and LIM are relative measures of poverty, they define threshold income levels at which a family may be “in straightened circumstances because it has to spend a greater proportion of income on food, shelter and clothing than the average family of a similar size” (135). The LICO is adjusted for family size and community size, low income threshold is 64% (after tax) and 55% (before tax) spent on essentials – food, clothing and shelter, depending on the city or area in Canada. LIMs are “defined as 50% of median income”, again adjusted for family size and composition. LICO and LIM are often preferred measures because they can be used to calculate who in Canada is worse off relative to the majority of society. The MBM is an absolute measure, based on the actual costs of a “basket” of goods and services for a nutritious diet, clothing suitable for employment and recreation, rent for a median priced apartment and other expenses such as basic furniture and household goods, entertainment and recreation. The MBM is also adjusted for family size and the costs of living in various communities across the country. As a former Chief Statistician pointed out: “Both approaches involve judgmental and hence, ultimately arbitrary choices. In the relative measures, the fundamental decision is about what fraction of medium or median income constitutes poverty... In the case of the absolute approach, the number of individual judgments is larger” (Felligi, quoted in (135)). First one must decide what necessities *are* before it is possible to calculate the minimum income required to buy them.

The INSPQ deprivation index uses an indicator of average personal income. This is advantageous because gradations are within a range specific to each city, not compared to a threshold of LIM or LICO. That is, in each of the three CMAs we explored in this report, Vancouver, Winnipeg and Halifax, the quintiles of average personal income are created within the CMA, not against a single threshold. The INSPQ index has the additional benefit of not depending on household income. As will be seen in Part III, household income is not a good measure of the money available to women because it cannot be assumed that women have shared or equal access to their partners’ income (136). The same may be true for men, but we did not find research that had looked at that question. Fortunately, Census data are available for average personal income, by sex, for dissemination areas.

## **Summary**

In this section we have described how the concepts underlying deprivation have been expressed by women and men in two different examples. Notwithstanding how people describe what it means to them to be deprived, researchers are faced with having to choose and use existing measures that both relate to what men and women say is meaningful to them and that can be used at a population-level. The balance is struck in the INSPQ deprivation index, as with others, between using data that can be found and matched for populations across Canada, and can be applied on a small enough scale to reliably represent the residents in that area.

We will return to our quantitative analysis of the INSPQ deprivation index for males and females in Part IV. In the meantime, Part III examines the known sex and gendered implications and influences for the six indicators in the index, which provided us with the context to understand the results of our statistical analyses that follow.

## Part III

# Sex- and Gender-based Analysis of the Indicators in the INSPQ Deprivation Index

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Health indicators should meet the globally accepted criteria of universality, acceptability, feasibility, comparability and reliability (137,138). In addition, good indicators should be useful for monitoring performance and evaluating interventions (139). According to Beck and Stelcner, “Gender-sensitive indicators have the special function of pointing out gender-related changes in society over time. Their usefulness lies in their ability to point out changes in the status and roles of women and men over time, and therefore to measure whether gender equity is being achieved” (140). The ability of indicators to be gender-sensitive depends at the very least on the availability of data by sex and the ability to demonstrate differences between women and men and among different populations of women and men, where differences occur (139,141). Furthermore, gender-sensitive indicators must be free of biases, that is, able to represent a characteristic of interest without reflecting, replicating or reinforcing gender stereotypes and norms of dominant members of society (140).

In this section we present a sex- and gender-based analysis (SGBA) of the indicators that form the composite deprivation index developed by INSPQ: the three material indicators, income, education, employment; and the three representing social disadvantage, living alone, separated, divorced, or widowed, and single parent families. Clow et al. (50) describe SGBA in terms of four core concepts: 1) sex, 2) gender, 3) diversity and 4) equity. *Sex* describes the physical and physiological make-up of a human body. Most, but not all, people are chromosomally either male or female. Sex characteristics from the cellular to the organic level can influence the mechanisms of health and disease response (51). *Gender* describes what it means to *be* male or *be* female in a society, the imposed and adopted patterns of social behaviour norms. Many people do not identify with either masculine or feminine characteristics, and others may identify somewhere along a continuum of both (52). SGBA acknowledges that not only are there differences and similarities *between* women and men, but also *among* women and men, that there is a *diversity* of lived experiences and circumstances. Lastly, the intent of SGBA is to identify and rectify where there is inequality in health created

by inequity. *Equity* of resources and opportunities provides the means to achieve the goal of equality (142).

For each indicator below, we reviewed literature from recent publications, within the past 10 years, chosen for their contribution to understanding sex and gender. Our SGBA invoked the four core concepts described above to assess the suitability of each measure for use in the index, its gender-sensitivity and the gendered influences and implications for health. The concepts are continually revisited in the iterative analysis as we frame issues, consider which populations are described or missing, examine the evidence available for its inclusivity and any bias, and assess the implications in terms of sex, gender, diversity and equity (50).

## **The Material Indicators in the INSPQ Deprivation Index**

As we saw in Part I, income has long been a standard measure of disadvantage. Unemployment and low levels of education have also been associated with poor health status in numerous studies. Given that these three measures form the basis for measuring material deprivation in the INSPQ index, the question remains whether differences between women's and men's *exposures* to limited income, education or employment, or differences in the *nature and effect* of these factors on health warrant reconsideration of gender-blind approaches common to small area analysis

### **Income - Average personal pre-tax income for males and females aged 15 years and older**

Income is one of the principal determinants of an individual's economic well-being and women generally have lower incomes than men. In 2008, Canadian women's average pre-tax income from all sources was \$30,100, which amounted to 64% of men's average income of \$47,000<sup>9</sup> (42). Moreover, the difference between women's and men's poverty persists for both pre- and post-tax figures (143,144). While these figures reflect men's greater time spent on paid work, ratios comparing females with males for annual earnings of only full-time, full-year workers (ratio 0.72) and average hourly wages (ratio 0.83) still indicate inequality, although the disparities are decreasing (145,146). Both women's and men's incomes vary by certain social and demographic characteristics, yet women's greater challenges

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<sup>9</sup> Includes females and males aged 15 and older.

remain evident. With the exception of those under age 18, women in all age groups are at greater risk than men of low income<sup>10</sup>. Elderly women are twice as likely as elderly men to have low incomes, but the highest rates of low income are found among unattached<sup>11</sup> women under age 65 (147). Bryant (148) recently confirmed that female lone parents and unattached females without children continue to show the highest rates of poverty in three of Canada's largest CMAs. According to women's health experts, other at-risk groups include women of Aboriginal ancestry and women with disabilities (149).

Population-level income measures based on *average* earnings mask the fact that more women occupy the lowest earning categories (150). Women's lower income is a consequence of their greater likelihood of holding low-status, low-paying jobs with few opportunities for advancement, and their over-representation among part-time, seasonal and casual workers (151). Women's personal incomes are often lower than men's because they are more likely to forego earnings to fulfill domestic, childcare and care-giving roles. The timing of having children has lasting effects on women's earnings, as young mothers lose significant skills and wage growth concentrated in early stages of career development (152). Despite many Canadian women's achievements in attaining higher education and entering jobs traditionally held by men, significant differences remain in actual earnings. For example, an analysis of physician billing data revealed that female physicians in their 30s and 40s earned 50% less than their male counterparts because they worked shorter hours and took fewer on-call shifts. Female physicians' peak incomes were 25-40% lower than males physicians' and were achieved 10 years later, on average (153).

Even when women perform comparable work, a sex difference in income persists. After controlling for hours worked, educational attainment, work experience, industry, occupation, and socio-demographic factors, a report by Statistics Canada found that approximately one-half to three-quarters of the gender wage gap could not be explained, and is regarded as an estimate of the extent of gender-based labour market discrimination (154).

Many women do not have incomes of their own, and an equal distribution of income between males and females within the household cannot be assumed (136).

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<sup>10</sup> See the description of low incomes measures in Canada in Part II.

<sup>11</sup> An unattached individual is a person living either alone or with others to whom he or she is unrelated, such as roommates or a lodger. Unattached individuals are distinguished from individuals who live in economic families, defined as two or more persons who live in the same dwelling and are related to each other by blood, marriage, common-law or adoption.

Studies of dual-earner couples have found that increases in wives' shares of household income are predictive of spending on child care and household food, whereas increases in husbands' incomes are not (155), indicating a persistence of traditional roles and social constraints on how women spend or benefit from income. According to Tichenor, women's increased contributions of income to marital partnership have not brought proportionate gains in women's control over money, decision making, or the division of domestic labour (156). Thus, gender relations and the gendered nature of family economies – not only levels of income – play a role in women's financial vulnerability. Socially scripted gender role specialization, the disadvantaged structural position of women within society, and systemic discrimination in the organization of paid labour continue to undermine the economic independence of women. Not surprisingly, the financial consequences of the death of a spouse in old age have been more detrimental for women than men and more often result in poverty due to the loss of a husband's larger pension income (157).

The detrimental effects of low income on health status are well established in the research literature, including Canadian studies employing individual-level and small area-based data (6,7,12,67,158,159). A wide range of health outcomes have been associated with low income, including both acute and chronic illness, heart disease, arthritis, stomach ulcers, migraines, and mental illness. For women, low socio-economic status has also been associated with an increased incidence of cervical cancer mortality and lower survival rates among breast cancer patients (67). The effect of income on health follow a continuous gradient; most often worsening health status is observed across successively lower income ranges, a relationship which Canadian research has shown to hold true for many causes of morbidity and mortality (160-162). Limited income can influence health in a number of ways, including limiting the ability to secure resources necessary to attain and maintain good health, increasing exposure to hazardous or unhealthy environments, constraining social supports, and through discrimination and systemic exclusion that commonly accompanies financial disadvantage. Among proximal causal factors, low income has been attributed to several psychosocial conditions such as chronic stress, anxiety, insecurity, low self-esteem, low control at work, and social isolation (158,163). Furthermore, the inequitable distribution of income within populations has been proposed as a more important determinant of health than the absolute amount of income earned (158,164).

Income arguably holds proportionately greater importance for the health of women than men because more women live in low income circumstances. However, income is also understood to interact with sex and gender in its influence on health,

so that the causes, strength and nature of the association between income and health differ for females and males. Few Canadian studies have directly or systematically explored the question of differences in the relationship between income and health by sex. Using logistic regression, a study of acute gastrointestinal illness in Canadians found that household income, age, gender, and the interaction between income and gender affected rates of illness. The risk of illness was similar across all income categories for males, whereas the risk was much higher for females in the lowest income category (165). Two studies employing multiple regression analysis applied to National Population Health Survey data explored differential vulnerabilities of Canadian women and men to the influence of structural factors on health. Prus and Gee found that income adequacy was positively related to overall functional health and self-rated health for older women, even after controlling for several other health determinants in the model, whereas education was not a predictor of the health measures for older men (166). Another study showed sex differences in several health measures (i.e. self-rated health, functional health, chronic illness and distress) and found that social structural and psychosocial determinants of health were generally more important for women and behavioural determinants were more important for men. While differences in *exposure* to these factors (e.g., low income) were understood to contribute to inequalities in health by sex, the study also found that statistically significant inequalities remained after controlling for exposure (167). A study from British Columbia found that two community-level income indicators (average household income and the incidence of low incomes) were more strongly related to female than to male age-standardized mortality. Furthermore, analyses by age and sex revealed that only elderly women's mortality, not that of young or middle-aged women, was related to the income indicators, suggesting that specific indicators of community-level economic attributes were differentially related to mortality for certain sex and age categories within the population (168). The importance of methodology was also highlighted by Mustard and Etches (169) whose systematic review of the literature found that, although the socio-economic gradient in mortality has generally been described as more unequal among males than females (170), these conclusions hold true primarily in studies which employ statistical treatments based on absolute measures of difference. Inequalities in mortality by socio-economic status were nearly identical for males and females when evaluated by relative measures of difference.

## Summary

The average personal income of Canadian women is considerably lower than that of men although the gap in income levels between women and men has decreased over time, and female youth under 18 years now earn more than males. Despite these gains, women who are elderly, live alone or parent alone persistently remain among the poorest in our society<sup>12</sup> and women continue to be overrepresented in the lowest income categories. Women's lower incomes clearly have systemic roots, as the gender wage gap remains unexplained by individual characteristics such as credentials and specific occupational roles. Giving birth and caring for children, other aspects of women's socially prescribed roles in the domestic sphere, and gender inequality continue to stymie women's career development and earnings, and influence how household income or women's own incomes are spent.

A wide range of health outcomes has been associated with low income for both males and females. Although causal factors are elusive, psychosocial conditions and the degree of inequality within populations are recognized to have distinct influences on the ill health of those with low income. There is some evidence that an interaction between gender and income contributes to greater morbidity among low income women than men, at least for particular conditions, whereas larger inequalities in mortality have been found for men (2). However, certain methodological challenges are yet to be resolved. While personal income is a better indicator of the financial resources available to women within the gendered contexts of the home and family, problems in measuring income persist and the choice or design of indicators factors into these results.

### **Education** – The proportion of individuals aged 15 years and older who have not completed high school

Educational attainment has improved in Canada over the last 50 years (171) and there are now more women than men completing high school. In 2006, high school certificate or higher education had been achieved by more than 76% of the Canadian population aged 15 years and older, almost as many women (74.55%) as men (76%). Approximately 25% of them had a high school diploma only, whilst the majority had continued to higher education (172). In younger age groups (15 to 24 years), 60% had completed high school, more than 62% of women and 57.6% of men. Young women were more likely than men to go straight from high school

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<sup>12</sup> Not to mention many Aboriginal women, women with disabilities and new immigrants.

to post-secondary education (173). Similar differences in high school education were seen between women and men in the age group 25 to 34 years where 87.3% of men had completed high school and just over 90% of women had. In older age groups (35 to 64 years), minor differences were noted as almost 84% of women and 82.5% of men with a high school certificate or higher education in 2006 (172).

Although educational attainment has improved, almost 24% of Canadian adults aged 25 to 64 years had no high school certificate, diploma or degree in 2006, with more men (24.1%) than women (23.4%) being without this level of education (172). Specific at-risk groups for dropping out of school before completing high school include people who identify as Aboriginal (174), young mothers (175), and youth from blended families or single-parent households (144). Research has shown that youth dropping out of school are “less likely to have at least one parent who completed post-secondary education; they are more likely to have worked in the labour market for more than 30 hours per week during their last year of school; and for females, they are more likely to be single parents” (171).

Donner et al. (144) noted that, “There has been remarkable progress made over the past few decades in closing the gender gap in formal educational attainment”. Research on gender and education has often focused on female disadvantage in the educational system (176), but more recent studies tend to focus on the “ways in which girls and women are advantaged (177). Buchmann and colleagues refer to studies that highlight girls’ higher grades in school when compared to boys (Perkins et al. 2004 in (177)) and studies showing that “High school teachers consistently rate girls as putting forth more effort and as being less disruptive than boys” (178). One theory presented in the literature relates to males higher risk for antisocial behavior (179), reading disabilities, attention disorders, dyslexia, stuttering, and delayed speech (179,180), which can affect boys’ ability to complete high school and continue to higher studies (181,182). Girls, on the other hand, have been shown to have greater “advantages in social skills and classroom behaviour”, and they show greater “attentiveness and organizational skills, leadership qualities and interest in school” (177). These advantages in academic performance could potentially lead to women’s higher educational aspirations. Research studies on gender differences in education have ranged from exploring the role of gender stereotypes and the socialization of girls and boys in schools, to family backgrounds and parental involvement, as well as the role of the teacher, their gender and potential ability to “systematically favour one gender over the other” (177).

Differences are also seen among women, where Aboriginal women (183) and older women (144) often have lower education than the general population.

There are gender differences among in women and men who drop out of school. According to the Youth in Transition Survey, young men were more likely to leave school in order to work and earn money, while young women were more likely to drop out of school due to pregnancy (184). Pregnancy and child caring responsibilities were the main reasons for leaving school among Aboriginal youth in Canada (reported by 25% of females) (185). Balancing education with parental responsibilities, “including making satisfactory childcare arrangements, attending to other childrearing needs, and completing domestic chores while trying to meet academic deadlines and requirements” (186) is a challenge for many mothers. Further, young mothers report “lack of social support and discriminating attitudes from some schools” (187), which can prevent them from finishing high school, and as Brownell et al. noted, “The children of young mothers have been found to do less well in school as well, signalling long-lasting inter-generational effects” (188).

Education is nested within employment and is a potential predictor of “one’s ability to secure stable employment that provides a sustaining livelihood and income” (144). Donner et al. (144) state that “Individuals with lower education levels are more likely to have lower paying jobs and be unemployed, thus increasing their likelihood of poverty. For women then, educational attainment, and hence increased access to a sustaining source of income, is of particular importance to their health and well-being” (144).

Higher education has been associated with several positive health effects and “decreases in age-specific rates of morbidity, disability, and mortality” (189). Further, education has been shown to build “knowledge and skills and develops values, attitudes and behaviors that are broadly useful and effective in improving health” (189).

People with low levels of education are more likely to engage in unhealthy behaviours, including smoking, poor nutrition, and lack of physical activity (65,190). Ross and colleagues found that the average Body Mass Index for men and women is higher in areas with low levels of education (less than high school) (191). Gambling problems are more prevalent among people with less than secondary school education when compared with those with higher education (192). Completion of high-school education has also, along with variables such as rural residency and less frequent alcohol and cigarette consumption, been associated with decreased odds of HIV testing. Orchard et al. (193) argue that less

than high school education and more frequent alcohol consumption “was associated with an increased odds of HIV testing among males, but not females”. Testing increased for women who rated their health as good or fair/poor but “decreased for males with comparable health status” (193).

Among immigrants to Canada, low educational levels (less than secondary education) was more often associated with poor self-reported health than higher education (masters’ degree or higher) (194).

Higher education is often associated with higher literacy levels, but it should be noted that the two cannot be equated. Low literacy, however, does not only affect the ability to understand health-related information but can also have negative effects on health, including increased risk for “morbidity and mortality, low birth weights, teen pregnancies, injuries and accidents, and a wide range of diseases such as diabetes, cardiovascular disease and rheumatoid arthritis” (190).

Thurston and colleagues suggested that risks associated with education vary by gender and that women with less than high school education were at greater risk of coronary heart disease than men after adjusting for age (196). Further, their study showed that “Low education was associated with greater social and psychological risks for women than men” but that “metabolic risks largely explained gender differences in the educational gradient in coronary heart disease” (196).

Educational attainment is an important indicator of women’s health. It is a key factor to improved employment and income for women, and it facilitates better access, understanding and use of health-related information by women (65,190). Ross and Mirowsky posited that education’s beneficial effects on health were greater for women than for men as women have fewer socio-economic resources such as power, authority, and earnings (197). However, it should be noted that “Simply providing more schooling for women is not sufficient to reduce the gender inequality in control of resources within the household” (198). A study of income inequality in the world from 1960 to 1994 and found that despite women’s gains in education there is persistent unequal control of resources in the household (Schultz 1997 cited in (198)). As will be seen in the following section, women are also less likely to be employed in positions that provide equal income and other benefits.

## **Summary**

Educational attainment has improved in Canada over the last 50 years and there are now more women than men completing high school. Gender differences in

educational attainment, however, have been noted in early ages with boys being at greater risk of antisocial behaviour and reading disabilities which can pose challenges in school. Other groups at-risk of not completing high school include young mothers, Aboriginal people, youth from mixed families or single-parent households, and those that combine school with 30 hours of work per week during school weeks. Although women generally have higher grades in high school and are more likely to continue to higher education than men, they are less likely to be employed in positions that provide income and other benefits.

**Employment** - The proportion of individuals aged 15 years and older who are employed

Despite dramatic changes over the past 30 years, Canadian women are still less likely to be employed than are men. In 2009, 58.3% of women were employed versus 65.2% of men. A sex difference in employment is apparent at every level of educational attainment, and greatest among those with limited education. Women with less than a grade nine education were half as likely as men to be employed in 2009 (13.7% versus 27.1%). The disparity is observed for most age groups, except among the young (aged 15-24) where women have consistently higher employment rates than males. Of any age-sex group, older women are least likely to be employed (53.1% at age 55 to 64). Traditionally, employment was particularly low among mothers with young children, yet in recent decades this group has seen the largest increases in employment rates; 64.4% of women with children under age 3 were employed in 2009, more than double the 1976 rate of 27.6% (199). Trends have also shown women's employment to be less vulnerable to economic downturns, as occurred in the 1990s when employment rates decreased less among women than among men, which has been attributed to the higher concentration of women employed in recession resilient sectors<sup>13</sup> (200).

In the lives of women, employment calls for tradeoffs among competing roles and their associated benefits. Notably, Canadian women's increased employment rates have not seen proportionate decreases in their share of unpaid work (199), leaving many women with heavy workloads and time stress. Family care giving responsibilities remain an important reason for women's lower labour force participation and employment rates, as women still leave jobs, delay entry to the workforce or avoid taking on paid work at all, in order to raise children or care for

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<sup>13</sup> These sectors are not named in Lu and Morissette (200), nor in their reference article, Morissette and Huo, 2008 Canadian Journal of Economics 41(4) 1185-1210.

an aging or disabled family member (144). As well, the limited availability of affordable child care prevents many women from participating in the labour force (150). According to Reskin and Padavic, women face not only more restricted opportunities for paid employment than men, but are also more likely to hold routine, poorly paid, and unfulfilling work, with less authority (cited in (197)). Women are over-represented in insecure, part-time and non-unionized employment. In 2009, nearly 7 out of 10 part-time workers in Canada were women and this has changed little over the past three decades (201). Privatization, declining power of labour and unions, and increases in contract and temporary positions are understood to have a disproportionate effect on women concentrated in the public sector (136,202). Cranford et al. have described a trend of increasing precarious employment in Canada as a process of feminization of employment norms, whereby growth occurs in sectors associated with women's work and such sectors are characterized by inadequate regulatory protection, security or benefits (203). Thus, the circumstances of women's employment limit their access to employment insurance and employment benefit plans, and increase their vulnerability to systemic wage discrimination (44).

Analyses of employment should consider whether indicators are equally meaningful measures for both women and men. For example, official unemployment rates are lower for women than for men (6.8% versus 7.5% in 2001), although when under-employment (the rate at which individuals involuntarily work part time) is accounted for, women fare worse than men (i.e. 10.1% versus 8.8% in 2001). As well, research on married couples has shown that women's entry into the workforce is often used selectively to help cushion the effects of a husband's job loss during periods of economic downturn (200), suggesting a need to consider employment trends within a larger context of social relationships and gender roles.

Employment has generally been associated with better physical and mental health for both men and women in the international research literature (204-207). Conversely, unemployment is associated with poorer health, although the particular health consequences differ for men and women (208). Employment influences health through its effects on income, employment environments, employed lifestyles, and social and psychological factors associated with working. The health effects of work have been examined much more extensively for men than for women, and comparisons between women and men are scarce (209). Moreover, there has been insufficient attention to distinct employment-related risks and pathways for illness for women, such as workplace gender violence, disproportionately experienced by women (210).

Researchers have explored health risks and outcomes associated with the combined effects of women's paid and unpaid work (204,211-214). Some have found that domestic roles confer added social and physical health benefits (215-217) though age of children and support given by spouses are also factors. There is strong evidence demonstrating higher mortality among workers in low-skill and low-wage occupations compared to high-skilled, high wage occupations (218). According to Karasek and Theorell, jobs performed by women are more likely to be characterized by high psychological demands and low levels of control, characteristics shown to influence cardiovascular disease (cited in (210)). Research from the UK suggests that women are more likely than men to work in monotonous jobs with fewer learning opportunities, with implications for women's health and wellbeing (219). Thus, women's health researchers have described several counteracting influences of employment on health. According to Colman, higher employment contributes to income equity, financial security, and social support, with positive influences on women's health, whereas poor work conditions, lack of job security, limited control over one's work, sexual harassment, overwork, and other conditions may undermine women's health (65).

Research exploring differences in the degree to which employment affects women's and men's health is somewhat limited, and often subsumed within research that explores several socio-economic and social factors at once. Arber (207) raised the question of whether different structural factors influenced women's and men's health, or whether the same factors had different effects and meanings for women and men. Her UK study confirmed a strong association between paid employment and occupational class for health outcomes in women and men, but found that women's health outcomes showed the importance of combined influences of family roles and housing tenure (207). Similarly, a longitudinal study of a British cohort found that the contribution of explanatory factors to socio-economic gradients in health were quite similar for men and women, though certain discrepancies emerged. For men, job insecurity was a greater contributor to poorer health, whereas age at birth of first child held more importance for women (220). McDonough (221) found little evidence of differential patterning by gender in the relationship between job insecurity and self-rated health, increased distress, and the use of medications among Canadian adults. Similarly, Mustard et al. found that unemployed Canadian men and women both had an elevated risk of mortality from traumatic causes and chronic disease, and although minor differences were observed, the cause-specific relative risks for men and women were similar (222). Based on a series of cross-sectional American surveys on physical impairment, Ross and Mirowsky found that employment and

income were equally beneficial to men's and women's health, although the same was not true for education (189). A study of mental and physical health outcomes associated with neighbourhood-level unemployment in Montreal has suggested a stronger relationship between employment status and health for immigrant males relative to both immigrant females and non-immigrant males (223).

## **Summary**

There is a gender divide in employment, apparent at every level of educational attainment, and greatest among women and men with limited education. Men are more likely to be employed than women, and women are more likely to have part-time, seasonal or casual jobs. More women with very young children are employed than ever before, but child care responsibilities, taken on by choice or because of insufficient child care spaces, can delay or interrupt opportunities for advancement, job security and long-term benefits.

For both men and women, employment is generally associated with better physical and mental health; however, low-skill and low-wage occupations are associated with poorer health and higher mortality. Researchers continue to explore specific differences in the kinds of work circumstances that have greater importance in influencing the health of women and men—such as job insecurity for men or combined paid and unpaid demands for women.

Employment as a measure of advantage or disadvantage is not the same for men as for women, since women are more likely to be underemployed and to not have additional employee benefits, but their jobs may be more stable in economic downturns. Furthermore, women's unpaid work at home is not accounted for in employment measures, and thus their time stress from added roles may be considerably under-represented.

## **The Social Indicators in the INSPQ Deprivation Index**

As with the material measures, the indicators for social deprivation used in the index developed by the INSPQ are ones for which there are comprehensive, comparable data from the Census. Based on the concept of deprivation, citing Townsend (24), the social indicators selected for the index attempt to capture social conditions that would be inherently stressful, and thus have consequences for both the physical and mental health of individuals (23).

## **Living Alone** - The proportion of individuals aged 15 years and older who live alone

Women are more likely than men to live alone in Canada. In 2006, one-person households represented almost 27% of all households in Canada, with 55% of these being women who lived alone. Seniors (65 years and older) represented 34% of all one-person households and of those, women represented 73%. Of all males who lived alone, 13.5% were young adults (aged 18-29 years). Only 9% of women who lived alone were aged 18-29 years (224).

Living alone has been used as a proxy for not being engaged in social relationships, and therefore not having social support, and is often associated with social isolation and negative health outcomes (225,226). A recent meta-analysis of the impacts of social isolation, which followed individuals for more than 7 years, showed that people with adequate social relationships had a 50% greater likelihood of survival compared to those with poor or insufficient social relationships, a finding that remained across cause of death. The association is similar in magnitude to the health effects of smoking, obesity, and lack of physical activity (227). Living alone has also been associated with greater risk of falls, poor diet, some chronic conditions, and lower quality of life among adults aged 60 years and over (228). Similar associations have been found in a Canadian study, showing that living alone is associated with increased mortality following post-acute myocardial infarction, particularly in those aged 75 years and older. Other risk factors identified in the study included current smoking, presence of hypercholesterolemia, cerebrovascular disease, chronic obstructive pulmonary disease, heart failure, peripheral vascular disease and poor left ventricular ejection fraction (226).

While many studies have found associations between social isolation and poor health outcomes, others show that living alone does not necessarily equate to social isolation. A recent literature review by Cheng (229) on the health of older women living alone found that they are often concerned about their personal safety and face discrimination based on aging and gender as they are “stereotyped as being dependent, frail and diseased” (229), but that they often found ways to mitigate social isolation and generally did not have worse health than women who did not live alone. Matheson et al. (230) also suggest that women have larger social networks than men, and often find social support outside their home such as support from family members, friends, neighbours and religion (229).

Little is known about men living alone (231). A review of European and American studies showed that men are more likely to be ‘solo-living’ (a term used to include

people who live alone as opposed to those ‘not having a partner’) than women “at ages conventionally associated with co-resident partners and children” (younger than 60 years) (231). According to Jamieson et al., these differences could partially be explained by “gender differences that resonate more with traditional behaviour and gender inequalities than women’s ability to drive social change” (231). The authors note that women often have lower income than men and therefore limited opportunities to live alone, they are often the primary caretakers of children following a separation (when men often become solo-living), and there is often an age gap between partners living together, with women moving in with partners at an earlier age than men (231). According to Jamieson et al., “solo-living men, despite being shown to be more sociable than their male peers, are less likely than their male peers to have anyone [with whom] they can discuss intimate and personal matters” (231).

Other studies have also shown that women’s and men’s experiences of living alone are different. A study by Kandler et al. (232) showed that living alone is a risk factor for mortality for men but not for women. Similarly, Schmaltz et al. (226) found that living alone was a risk factor for mortality for patients who had suffered an acute myocardial infarction, with men living alone having a higher risk of mortality than women. These differences are also supported in studies showing that men who live alone are at greater risk for hypertension (233), and respiratory disease-related deaths (234) than women living alone. Case et al. (235), on the other hand, found that women living alone were at greater risk for recurrent cardiac event than men. Other studies have pointed at the greater need for help and health-related personal assistance that women who live alone experience, compared to men (236), as well as their higher rates of unmet needs (237). Bergeron et al. (238) identified that living alone and being female were the main predisposing factors associated with service use among young Canadians with mental disorders.

Living arrangements can also affect levels of everyday physical activity later in life. Chipperfield et al. (239) found that women living with a partner had higher activity levels than women living alone. The same effect was not seen in men, leading the authors to suggest that the “social context is less important for men’s everyday physical activity” (239). Men’s activity levels, however, were associated with better self-rated health, which was not the case for women. The authors speculate that these differences could be due to social roles, coping mechanisms, genetic factors, physiological processes, or differences in the types of health problems that women and men experience (239).

Jamieson et al. (231) found that men living alone were more likely to feel socially isolated and less likely to be in a romantic relationship. Gadalla (240) found a positive correlation between social support and physical health that was stronger in elderly women compared to men. However, older women's social support networks were less likely to mitigate poor health and stress than were men's. Although social support was positively associated with greater sense of control over their lives for both men and women, the "total effect of social support on stress was much stronger in men compared to women" (240).

A study looking at the relationship between leaving home and entry into poverty among young people in Europe showed that "leaving home is the strongest predictor behind youth poverty" (241). The study showed, however, that young people were often aware of this risk and either made the decision to stay at home longer (more common in Mediterranean countries) or decided to leave home at an early age (more common in Scandinavian countries), knowing that the state of economic hardship was temporary due to the labour market in Scandinavian countries. The authors also noted that social norms have significant influence over the decision to stay at home and that it might be more socially acceptable to live in the parental home until older ages in Mediterranean countries than in Scandinavian countries. Leaving home often coincided with marriage in Mediterranean countries, whilst it often meant living alone in Scandinavian countries (241).

## **Summary**

Women's and men's experiences of living alone are diverse. Studies suggest that women have larger social networks and receive social support from neighbours, religion and friends to a larger extent than men, which might have positive effects on their health. Certain health conditions, however, were elevated for both men and women living alone compared to those living with a partner. This review pointed to women's greater need for help and higher rates of unmet needs when compared to men living alone. As research has shown that the experiences of Canadian men and women living alone are different, additional research on the relationship between living alone, social deprivation, and health should be designed carefully to capture how these differential experiences based on sex and gender may mediate the influence of living alone on the health of Canadians.

**Separated/Divorced/Widowed** - The proportion of individuals aged 15 years and older who are separated, divorced or widowed

In 2007, 58% of all divorced people and 80% of those who were widowed in Canada were women (242). National data on separation are often missing as those who are separated are often grouped together with people who are divorced or widowed, and sometimes with those that are married or living in common-law unions. Data from 2006 Census showed that 56% of all separated but legally married people were women. According to Statistics Canada, divorced or widowed women are just as likely to remarry as divorced or widowed men (244). Other studies, however, indicate that men are more likely to remarry and also to do so more quickly (243).

Separation and divorce rates are frequently linked to single parenthood, particularly for women as they more often get custody of children following a separation or divorce. In 2001, almost 50% of female single parents were divorced (30%) or separated (19%). Women who are separated, divorced or widowed have lower average earnings than married and single, never-married women (65). Men, however, have higher incomes in almost all age categories, regardless of their marital status (244). A European study conducted by Ruspini on women's deprivation and the gender dimension of poverty, showed that female poverty is closely linked to critical family events such as widowhood, divorce or separation whilst male poverty is more related to labour-market conditions (68). The connection between women's poverty and family events often made women's poverty trajectories longer but women were more likely to "enter and exit from the poverty condition intermittently" than men. Ruspini noted that following a divorce, women often experience a substantial drop in household and living standards whilst men experience greater or similar standards (68).

Women leaving abusive relationship often experience "a profound sense of freedom, relief and enhanced sense of control" (245). The effects of violence on mental and physical health, however, lasted on average 20 months after leaving the relationship. Social and economic resources were deemed important determinants for women's health outcomes. Social relations may be beneficial to the mental and physical health for women leaving abusive relationships, but "the degree of conflict inherent in social relationship has been a better predictor of health outcomes than perceived social support" (245). For example, "social relations may be strained as those in the woman's network take sides with the abusive partner, make demands on the woman as a condition of receiving help or interfere with her ability to make her own decisions" (245).

In a review of the literature, Jamieson et al. found a range of practices among fathers whose marriage or partnership dissolves: some become absent fathers and may lose all contact, others do not live with their children but remain very involved (231). They found no clear indication of men “in a new flight from committed personal relationships so much as a continuation of difficulties in negotiating equal and emotionally intense relationships associated with hegemonic masculinities” (231).

Women and men who are separated, divorced or widowed often experience poorer health than those who are married or single, particularly related to mental health (246,247). It has also been suggested that those who are divorced, separated and single are at higher risk of experiencing food insecurity than those who are married, in common-law relationships or widowed (248). Being a young, separated woman is also a greater risk factor for spousal assault or homicide than being an older married woman (65). Remaining in a stable marital relationship, however, does not necessarily imply good health. Chipperfield and Havens found that the level of life satisfaction among older women who remained never married or always married both declined over time, which could be related to women’s caregiving roles and health issues associated with providing care, as well as older women’s unmet needs for care (243).

Studies suggest that men benefit more from marriage than women do in terms of health (249-251). Cramer argued that “separated and divorced men, relative to married men, are more likely to die younger and to be hospitalized than separated and divorced women are in relation to married women” (249). In comparison to married women, separated and divorced women are more likely to report physical symptoms and greater depression than separated and divorced men are in relation to married men. Additionally, more single and widowed men than married men reported psychological distress compared to single, widowed and married women, but the reverse was true for physical symptoms and alcohol intake. Cramer also found that married women and widowed men felt most included in the community but had the least contact with friends (249). Caron and Liu analyzed the prevalence of psychological distress and selected mental disorder and substance abuse (SMDSD) in the Canadian population and found that “women, people who are single, separated or divorced, non-immigrants and Aboriginal Canadians are more likely to suffer from psychological distress or from SMDSD” than men, those who are married, immigrants and Chinese Canadians (252).

St John and Montgomery examined whether marital status and partner satisfaction are associated with depressive symptoms in men and women. The study showed

that those that “were dissatisfied with the living partner had higher levels of depressive symptoms” (253). When comparing women and men with depressive symptoms, men were more likely to be never married and women were either separated or divorced (253). Rotermann, on the other hand, found a stronger association between marital dissolution and depression among men than women. Depression, however, was often “isolated to the period immediately surrounding the break-up” but remained four years later for some people (254).

In Chipperfield and Havens’ study looking at gender differences in marital status transitions and life satisfaction later in life over a 7 year period, a more predominant decline in life satisfaction was found in men compared to women. Those men who found a partner within the 7 year period, however, experienced greater life satisfaction than women who found a partner (243).

Afifi et al. looked at gender differences in problem gambling and found that being a never-married woman or a separated, divorced or widowed man was associated with problem gambling (255). The authors suggest that social support is a protective factor against problem gambling for men but not women, and that “gambling may be a social event for some women”. Middle-age, middle to low levels of income, high school diploma or less, never-married, and high levels of life stress and negative coping abilities were the main indicators increasing the odds of problem gambling for women, whilst separation, being widowed or divorced, and having negative coping abilities increased the odds of problem gambling for men (255).

## **Summary**

The literature suggests that the loss of a partner, through separation, divorce or widowhood, has significant psychological effects on both women and men. Although some studies indicate that men benefit more from being in a relationship than women and also experience a greater decline in health status after marital disruptions, women experience both changes in health and economic status, which is not the case for men. Differences were also found when comparing the experiences of those who were separated with those who were divorced and/or widowed, suggesting that the three categories grouped together might be misleading. For studies comparing the experiences of those who are separated, divorced or widowed with those who are married, it should be noted that the quality of marriage is also important to consider as women and men experience the quality of their marriages differentially (243,250). This is important if we assume

that it is not just being married, but the quality of the relationship that relates to social advantage and health.

### **Lone Parent** - The proportion of lone parent families

In 2006, over 80% of all lone parent families were female-headed, representing 20% of all families with children in the country (256). Nine percent of the female population (representing over 1 million female-headed single-parent families) and 2% of the male population over the age of 15 were lone parents. Women in the age group 25 to 44 years were most likely to be lone parents than any other age group (244).

One of the main reasons there are so many lone female-headed families is because women often get custody of their children in case of a divorce or separation. Reports from Statistics Canada shows that most lone mothers are either divorced or separated but that the number of never-married female lone parents is growing (244). Lone mothers have one of the lowest incomes of all family types, with 32% of lone mothers living with a low income. In 2008, it was estimated that 23.4% of lone mothers lived below the low income cut off (147). In 2008, lone mothers had an average annual income of \$41,300 after tax, compared to lone fathers with an income of \$54,200 (257). Single mothers are also more likely to work part-time than single fathers (258), which could be a result of limited full-time employment options or lack of affordable and accessible child care (259,260).

Single parents often experience a lack of financial and social support which may affect both their physical and mental health. Lone parents report higher levels of time stress, lower self-rated health (261) and seek help for mental health issues more often than those that are married (262). McIntyre et al. (263) and Che and Cheng also found that low income lone mothers are more likely to compromise their nutrition in order to feed their children and to experience food insecurity than lone fathers. In fact, almost 28% of lone mothers reported compromised diets, compared to 13% of lone fathers (248). Lone mothers also experience more social stressors than lone fathers (264), report worse health status and have higher risk of chronic illness than other family type in Canada (65,244,265).

A study by Boyle and Lipman evaluated the influence of neighbourhoods and socio-economic disadvantage on behavioural problems among children aged 4 to 11 years and found that family socio-economic status, lone-parent family status, and the percentage of lone parents in neighbourhoods were all strong predictors of behavioural problems in children (264).

## Summary

Lone-parent families experience different social *and* material disadvantage, depending on whether the family is headed by a lone mother or a lone father. Lone mothers represent one of the most vulnerable groups in Canada due to their low income and reported health status. Additional research analyzing the relationship between lone-parenthood, social deprivation and health should therefore consider potential sex and gender differences to better assess their experiences of social and material deprivation. It is also noteworthy that several studies included in this review used lone-parenthood as an indicator of material deprivation whereas in the INSPQ deprivation index, it is used as an indicator of social deprivation.

### **Six Indicators – Many Interpretations?**

In Part III we have seen that understanding the gendered context and influences of each of the six indicators in the INSPQ deprivation index reveals how the indicators may be measuring different things for men and for women, thus demonstrating some gender-sensitivity (140). The sensitivity arises in understanding the differences in contexts and meanings of the indicators in women's and men's lives.

Overall women have lower average incomes than men, but for different reasons. In many cases income is related to employment, but elderly unemployed women have considerably lower incomes than elderly men who are likely retired. Employment is more likely to provide stability and benefits such as insured services for men than for women, creating assets that are not captured in this particular deprivation index.

Fewer women are employed than men, but women continued to do more unpaid domestic work, which contributes to time stress and poorer physical and mental health for some women. For both sexes, however, conditions of employment are of course critical, as occupational hazards and harassment or discrimination can diminish health, as was demonstrated in British studies on employment status (11,12,207).

Education levels do not necessarily lead to better income or employment, since women, whose education levels are increasing and surpassing men's, are still less likely to be employed in positions that provide income and other benefits. This is especially the case for some women more than others, such as women who are

Aboriginal or new immigrants. For both males and females, physical disability can hinder finding employment and income, despite their education levels.

The lack of childcare in Halifax, Winnipeg and Vancouver can prevent parents, male and female, from securing full-time employment and commensurate income, but this is particularly true for women, whether they are lone parents or not.

Separation, divorce and widowhood also have gendered influences and implications for women and for men. Whereas males have been shown to be more emotionally and physically affected by the loss of a relationship, and women are more likely to have their financial resources reduced, women may benefit from separation and divorce if they are leaving an abusive relationship.

Overall, women have been found to have stronger social networks than men, but when the social networks are few or lacking, men's physical and mental health are reduced more than are women's. Living alone may not equate with social deprivation if young people are starting independent lives, or if, in the case of employed women, living alone accompanies sufficient employment and income, as is the case for some women in Vancouver.

## Part IV

### Exploring the INSPQ Deprivation Index by Sex

**B. A. Kinniburgh, H. Isfeld, M. J. Haworth-Brockman**

In this section we describe our statistical analyses to explore sex differences in the INSPQ deprivation index for the Census Metropolitan Areas of Vancouver, Winnipeg and Halifax. Working with the methods developed and described by researchers at INSPQ, we replicated the principal component analyses for the total population in each city, and calculated it for women and men separately.

#### Small Area Analysis

Part II in this report provided a brief description of small area analysis as a method used in population health research, where the average characteristics of the residents of a small geographical area are used as proxies for the characteristics of the individuals within that area. The deprivation index developed by the INSPQ uses the Census of Canada Dissemination Area (DA) as the geographic unit for small area analysis. DAs are small, relatively stable geographic units that each include between 400 and 700 residents. All of Canada is divided into DAs, and this is the smallest geographic level for which Statistics Canada will release Census data.

Three Census Metropolitan Areas (CMAs) – Vancouver, Winnipeg, and Halifax – were selected for this analysis. These three CMAs include 5,071 DAs, 4,897 of which have a population of at least 250 residents age 15 years or older (560 in Halifax, 1,115 in Winnipeg, and 3,222 in Vancouver). A minimum population of 250 adults (15 + years) is consistent with that used in the INSPQ methodology.

#### Data Sources

Data for the six Census indicators included in this deprivation index (23) were purchased from Statistics Canada. To replicate the INSPQ methods, for each DA we obtained the following 2006 Census of Canada information for persons aged 15 years or older:

- total population count;
- census family count;

- number of persons in private households;
- number of persons without high school diploma;
- number of persons with employment;
- number of persons living alone;
- number of persons separated, divorced, or widowed;
- number of lone parent households; and
- average personal pre-tax income.

For all indicators data were requested for the total population, for males and females separately, and in five-year age groups (up to age 85 years or older) with the exception of income data. The income data were obtained for four age groups (15-24 years, 25-44 years, 45-64 years, and 65 years or more) after consultation with the researchers at INSPQ.

### Data Manipulation

For each DA, age-standardized rates were calculated for five indicators: education, employment, income, living alone and S/D/W. Data were standardized to the Canadian population age 15 or more years from the 2006 Census of Canada (266). The proportion of families headed by lone parents is a crude rate. Rates were calculated for the total population and for males and females separately. In accordance with the original methodology, the standardized rates for income were log transformed, and the standardized rates for living alone were arcsine transformed to normalize the distribution of the data. Because the proportion of lone parents is expressed as a proportion of the number of census family reference persons, we were unable to use a sex-specific denominator for this indicator. For all models (total, male, and female) this proportion is therefore the sex-specific number of family heads who are lone parents divided by the total number of census families in each DA.

#### Reminder – Indicators in the INSPQ Deprivation Index:

**Education** - proportion of individuals aged 15+ years with no high school diploma

**Employment** - proportion of individuals aged 15+ years who are employed

**Income** - average personal income for individuals aged 15+ years

**Living alone** - proportion of individuals aged 15+ years living alone

**S/D/W** - proportion of individuals aged 15+ years who are separated, divorced or widowed

**Lone parent** – proportion of lone parent families

## Principal Component Analysis

Principal component analysis (PCA) reduces variables (indicators) into a smaller number of artificial variables that account for most of the variance represented by the original variables (267). Pampalon et al. used this technique to reduce the six Census variables into summary variables for material and social deprivation (23).

Principal component analysis (PCA) with varimax rotation was generated using PROC FACTOR in SAS® software, Version 9.2 of the SAS System for Windows<sup>14</sup> (268) to calculate the social and material deprivation scores for each DA in Vancouver, Winnipeg and Halifax. For each city, DA deprivation scores were calculated for all residents (“total”), “male” residents only, and “female” residents only. These scores were grouped into social and material quintiles so that approximately 20% of the CMA’s population was included in each quintile. Quintile 1 comprises the least deprived DAs (those having the lowest scores) and quintile 5 comprises the most deprived DAs (having the highest scores)(23)<sup>15</sup>. Each DA therefore had six scores and six quintiles: social deprivation for the total population, males and females; and material deprivation for the total population, males and females.

Our calculated factor scores for each DA were compared with those from the most relevant INSPQ model: our Vancouver CMA scores were compared against the INSPQ Vancouver CMA model and the Winnipeg and Halifax CMAs were compared against the Other CMAs model (see Table 3 in Pampalon et al. (23)). We assessed the fit of our PCA calculations based on the variance explained by the retained components and on the presence of simple structure. Generally, results from PCA are satisfactory when the factors explain at least 70% of total variance. Simple structure is identified when a variable has a strong association (factor score  $\geq 0.40$ ) on one component and weak or no association (factor score approaches 0) on the other(s). We define a moderate association as a factor score between 0.30 and 0.39.

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<sup>14</sup>SAS and all other SAS Institute Inc. product or service names are registered trademarks or trademarks of SAS Institute Inc., Cary, NC, USA.

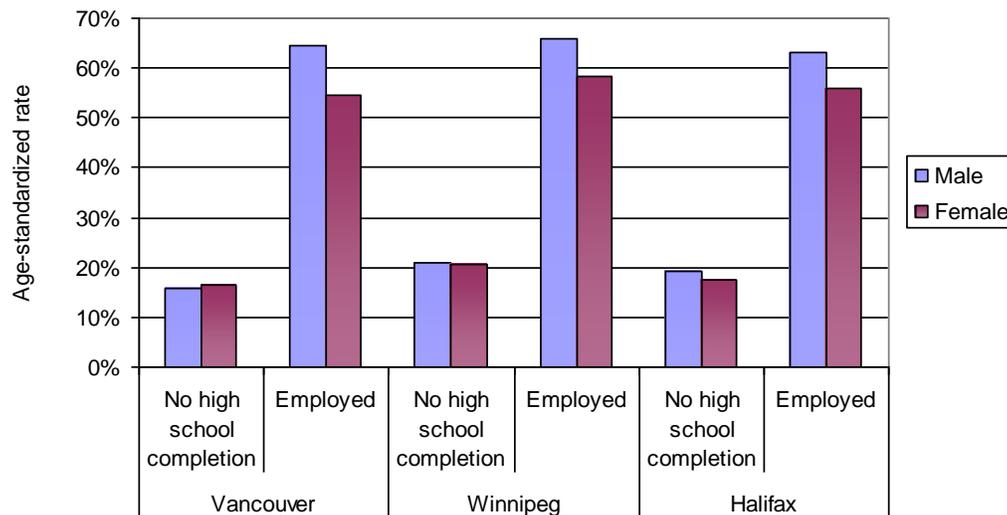
<sup>15</sup> INSPQ. Canadian correspondence table between Dissemination areas and deprivation index scores downloaded from <http://www.inspq.qc.ca/Santescope/documents/IndicesDefavorisation/TableEquivalenceCompleteCanada2006.xls> on July 26, 2010

## Results

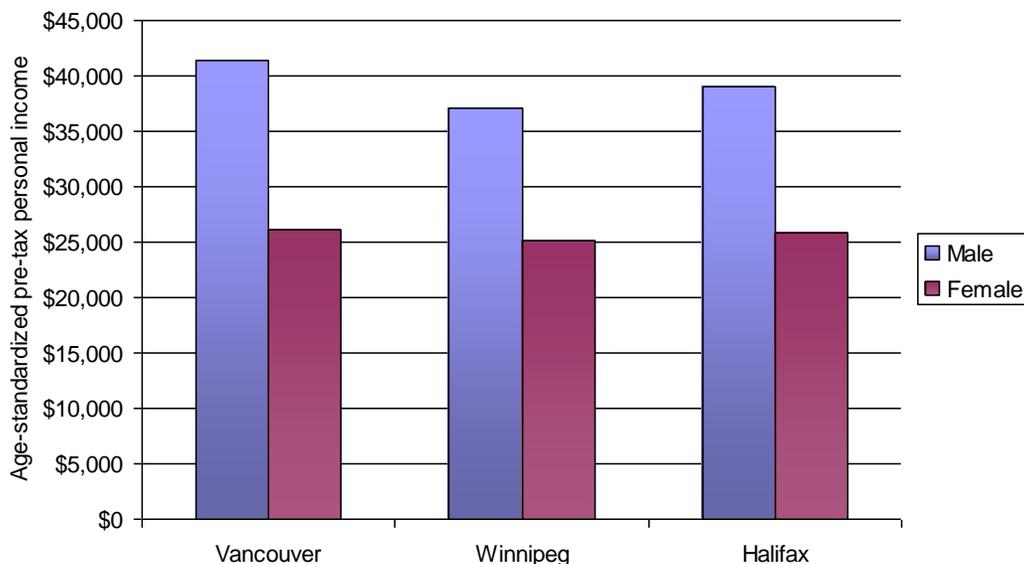
### Material and Social Indicators for Males and Females

Examination of these six indicators revealed that males generally fared better than females in the three cities. For all CMAs, males had more favourable age-standardized rates for two of the three indicators that are used for material deprivation in nearly all cases. Specifically, a larger proportion of males than females were employed in all three CMAs (7.5% higher in Halifax, 8.0% higher in Winnipeg and 9.9% higher in Vancouver, Figure 3) and had higher average pre-tax income (from \$11,800 higher in Winnipeg to \$15,200 higher in Vancouver, Figure 4). More females than males completed high school in Winnipeg and Halifax, but this was not true in Vancouver (Figure 3). These sex differences in high school completion were small.

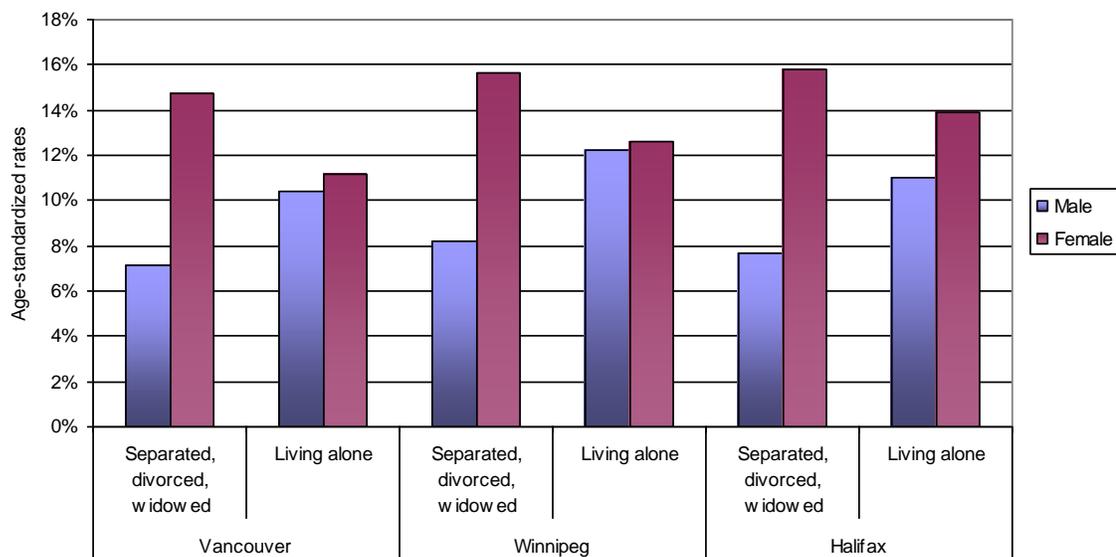
**Figure 3. Age-standardized rates for no high school completion and employment by sex and CMA.**



**Figure 4. Age-standardized average personal pre-tax income by sex and CMA.**



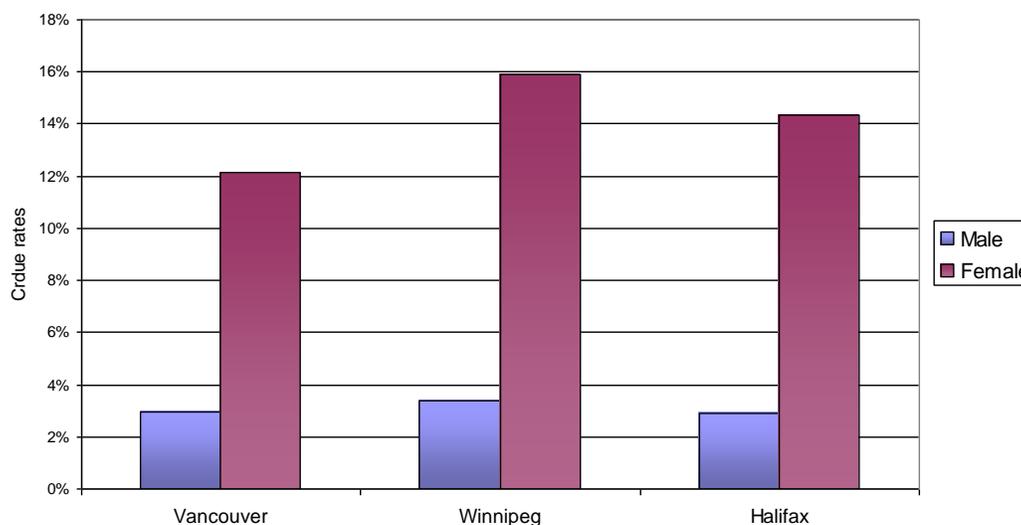
**Figure 5. Age-standardized rates for being separated, widowed or divorced and for living alone by sex and CMA.**



The age-standardized rate of being separated, divorced, or widowed was twice as high for females as the rate for males in all three CMAs. Age-standardized rates for living alone were similar for males and females, although there were more females living alone in Halifax than males and Halifax also had the highest rate of females

living alone among these CMAs (Figure 5). The proportion of females leading a household as a lone parent was five to seven times greater than males across all the CMAs (Figure 6).

**Figure 6. Crude rates for lone parent households by sex of lone parent and CMA.**



### The Deprivation Index by Sex

The deprivation index was calculated for 4,897 DAs in Vancouver, Halifax and Winnipeg, representing 97% of the DAs in these CMAs. DA-level data were incomplete for females in 10 Vancouver DAs and for males in two Vancouver DAs; results for females in Vancouver are thus based on 3,213 DAs and male results are based on 3,221 DAs. Each of the two deprivation components – material and social – accounted for approximately one-third of the total variance from the six indicators in this deprivation index. The two deprivation components together explained at least half of the variance in all models (ranging from 50% for males in Vancouver to 70% for Winnipeg total). The variables displayed a similar factor structure to that reported by Pampalon et al. (Table 4) (23). At the DA level, the correlation between our “Total” deprivation scores and those calculated by INSPQ was strong (material deprivation  $r = 0.93$  for Halifax and  $r = 0.94$  for Winnipeg and Vancouver, social deprivation  $r = 0.83$  for Winnipeg and  $r = 0.85$  for Halifax and Vancouver).

**Table 4: Principal components of the deprivation index by CMA and sex.**

	Total		Male		Female		INSPQ Vancouver Model	
	Material	Social	Material	Social	Material	Social	Material	Social
<b>Vancouver CMA</b>								
No high school certificate	-0.81*	0.00	-0.75*	-0.01	-0.72*	0.08	-0.81*	-0.11
Employed	0.58*	0.07	0.51*	0.02	0.57*	0.13	0.65*	0.00
Pretax personal income	0.77*	-0.30 <sup>†</sup>	0.75*	-0.30 <sup>†</sup>	0.78*	-0.11	0.84*	-0.20
Living alone	0.21	0.78*	0.03	0.79*	0.34 <sup>†</sup>	0.70*	0.10	0.87*
Separated, widowed, or divorced	-0.09	0.88*	-0.05	0.86*	-0.04	0.88*	-0.10	0.90*
Lone parent household	-0.34 <sup>†</sup>	0.62*	-0.09	-0.39 <sup>†</sup>	-0.34 <sup>†</sup>	0.64*	-0.49*	0.48*
<b>Variance explained</b>	<b>29%</b>	<b>31%</b>	<b>23%</b>	<b>27%</b>	<b>28%</b>	<b>29%</b>	<b>34%</b>	<b>31%</b>

	Total		Male		Female		INSPQ Other CMAs Model	
	Material	Social	Material	Social	Material	Social	Material	Social
<b>Winnipeg CMA</b>								
No high school certificate	-0.83*	0.06	-0.74*	0.05	-0.70*	0.15	-0.85*	-0.01
Employed	0.73*	-0.15	0.69*	-0.08	0.70*	0.00	0.67*	-0.23
Pretax personal income	0.79*	-0.30 <sup>†</sup>	0.76*	-0.31 <sup>†</sup>	0.81*	-0.02	0.78*	-0.35 <sup>†</sup>
Living alone	-0.12	0.88*	-0.23	0.74*	0.00	0.83*	-0.04	0.89*
Separated, widowed, or divorced	-0.24	0.86*	-0.06	0.87*	-0.16	0.88*	-0.30 <sup>†</sup>	0.84*
Lone parent household	-0.63*	0.51*	-0.08	0.52*	-0.65*	0.47*	-0.52*	0.56*
<b>Variance explained</b>	<b>39%</b>	<b>31%</b>	<b>28%</b>	<b>28%</b>	<b>35%</b>	<b>29%</b>	<b>35%</b>	<b>33%</b>

	Total		Male		Female		INSPQ Other CMAs Model	
	Material	Social	Material	Social	Material	Social	Material	Social
<b>Halifax CMA</b>								
No high school certificate	0.86*	-0.01	-0.77*	-0.06	-0.78*	0.17	-0.85*	-0.01
Employed	-0.61*	0.00	0.62*	-0.03	0.59*	0.11	0.67*	-0.23
Pretax personal income	-0.75*	-0.37 <sup>†</sup>	0.73*	-0.38 <sup>†</sup>	0.81*	-0.01	0.78*	-0.35 <sup>†</sup>
Living alone	-0.10	0.88*	0.01	0.87*	0.15	0.81*	-0.04	0.89*
Separated, widowed, or divorced	0.26	0.83*	-0.17	-0.82*	-0.13	0.87*	-0.30 <sup>†</sup>	0.84*
Lone parent household	0.59*	0.53*	-0.37 <sup>†</sup>	-0.29	-0.49*	0.58*	-0.52*	0.56*
<b>Variance explained</b>	<b>35%</b>	<b>31%</b>	<b>28%</b>	<b>32%</b>	<b>32%</b>	<b>30%</b>	<b>35%</b>	<b>33%</b>

<sup>†</sup> Moderate association with component ( 0.30 - 0.39)

\* Strong association with component (≥ 0.40)

Source: 2006 Census of Canada; Pampalon et al., Table 3 (23).

Overall, the rotated factor structure was similar for males and females although the models for females explained 6-7% more total variance than the models for males (Table 4). In all three CMAs, pre-tax personal income among males had a moderate association with social deprivation (-0.30 in Vancouver, -0.31 in Winnipeg, and -0.38 in Halifax), whereas no association between income and social deprivation was seen for females. For females in Vancouver CMA, living alone was moderately associated with material deprivation (0.34). For all three CMAs, the sex-specific association between lone parent families and these deprivation constructs showed the most discrepancy. Among males, this variable was moderately associated with social deprivation in Vancouver (0.39), strongly associated with this construct in Winnipeg (0.52), and moderately associated with material deprivation in Halifax (-0.37). For females, lone parent status was strongly associated with social deprivation and was moderately or strongly associated with material deprivation in all three CMAs (association with material deprivation -0.34 in Vancouver, -0.65 in Winnipeg and -0.49 in Halifax).

Sex-specific age-standardized values for five indicators (employment, education, income, living alone and separated/divorced/widowed) and crude rates of households headed by lone parents by deprivation quintile (material and social) and CMA are shown in Tables 5a-5f. For males and females in all three CMAs, variations in the rates of education and employment, as well as pre-tax personal income, are visible across material quintiles. Among males, a smaller gradient in pre-tax income across social deprivation quintiles was noted. A small gradient in the proportion of the female population who had not completed high school by social quintiles was observed.

For the indicators of social deprivation, strong gradients across deprivation quintiles were observed for males and females, but the rates of each of the three indicators were generally higher for females than males. The proportion of females in Vancouver who lived alone displayed a gradient according to material deprivation – the highest rate of females living alone was observed in the areas that were least materially deprived (Table 5b). For females in all three CMAs, lone parent status showed a strong gradient with both material and social quintiles.

**Table 5a: Age-standardized values of the deprivation index component variables for males in Vancouver CMA by quintile of deprivation.**

			Material			Social		
Deprivation quintile	DAs	Population	No high school certificate	Employed	Pretax personal income	Living alone	Separated, divorced, or widowed	Lone parent*
<b>Male</b>	3,221	827,565	15.7%	64.4%	\$41,327	10.4%	7.2%	2.9%
<b>Material</b>								
1	624	165,330	6.5%	71.3%	\$68,452	12.1%	6.7%	2.2%
2	615	165,580	10.9%	68.1%	\$44,413	10.6%	7.2%	2.9%
3	636	165,365	13.9%	64.8%	\$37,684	9.2%	7.0%	3.0%
4	658	165,580	18.5%	61.9%	\$32,225	9.7%	7.0%	3.0%
5 (deprived)	688	165,710	27.3%	56.7%	\$26,041	10.3%	7.8%	3.5%
<b>Social</b>								
1	735	166,315	15.6%	63.2%	\$50,838	2.2%	0.9%	0.5%
2	648	164,945	15.3%	64.6%	\$43,580	4.9%	3.7%	2.2%
3	626	165,455	16.2%	65.2%	\$39,675	8.0%	6.6%	3.0%
4	608	165,590	15.9%	65.1%	\$37,021	12.5%	9.9%	4.3%
5 (deprived)	604	165,260	15.3%	64.0%	\$33,385	26.5%	16.2%	5.4%
<b>Material &amp; Social</b>								
1 & 1	151	35,865	7.4%	69.3%	\$92,280	2.5%	1.0%	0.4%
5 & 5	128	33,540	28.7%	53.7%	\$22,174	26.7%	17.1%	6.5%

Source: 2006 Census of Canada

\*Crude rate of lone parent households

**Table 5b: Age-standardized values of deprivation index component variables for females in Vancouver CMA by quintile of deprivation**

Deprivation quintile	DAs	Population	Material			Social		
			No high school certificate	Employed	Pretax personal income	Living alone	Separated, divorced, or widowed	Lone parent*
<b>Women</b>	3,213	886,155	16.5%	54.5%	\$26,138	11.2%	14.8%	12.2%
<b>Material</b>								
1	614	177,005	7.4%	62.5%	\$37,047	19.7%	14.9%	8.4%
2	635	177,280	11.6%	58.2%	\$28,556	11.3%	14.0%	10.1%
3	615	177,130	14.9%	55.4%	\$25,271	9.2%	14.2%	11.8%
4	664	177,450	19.0%	52.2%	\$22,313	8.9%	14.8%	13.8%
5 (deprived)	685	177,290	28.2%	45.5%	\$18,602	7.4%	15.8%	16.1%
<b>Social</b>								
1	764	177,400	14.0%	52.2%	\$27,638	3.4%	5.7%	5.3%
2	672	177,070	17.6%	54.0%	\$26,754	6.0%	11.0%	9.7%
3	645	177,720	17.8%	55.2%	\$25,325	8.9%	14.7%	12.9%
4	591	176,840	17.0%	55.5%	\$25,781	14.7%	19.7%	15.6%
5 (deprived)	541	177,125	16.6%	56.7%	\$24,612	27.3%	26.8%	20.2%
<b>Material &amp; Social</b>								
1 & 1	150	34,750	7.1%	59.5%	\$40,745	4.6%	5.5%	3.1%
5 & 5	120	34,130	29.2%	45.9%	\$18,194	18.0%	27.8%	28.2%

Source: 2006 Census of Canada

\*Crude rate of lone parent households

**Table 5c: Age-standardized values of deprivation index component variables for males in Winnipeg CMA by quintile of deprivation**

Deprivation quintile	DAs	Population	Material			Social		
			No high school certificate	Employed	Pretax personal income	Living alone	Separated, divorced, or widowed	Lone parent*
<b>Male</b>	1,160	265,320	20.8%	65.9%	\$37,019	12.2%	8.2%	3.4%
<b>Material</b>								
1	207	53,055	10.3%	75.2%	\$57,772	10.7%	8.8%	3.0%
2	223	52,885	14.9%	70.8%	\$41,724	9.5%	7.2%	3.3%
3	237	53,115	18.7%	67.9%	\$34,330	11.1%	7.6%	3.1%
4	237	53,150	24.3%	63.5%	\$31,075	11.9%	8.5%	3.2%
5 (deprived)	256	53,115	33.1%	54.4%	\$24,130	17.0%	9.0%	4.2%
<b>Social</b>								
1	240	53,190	19.6%	66.5%	\$43,647	3.2%	1.0%	0.2%
2	233	52,985	19.0%	67.2%	\$41,150	6.8%	4.0%	1.9%
3	235	53,240	21.9%	66.9%	\$35,432	10.4%	7.1%	3.3%
4	238	52,910	22.0%	65.0%	\$33,573	15.3%	11.1%	4.6%
5 (deprived)	214	52,995	21.6%	63.8%	\$30,661	26.7%	18.9%	7.3%
<b>Material &amp; Social</b>								
1 & 1	32	8,430	9.6%	74.5%	\$73,534	1.7%	0.7%	0.1%
5 & 5	48	10,905	33.7%	50.7%	\$18,757	29.1%	16.7%	9.7%

Source: 2006 Census of Canada

\*Crude rate of lone parent households

**Table 5d: Age-standardized values of deprivation index component variables for females in Winnipeg CMA by quintile of deprivation**

			Material			Social		
Deprivation quintile	DAs	Population	No high school certificate	Employed	Pretax personal income	Living alone	Separated, divorced, or widowed	Lone parent*
<b>Female</b>	1,155	286,010	20.5%	58.2%	\$25,186	12.6%	15.7%	15.9%
<b>Material</b>								
1	198	57,150	10.6%	66.8%	\$34,805	14.9%	14.8%	8.7%
2	220	57,195	15.2%	63.4%	\$27,331	11.9%	14.1%	10.2%
3	233	57,135	18.2%	59.9%	\$25,290	11.5%	14.6%	13.2%
4	251	57,115	22.9%	56.6%	\$22,491	11.2%	15.0%	15.5%
5 (deprived)	253	57,415	32.8%	47.1%	\$18,371	13.9%	19.4%	29.3%
<b>Social</b>								
1	267	57,405	16.8%	57.7%	\$25,249	2.4%	4.7%	7.5%
2	237	57,000	20.2%	59.2%	\$25,634	6.7%	11.3%	12.4%
3	236	57,470	22.3%	58.7%	\$25,836	11.2%	15.7%	17.6%
4	232	57,020	22.2%	57.7%	\$24,314	17.3%	21.7%	21.1%
5 (deprived)	183	57,115	22.0%	57.8%	\$24,782	31.0%	29.7%	23.9%
<b>Material &amp; Social</b>								
1 & 1	33	7,840	9.8%	65.9%	\$35,271	2.4%	3.3%	2.8%
5 & 5	43	12,395	36.4%	44.5%	\$19,111	28.4%	32.4%	39.5%

Source: 2006 Census of Canada

\*Crude rate of lone parent households

**Table 5e: Age-standardized values of deprivation index component variables for in Halifax CMA by quintile of deprivation**

Deprivation quintile	DAs	Population	Material			Social		
			No high school certificate	Employed	Pretax personal income	Living alone	Separated, divorced, or widowed	Lone parent*
<b>Male</b>	560	145,575	19.3%	63.3%	\$39,013	11.0%	7.7%	2.9%
<b>Material</b>								
1	108	28,850	7.9%	70.5%	\$57,017	13.4%	7.4%	1.2%
2	94	29,315	12.7%	67.4%	\$42,182	10.6%	6.0%	1.4%
3	114	29,100	17.1%	65.2%	\$38,452	9.4%	6.6%	2.1%
4	114	28,975	21.8%	61.6%	\$33,995	9.4%	7.7%	4.4%
<b>5 (deprived)</b>	130	29,335	33.2%	54.0%	\$26,657	12.3%	10.1%	4.9%
<b>Social</b>								
1	126	29,435	19.8%	62.1%	\$47,049	2.5%	1.4%	1.3%
2	110	28,920	19.9%	65.0%	\$41,570	5.3%	4.5%	2.5%
3	99	29,060	19.3%	64.9%	\$38,281	8.5%	6.7%	2.7%
4	116	29,185	18.5%	62.5%	\$36,144	13.8%	9.5%	3.7%
<b>5 (deprived)</b>	109	28,975	18.9%	62.1%	\$30,861	26.1%	17.2%	4.6%
<b>Material &amp; Social</b>								
1 & 1	23	5,340	8.8%	71.2%	\$83,721	1.6%	1.6%	0.5%
5 & 5	34	8,405	30.9%	53.8%	\$21,341	23.7%	18.7%	7.5%

Source: 2006 Census of Canada

\*Crude rate of lone parent households

**Table 5f: Age-standardized values of deprivation index component variables for females in Halifax CMA by quintile of deprivation**

Deprivation quintile	DAs	Population	Material			Social		
			No high school certificate	Employed	Pretax personal income	Living alone	Separated, divorced, or widowed	Lone parent*
<b>Female</b>	560	160,775	17.5%	55.8%	\$25,771	13.9%	15.8%	14.3%
<b>Material</b>								
1	104	32,120	7.3%	63.3%	\$33,955	20.3%	15.9%	9.3%
2	105	32,010	12.2%	59.4%	\$29,104	13.5%	14.5%	11.1%
3	113	32,275	15.8%	57.0%	\$25,489	11.4%	14.9%	12.9%
4	120	32,085	19.7%	54.0%	\$22,790	11.0%	14.6%	14.7%
<b>5 (deprived)</b>	118	32,285	30.8%	46.7%	\$18,895	14.0%	18.8%	22.6%
<b>Social</b>								
1	131	32,400	15.1%	52.8%	\$25,593	3.8%	6.3%	6.7%
2	110	32,160	15.6%	56.8%	\$26,858	7.2%	11.7%	10.2%
3	108	32,030	18.6%	56.8%	\$26,429	11.8%	15.8%	14.2%
4	102	32,260	18.3%	56.3%	\$25,784	18.9%	20.2%	18.2%
<b>5 (deprived)</b>	109	31,925	20.8%	56.9%	\$24,224	30.3%	27.1%	24.2%
<b>Material &amp; Social</b>								
1 & 1	10	2,435	6.8%	63.6%	\$37,271	3.3%	4.6%	5.4%
5 & 5	31	8,845	33.5%	47.3%	\$17,568	25.8%	28.1%	37.7%

Source: 2006 Census of Canada

\*Crude rate of lone parent households

## Summary

We successfully replicated the deprivation index developed by INSPQ and calculated sex-specific versions of this index from the 2006 Census of Canada for three CMAs – Vancouver, Winnipeg, and Halifax. Where it was possible to compare our results with those of the INSPQ, correlations with the results from Pampalon et al. at the DA-level were strong (23). When the data were disaggregated by sex, females in these three CMAs were more disadvantaged on the material and social measures than males. Despite this relative disadvantage, most variables in the INSPQ deprivation index showed similar associations with material and social deprivation regardless of sex.

The indicators intended to measure material deprivation – no high school certificate, employment, and personal income – displayed similar associations with this deprivation construct for males and females. A moderate association between personal income and social deprivation was observed for males but not for females. With respect to the indicators reflecting social deprivation, only the proportion of residents who were separated, divorced, or widowed was associated only with social deprivation in all CMAs and for both sexes; a moderate inverse association between living alone and material deprivation was observed for females in Vancouver. In Halifax and Winnipeg, rates of living alone showed a U-shaped association with material deprivation quintiles. This pattern suggests that areas with the highest proportion of women who live alone are located in both the most and the least affluent areas of these cities.

Our results confirmed and quantified the previously noted dual association of lone parent status with material and social deprivation in urban areas (23), and suggest that this dual association is largely accounted for by the experience of households headed by female lone parents. Lone parent status was strongly or moderately associated with both material and social deprivation for females in all three CMAs. Among males, however, lone parent status was strongly associated with social deprivation in Winnipeg, moderately associated with social deprivation in Vancouver, and moderately associated with material deprivation in Halifax.

These differing results may have several origins. In all three cities, the rate of lone parent households headed by a female is at least four times the rate of males who head lone parent households. Despite this difference in magnitude, the proportion of families headed by lone parents is similar across quintiles of social deprivation for both males and females. The association of single parenthood with material deprivation as well as social deprivation in the principal component analysis among females may be related to the financial hardships experienced by female lone parents. Data from the 2006 Census of Canada indicate that 32% of female-headed single parent families are considered low income<sup>16</sup> based on pretax dollars, compared to 16% of male-led lone parent families (269). The median pretax income for male-headed lone parent families was at least \$10,000 more than for female-headed families (Vancouver: \$48,561 vs. \$36,475, Winnipeg: \$43,821 vs. \$33,041, Halifax: \$42,843 vs. \$32,094). In Canada, among lone parent families with children under age 18, 66% of female-headed families are considered low income vs. 21.8% of male-headed families. Females also lead at least 80% of lone-

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<sup>16</sup> Based on LICO measurements.

parent families in these three CMAs (269). These poorer material circumstances of female lone parents may account for the dual association with social and material deprivation.

Given the results of these analyses and the financial differences between female- and male-headed lone parent families, the inclusion of a general indicator of lone parent status does not appear to quantify a solely social aspect of deprivation.

As we saw in Part III, it is possible that living alone indicates financial security for some women. The opportunities presented by a stronger financial situation may also account for the association between income and social deprivation among males and between income and living alone among females in Vancouver. That is, a higher income allows for more possible options. In a city with a high cost of living such as Vancouver, females who live alone may do so because their means permit them to; thus living alone may not indicate social deprivation for all segments of the population. A higher income may also allow males more social opportunities, or income could be correlated with other variables thought to reflect social deprivation in this model.

The reasons for these different associations between select indicators of social and material deprivation – income, living alone, and lone parents – across sexes cannot be completely discovered using an ecological model. However, these sex-specific results suggest that the age- and sex-standardization carried out as part of the calculation of this deprivation index may not be sufficient to account for the different lived experiences of males and females that contribute to their health status. Auger et al., for instance, found that the material component of this deprivation index differs for males and for females when correlated with life expectancy in Montreal, and in particular over the life course. Men showed shorter life expectancies for a number of age categories, but the gap between women and men diminished with age (270). These results suggest that the current structure of the deprivation index is not equally applicable to men and women, and that future refinements of the INSPQ deprivation index should explore additional or alternate variables that will reflect differences in deprivation for all segments of the population.

## **Limitations**

Despite requesting the same indicators from Statistics Canada, our results did vary slightly from those generated by Pampalon et al. We had fewer DAs with missing or incomplete data than the researchers at INSPQ. We requested data in smaller age categories than were used by Pampalon et al. (23), and this may account for some of the variation in results. As the primary purpose of this analysis was exploratory, we only requested the data elements included in the current deprivation index and therefore are unable to propose indicator(s) that may lead to a more robust measure of deprivation for the entire population.

## **Part V**

### **Discussion and Conclusions: Keeping Sex and Gender in Careful Measures**

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#### **Careful Measures and Deprivation**

Our sex- and gender-based analysis of the INSPQ deprivation index illustrates the complexities of understanding conceptually what disadvantage is at a population level, how that relates to individual women and men, and some of the limitations of current measurements.

In reviewing the theory behind deprivation, we found that it is closely related to other constructs of disadvantage. Poverty is often equated solely with low income but the social determinants of health perspective encourages a broader inclusion of factors that contribute to disadvantage and thus poor health. The concept of relative deprivation delves deeper and is based on three richer concepts: 1) that disadvantage is not purely about goods and material assets, but includes also a social component; 2) that individuals and sub-populations can experience more than one aspect of disadvantage at a time; and 3) that disadvantage restricts the ability for individuals to engage with wider society and thus creates marginalization that is broader and deeper than might be only described as “lack of education” or “being unemployed”. It is in the third point that deprivation is allied with the marginalization that social and economic inclusion and exclusion and capability theories endeavour to address through policy change and individual agency.

The INSPQ deprivation index is structured to incorporate the three points mentioned above, including as it does indicators that address several material and social aspects of disadvantage, in keeping with the concept described by Townsend (24). The value of this deprivation index is that it uses Census dissemination areas in the small area analysis. While this does not entirely reduce the risk of ecological fallacy – in which assuming that characteristics of a group or area represent the individuals within affects the measurements of health outcomes – the resulting deprivation scores are more accurate than they would be using a larger area.

Deprivation indices summarize information from a number of indicators, providing complex information in a compact form. Importantly, they summarize demographic information which would be missing from health studies that use only administrative data.

Income, education and employment are straightforward choices for the material component indicators of the index. They have each been demonstrated to be strongly linked to health, although Lynch et al. (271) (among others) point out the conundrum of “which came first” – disadvantage or poor health – is not easily answered, and cannot be captured in this type of analysis of cross-sectional data. Furthermore, we have a concern that they are not independent variables, with income being nested within both employment and education, and education also nested within employment.

The indicators for the social component are somewhat more troublesome. Living alone, as we have seen in Part III can be both beneficial and detrimental to health. For young women and men, living alone confers a desirable status since one must have a secure income to maintain a home without a spouse or roommates. Living alone may also be an achievement if the alternative has been to stay in an abusive relationship. For older women, living alone might be linked to low income, if they have not been able to accrue sufficient savings and pension from past employment income. Being separated, widowed or divorced likewise has both benefits and drawbacks. Women who have left an unhappy or abusive home or relationship will likely be happier with a dissolved marriage than some widows. Men’s health, however, generally declines after a relationship dissolves.

We found that the lone parent indicator is more highly related to the material deprivation component than the social component in Winnipeg and Halifax, a result Chateau (272) also found, although Chateau did not use the “Other CMA” values Pampalon et al. created for the national version of the index (23). Nevertheless, we saw in our analysis in Part IV that lone parenthood loads unevenly for males and for females in all the cities. Chateau replaced “lone parent” with “moving” for Winnipeg, to create a version of the deprivation index with the material and social components more distinctly separated, an adaptation that worked well for the city of Winnipeg (272).

As is the case anywhere, choosing indicators to include in an index is restricted by the data available. According to Pampalon et al., the six indicators in the INSPQ index were appropriate for their use because of their universality across Canada, and because they captured the “essence” of deprivation. However, even at the CIHI

workshop for *Reducing the Gaps in Health: A Focus on Socio-economic Status in Urban Canada* (27) (held in September, 2009 and attended by two of the authors of this research), participants brought up other health-related factors that they thought were at least as important as the six indicators used, such as core housing need and proximity to industrial contaminants. Our team, likewise, wondered about other possible indicators to use. Housing, in our experience, is critical to health status. Looking for, or paying for better housing can pre-occupy people's lives, at the expense of other life conditions such as eating well (let alone recreation or exercise) (273,274). In Winnipeg, for instance, the housing shortage is so critical that it would worthwhile to see if there are sex differences in an index that includes core housing need. Core housing need is available through Census data and testing housing need in the index would be an area for new research if it can be included at the DA level. A caution for any new research in this direction is to consider, as Townsend originally commented, that unsuitable housing has social implications as well as suggesting material disadvantage (24).

In Part I we noted that Townsend and his colleagues surveyed English community members about the assets that were most important to them to maintain dignity and feel less deprived (24), a method emulated by others, including researchers in Ontario twenty-five years later. In neither case did they publish the data by sex, if it were collected that way, nor did they do a gendered analysis. An inquiry or at least a re-analysis of the information by sex might produce some surprising differences. Gendered perceptions of deprivation may differ between males and females as well as among males and females, because of the differing circumstances males and females face.

Nevertheless, there remains a gap between individual women's and men's perspectives on what it feels like to be deprived, and what can be measured at the population-level. As is often the case we must balance a tension between "horizontal" comparisons between situations and cases that resemble each other and "vertical" context between the individual and populations. In both cases, one is hampered by the data that are available, developed and collected according to criteria and assumptions that one did not generate, that do not really get at either the material or the social aspects of deprivation that men and women say are important to them. Pampalon et al. have done some explorations of these differences in a comparison of individual and area-based scores using their deprivation index (48), but it requires a large survey, such as the 2009 project in Ontario conducted by Daily Bread Foodbank, to record men's and women's opinions about what deprivation means to them (13,275). Although expensive to

conduct, similar surveys can provide occasional checks that population measures of deprivation are developed to reflect local experience.

## Deprivation and Health

The intent of deprivation indices is to be linked in some way to health data to both document where there are disparities, and to effect policy and programming that can reduce health disparities. The CIHI report, *Reducing Gaps in Health* (27) provides this kind of important analysis for 15 Canadian cities using the INSPQ index, looking at a variety of health indicators. There are a number of new research opportunities to examine including testing the index with one or two different indicators such as core housing need and recently moving as noted, as well as linking the dissemination areas and their deprivation scores to administrative health data in Canadian cities, as has been done in Quebec (21), for men and for women separately. It is possible that there could be different configurations of the index depending on the city. Either way, applying a deprivation index to health outcomes and then interventions pushes researchers, analysts and planners to articulate what creates deprivation in a community, and critically examine how deprivation is experienced differently for males and for females.

In the interim, planners, policymakers, and researchers should be mindful of how deprivation has been operationalized in this index, the ways these concepts are related to social and material deprivation for men and women, and the ways in which these forms of deprivation are interrelated for men and women. The decision to characterize an area as deprived without assessing both the indicators of social and material deprivation may limit the usefulness of these data. For example, useful interventions to improve the health of women in the most socially deprived areas will differ based on the material assets present in those communities. Women in socially deprived neighbourhoods could be materially advantaged and living alone, or they could be single mothers or widowed seniors with considerably fewer material resources.

Besides individual experiences, the concept of relative deprivation is a reminder that disadvantage is experienced in terms of what “others” have. Flora Matheson has initiated a few studies in which she examined the relationship between neighbourhood deprivation and gender. Matheson et al. suggest that there are “grounds to believe that neighbourhood stressors may be more detrimental for women’s health” than for men because of women’s larger social networks (230). Three studies by Matheson, focusing on depression, body mass index (BMI) and

hypertension, use lone parent families as one of six measures of material deprivation<sup>17</sup>. In these studies, Matheson et al. found that women are at greater risk of depression than men but that neighbourhood chronic stress was not associated with gender differences in depression. Their second study showed that neighbourhoods with higher material deprivation were associated with higher BMI for women but not for men. Whilst women living in deprived areas had higher BMI than women in affluent neighbourhoods, the reverse was true for men (276). The third study showed that neighbourhood deprivation was associated with an increased risk of reporting hypertension, and that women living in deprived areas were more likely to report hypertension than men in deprived areas and women in less deprived areas (277).

These studies illustrate what Wilkinson and Pickett (278) have been documenting for a number of years: that is, that the greater the inequality of any one of several indicators – income, education, employment, among others – across a society, the greater the deprivation individuals feel and the greater health disparities that are manifested. In their opinion, comprehensive policy options are needed to reduce inequities of opportunity and assets in order to reduce disparities in health.

## **Gender, Deprivation and Health**

Our exploration of a Canadian deprivation index uncovered some interesting patterns for women and men, some based on sex differences in the statistical analyses of the Census indicators in three cities, some based on gender influences and implications of the indicators selected for inclusion.

As noted in Part IV, the reasons for these different associations with select indicators of social and material deprivation – income, living alone, and lone parents, for example – across sexes cannot be completely discovered using an ecological model. As noted earlier, Auger et al. found that the material component of this deprivation index differs for males and for females when correlated with life expectancy in Montreal, and in particular over the life course. Men showed shorter life expectancies for a number of age categories, but the gap between women and men diminished with age (270). These results suggest that the current structure of the deprivation index is not equally applicable to men and women, nor to women and men of all ages. Future refinements of the INSPQ deprivation index should

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<sup>17</sup> Note that Matheson is using single parenthood in this case as a measure of *material* deprivation. See the discussion above.

explore additional or alternate variables that will clearly reflect differences in deprivation for women and men and should be analyzed by age and other stratifiers.

Investigating other published literature demonstrated that, indeed, women's and men's experiences of income; education; employment; living alone; separation, divorce or widowhood; and lone parenting are diverse. There are well-documented sex and gender differences, including the persistent gender wage gap among employed women and men, the greater likelihood that women will live with low income, and the greater number of social relationships that many women enjoy, compared to men. In several cases, such differences have been found to be associated with health status (65,67,219,231). Not all women experience the same influences, and nor do all men. As we have seen in Part III there is diversity of experience among women and among men, information that can emerge from other research methods, to complement and enrich quantitative data analyses.

Thus, as Margaret Denton wrote, "There are very real differences in the factors that predict women's and men's health... (that) affirm the importance of looking more closely at gender differences in the determinants of health" (279). Nancy Moss expanded on this requirement by pointing out, "Research is costly, but so is the failure to understand" (136). Moss (136) and others (e.g. Krieger et al. and Murthy (127,280) point to the need for multi-level frameworks and methods to enrich our knowledge of the interactions of determinants of health, drawing in information at meso and macro levels, as well as personal and individual level data. Further explorations of sex and gender differences in health outcomes associated with the INSPQ deprivation index—or some variation of it—and the complexity of reasons for those differences are warranted.

The call to persevere with sex- and gender-based analysis is still needed. If the goal of population health planning is to reduce health disparities by reducing the inequities that create disparity, then it is critical to understand where and how the inequities originate. As Lesley Doyal wrote in 2000, "This requires careful identification of the similarities and differences in the health needs of men and women. It also necessitates an analysis of the gendered obstacles that currently prevent men and women from realising their potential for health" (40). Eleven years later, the requirement persists. As Read and Gorman point out, individual-level research and analysis on gender differences must be "situated within broader social, cultural and political contexts that also condition (individual) health status... The neighborhoods that people occupy can have direct as well as indirect effects on health status... although there is no reason to assume that these effects

are similar across health outcomes or population groups” (281). Multi-level, multi-method and longitudinal research on gender influences and outcomes can provide that essential context (50,281).

In this research we have confirmed, as we have in the past, that robust sex- and gender-based analyses are essential to understanding populations under consideration, the issues that affect them, available evidence and the implications and influences of policy decisions (50). Redressing health disparities in work such as the development and application of an area-level deprivation index requires the time and effort of sex- and gender-based analysis.

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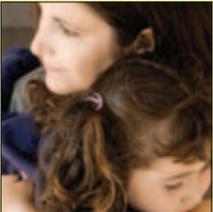
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**Deprivation indices – measures of social and material disadvantage –**

are receiving increased attention in a number of countries for their potential value in answering questions about what constitutes disadvantage, how much disparity affects health, and how particular measures (or indicators) can be used to inform health policy. These composite indices have been found to be stronger measures of disadvantage than any single measure of either social or material deprivation.



**Deprivation indices are rarely analyzed for sex and gender considerations,**

despite the wealth of evidence demonstrating that sex and gender are both important influences on disadvantage and health equity.



**We explore the opportunities and limitations of one deprivation index**

for representing the different experiences of men and women in three Canadian cities: Vancouver, Winnipeg and Halifax. We discuss how the findings from our investigation can inform future use of the deprivation index for health planning as well as for future research on sex, gender, deprivation and health.

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